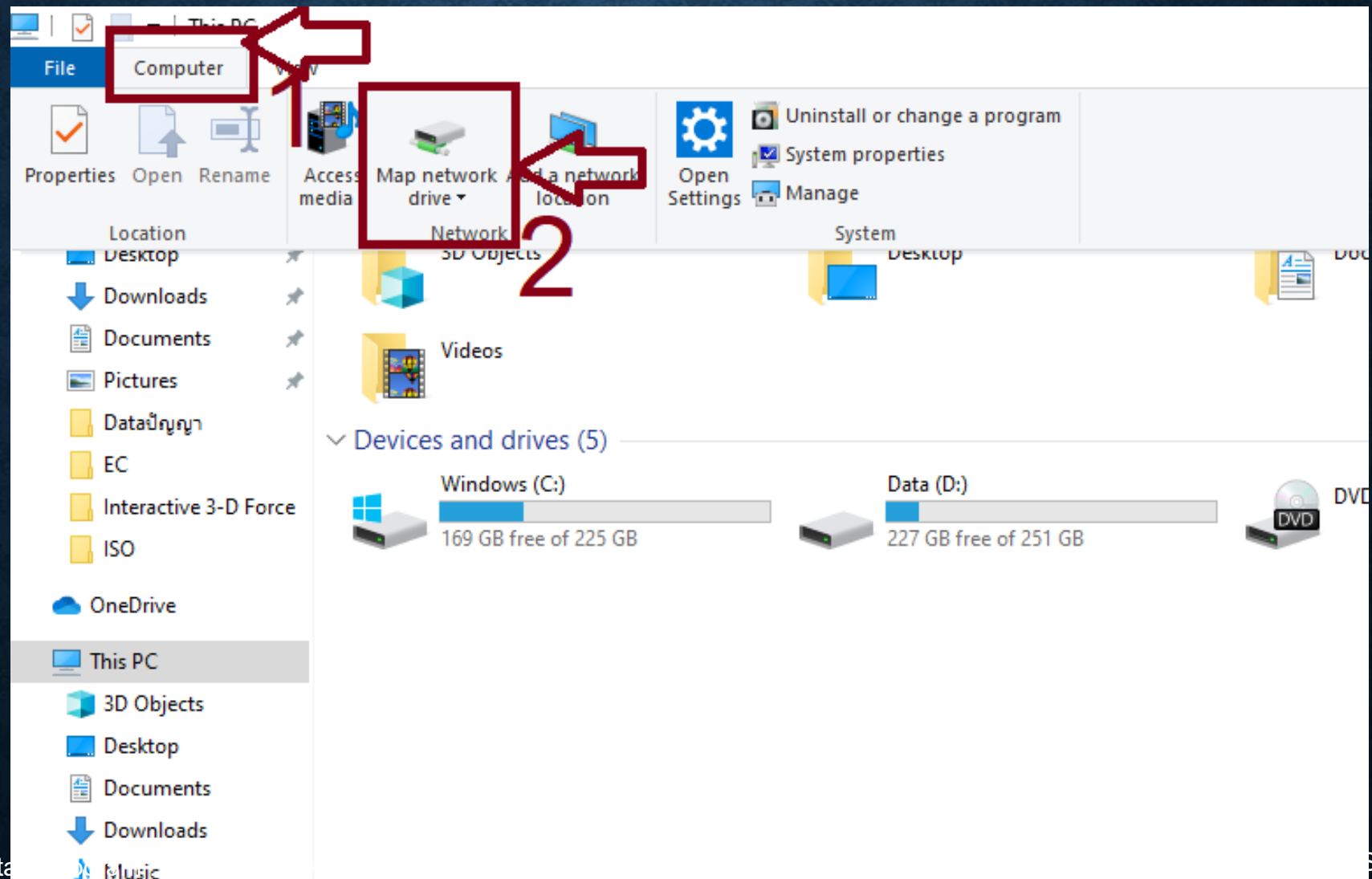
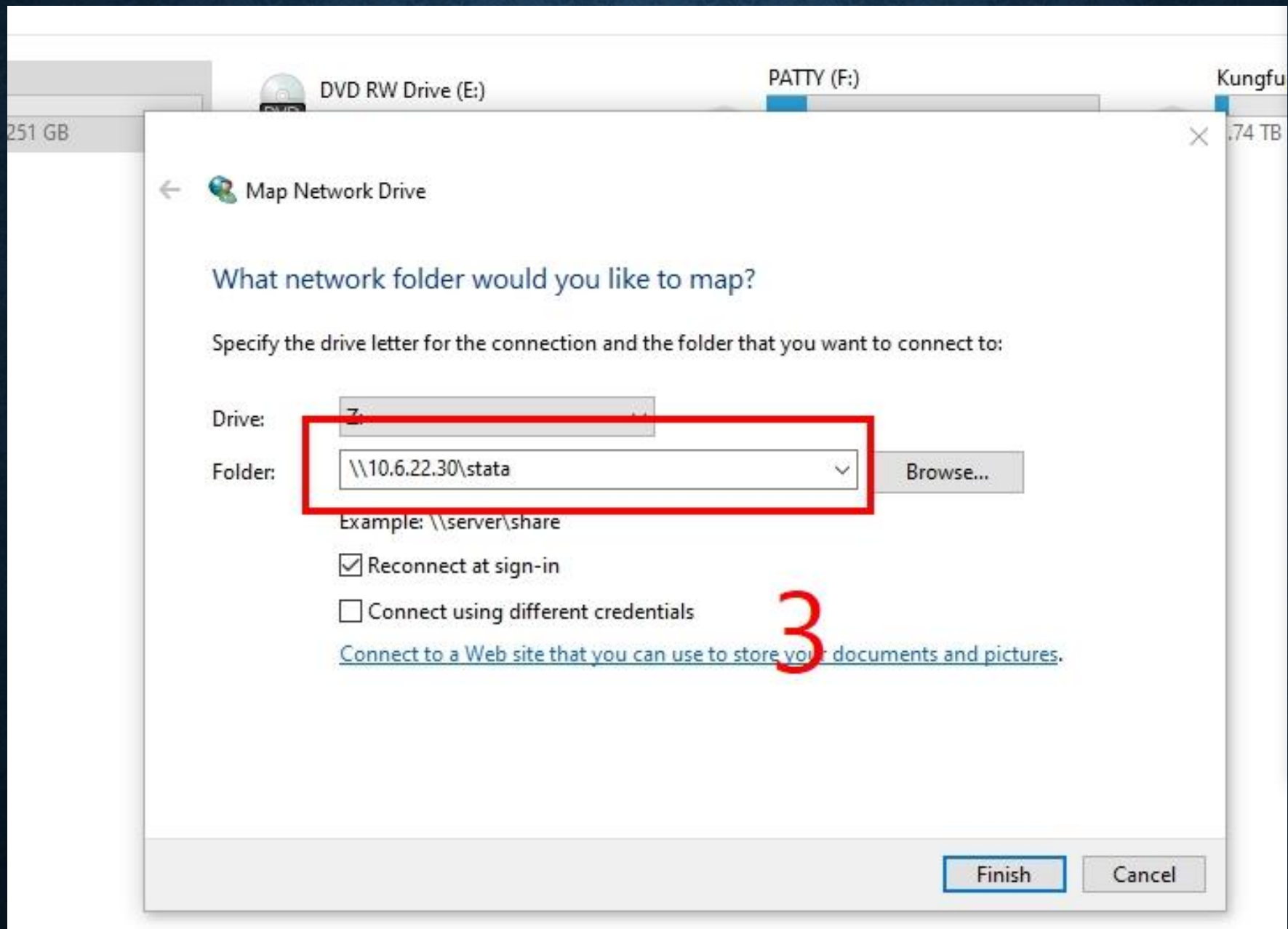


# STATISTICAL ANALYSIS ON STATA PROGRAM

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Department of Surgery, Faculty of Medicine,  
Ramathibodi Hospital, Mahidol University

# วิธีเข้าโปรแกรม STATA ผ่านระบบ RAN







ome   Share   View   Drive Tools

↑   This PC > stata (\\10.6.22.30) (Z:)

Name	Date modified	Type	Size
key ก่อนใช้	15/6/2559 9:56	Text Document	1 KB
plus	4/10/2559 9:17	Shortcut	1 KB
R-3.0.2-win	27/1/2557 16:16	Application	52,693 KB
RStudio-0.98.497	29/1/2557 16:08	Application	36,203 KB
StataSE	26/5/2559 8:32	Shortcut	2 KB
STATCALC	5/7/2553 8:01	Application	181 KB
วิธีใช้ STATA on Severe (Update 23 June 20...	23/6/2558 9:24	Adobe Acrobat D...	113 KB

4

# **BASIC FUNCTIONS AND COMMANDS IN STATA**

Stata/SE 16.0 - G:\My Drive\Job\Staff Surg\Paramin\Omental\Omental dataset.dta

File Edit Data Graphics Statistics User Window Help

History

Filter commands here

#

Command

1 use "G:\My Drive\...

Statistics/Data Analysis

Special Edition

15-user Stata network perpetual license:  
Serial number: 401606221048  
Licensed to: SCEB Ramathibodi Hospital  
SCEB Ramathibodi Hospital

Notes:  
1. Unicode is supported; see help unicode\_advice.  
2. Maximum number of variables is set to 5000; see help set\_maxvar.

. use "G:\My Drive\Job\Staff Surg\Paramin\Omental\Omental dataset.dta"

.

Command

16.0

Copyright 1985-2019 StataCorp LLC  
StataCorp  
4905 Lakeway Drive  
College Station, Texas 77845 USA  
800-STATA-PC http://www.stata.com  
979-696-4600 stata@stata.com  
979-696-4601 (fax)

2. Results

Variables

Filter variables here

Name	Label
HN	HN
ID	ID
Gender	Gender
Age	Age
Clinical	Clinical
Clinical_others	Clinical_c
Patho	Patho
Patho_others	Patho_ot
Staging_T	Staging_
Staging_N	Staging_I
Size	Size

4. Variables

Properties

Variables

Name	
Label	
Type	
Format	
Value label	
Notes	
Data	

5. Properties

Frame	default
Filename	Omental dataset
Label	
Notes	
Variables	59
Observations	68
Size	13.61K
Memory	64M
Sorted by	

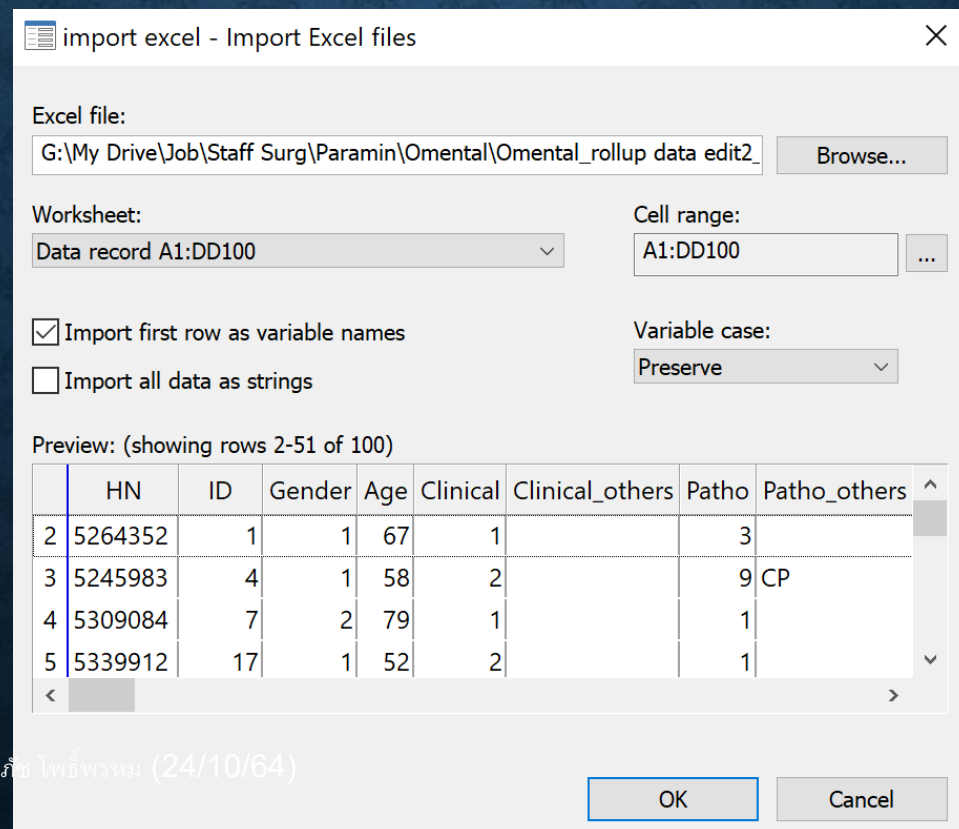
3. History

1. Command



# IMPORTING DATA FROM EXCEL

- Menu > File > Import
- Select “Import first row as variable names”
- A range of Excel cells to import can also be specified



import excel - Import Excel files

Excel file:  
G:\My Drive\Job\Staff Surg\Paramin\Omental\Omental\_rollup data edit2 Browse...

Worksheet:  
Data record A1:DD100

Cell range:  
A1:DD100 ...

☒ Import first row as variable names  
☐ Import all data as strings


Variable case:  
Preserve

Preview: (showing rows 2-51 of 100)

	HN	ID	Gender	Age	Clinical	Clinical_others	Patho	Patho_others
2	5264352	1	1	67	1		3	
3	5245983	4	1	58	2		9	CP
4	5309084	7	2	79	1		1	
5	5339912	17	1	52	2		1	

OK Cancel

# GENERAL STRUCTURE

- `bysort Gender: sum Age if Operation==1, detail`  


**Prefix**      **Command Variables**      **Data condition**      **Option**

## Example

- `list id age education if school==1 in 1/5, nolabel`



# STATA'S .DO FILE

- Do-file: a file containing list of Stata commands
- Useful when you are doing large projects that may require repeated analysis

Starting a new empty do-file:

- Window > Do-file Editor > New Do-file Editor (or through the “Do-file” icon)

Stata/SE 16.0 - G:\My Drive\Job\Staff Surg\Paramin\Omental\Omental dataset.dta

FileEditDataGraphicsStatisticsUserWindowHelp

History

Filter commands here

1

use "G:\My Drive\...

2

bysort sum: Age if...

3

codebook Operati...

4

bysort Gender: su...

Operation

unique values

tabulation

. bysort Gender: sum A

-> Gender = male

Percentiles

1%43

CommandCtrl+1

ResultsCtrl+2

HistoryCtrl+3

VariablesCtrl+4

Properties

Graph

Viewer

Data Editor

Do-file Editor

Variables

Do-file Editor - Untitled.do

FileEditViewLanguageProjectTools

Untitled.do

1

Statistical Analysis on stata program : อ.ดร.ณภัฏ



นครราชสีมา

### Variables

Filter variables here

<input checked="" type="checkbox"/>	Name	Label
<input checked="" type="checkbox"/>	dcoll	Date of collection @
<input checked="" type="checkbox"/>	namecoll	Name of collector @
<input checked="" type="checkbox"/>	site	Site of Study @
<input checked="" type="checkbox"/>	diagsc	Diagnosed as uncompli...
<input checked="" type="checkbox"/>	agesc	Age more than 18 and l...
<input checked="" type="checkbox"/>	pregsc	Non pregnancy. @
<input checked="" type="checkbox"/>	thaisc	Understanding Thai lan...
<input checked="" type="checkbox"/>	immuncsc	Did not receive immun...
<input checked="" type="checkbox"/>	autosc	Non-autoimmune disea...
<input checked="" type="checkbox"/>	renalsc	Non history of end stag...
<input checked="" type="checkbox"/>	severesc	Non severe underlying ...
<input checked="" type="checkbox"/>	id	Participants ID @

< [ ] >

Variables | Snapshots

---

### Properties

- Variables**

Name	prov
Label	Province @
Type	str51
Format	%51s
Value label	
▶ Notes	
- Data**

Frame	default
▶ Filename	data overall.dta
Label	form 1
▶ Notes	
Variables	487
Observations	904
Size	5.96M
Memory	64M
Sorted by	id

### Variables

Filter variables here

<input checked="" type="checkbox"/>	Name	Label	Type
<input checked="" type="checkbox"/>	dcoll	Date of collection @	date
<input checked="" type="checkbox"/>	namecoll	Name of collector @	string
<input checked="" type="checkbox"/>	site	Site of Study @	boolean
<input checked="" type="checkbox"/>	diagsc	Diagnosed as uncompli...	boolean
<input checked="" type="checkbox"/>	agesc	Age more than 18 and l...	boolean
<input checked="" type="checkbox"/>	pregsc	Non pregnancy. @	boolean
<input checked="" type="checkbox"/>	thaisc	Understanding Thai lan...	boolean
<input checked="" type="checkbox"/>	immuncsc	Did not receive immun...	boolean
<input checked="" type="checkbox"/>	autosc	Non-autoimmune disea...	boolean
<input checked="" type="checkbox"/>	renalsc	Non history of end stag...	boolean
<input checked="" type="checkbox"/>	severesc	Non severe underlying ...	boolean
<input checked="" type="checkbox"/>	id	Participants ID @	integer

< [ ] >

Variables | Snapshots

---

### Properties

- Variables**

Name	prov
Label	Province @
Type	str51
Format	%51s
Value label	
▶ Notes	
- Data**

Frame	default
▶ Filename	data overall.dta
Label	form 1
▶ Notes	
Variables	487
Observations	904
Size	5.96M
Memory	64M
Sorted by	id

**Variables**

filter variables here

Name	Label	Type
coll	Date of collection @	date
mecoll	Name of collector @	string
e	Site of Study @	boolean
ngsc	Diagnosed as uncompl...	boolean
esc	Age more than 18 and l...	boolean
egsc	Non pregnancy. @	boolean
aisc	Understanding Thai lan...	boolean
munsc	Did not receive immun...	boolean
tosc	Non-autoimmune disea...	boolean
nalsc	Non history of end stag...	boolean
veresc	Non severe underlying ...	boolean
	Participants ID @	integer

**Snapshots**

**Properties**

Variable	Value
me	prov
el	Province @
oe	str51
mat	%51s
ue label	
tes	

**Data**

Variable	Value
me	default
ename	data overall.dta
el	form 1
tes	
iables	487
servations	904

Sorted by	Id
	กรุณา
	กรุณา
	แพตเตอรี่

Sorted by	Id
	กรุณา
	กรุณา
	แพตเตอรี่

Size	5.96M
Memory	64M
Sorted by	id



```
. tab gender
```

2. Gender @	Freq.	Percent	Cum.
1. Male	356	39.38	39.38
2. Female	548	60.62	100.00
Total	904	100.00	

```
. codebook nausea
```

```
nausea 1. Nausea @
```

```
type: numeric (byte)
label: LABEL_ADMIS
```

```
range: [1,2] units: 1
unique values: 2 missing .: 0/904
```

```
tabulation: Freq. Numeric Label
              388      1  1. yes
              516      2  2. no
```

# **ANALYSIS OF CATEGORICAL DATA**

Data Editor (Edit) - [dataset APP 14-10-21]											
File Edit View Data Tools											
Index100[1]											
100											
	abtright	nausea	vomit	anorex	fever	urine	feval	dm	ht	otdisease	allergy
1	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
2	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
3	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
4	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
5	24	1. yes	1. yes	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
6	24	1. yes	1. yes	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
7	24	1. yes	1. yes	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
8	24	1. yes	1. yes	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
9	5	1. yes	1. yes	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
10	5	1. yes	1. yes	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
11	5	1. yes	1. yes	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
12	5	1. yes	1. yes	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
13	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
14	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
15	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
16	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
17	12	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
18	12	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
19	12	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
20	12	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
21	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	1. yes
22	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	1. yes
23	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	1. yes
24	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	1. yes
25	24	1. yes	1. yes	2. no	1. yes	1. normal	1. normal	2. no	2. no	1. yes	2. no
26	24	1. yes	1. yes	2. no	1. yes	1. normal	1. normal	2. no	2. no	1. yes	2. no
27	24	1. yes	1. yes	2. no	1. yes	1. normal	1. normal	2. no	2. no	1. yes	2. no
28	24	1. yes	1. yes	2. no	1. yes	1. normal	1. normal	2. no	2. no	1. yes	2. no
29	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
30	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
31	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
32	24	2. no	2. no	2. no	2. no	1. normal	1. normal	2. no	2. no	2. no	2. no
33	8	2. no	2. no	2. no	1. yes	1. normal	1. normal	2. no	2. no	2. no	2. no
34	8	2. no	2. no	2. no	1. yes	1. normal	1. normal	2. no	2. no	2. no	2. no
35	8	2. no	2. no	2. no	1. yes	1. normal	1. normal	2. no	2. no	2. no	2. no
36	6	2. no	2. no	2. no	1. yes	1. normal	1. normal	2. no	2. no	2. no	2. no
37	9	1. yes	1. yes	2. no	1. yes	1. normal	1. normal	2. no	2. no	2. no	2. no



# ข้อตกลงเบื้องต้นในการใช้ **CHI-SQUARE TEST**

- ประชากร 2 กลุ่มหรือมากกว่า และเป็นอิสระต่อกัน
- ข้อมูลเป็น **categorical data**
- ค่าคาดหวัง (**expected frequency**) น้อยกว่า 5 ไม่เกิน 20% ของจำนวน **cell** ทั้งหมด

\*\*\*\*\*ถ้าไม่เป็นไปตามข้อตกลงนี้ให้ใช้ **Fisher's exact test**\*\*\*\*\*

# CHI-SQUARE TEST

In assessing association between types of intervention and recurrence of appendicitis.

*H0: Incidence of recurrence of appendicitis between those who received each intervention is not different.*

*Ha: Incidence of recurrence of appendicitis between those who received each intervention is different.*



# STATA COMMAND

- `tab intervention recurrence, col chi2 exact expect`

intervention	recurrence		Total
	0. no	1. yes	
Open	552	0	552
	536.7	15.3	552.0
	62.80	0.00	61.06
Laparoscopic	32	0	32
	31.1	0.9	32.0
	3.64	0.00	3.54
Betalactamase	67	5	72
	70.0	2.0	72.0
	7.62	20.00	7.96
Quinolone	46	6	52
	50.6	1.4	52.0
	5.23	24.00	5.75
Cef_Metro	182	14	196
	190.6	5.4	196.0
	20.71	56.00	21.68
Total	879	25	904
	879.0	25.0	904.0



# CONCLUSIONS

- The p value is  $<0.001$  which is less than the level of significance (0.05).
- We can reject the null hypothesis and conclude that types of intervention is associated with recurrence of appendicitis.
- In other words, the incidence of recurrence of appendicitis among those interventions are different.

# ANALYSIS OF CONTINUOUS DATA





Index100[1]

100

	urine	feval	dm	ht	otdisease	allergy	bodytemp	pr	sbp	dbp	rr	pale	icteric	inspec	
1	1. normal	1. normal	2. no	2. no	2. no	2. no	37.2	97	144	72	20	2. no	2. no	1. normal	
2	1. normal	1. normal	2. no	2. no	2. no	2. no	37.2	97	144	72	20	2. no	2. no	1. normal	
3	1. normal	1. normal	2. no	2. no	2. no	2. no	37.2	97	144	72	20	2. no	2. no	1. normal	
4	1. normal	1. normal	2. no	2. no	2. no	2. no	37.2	97	144	72	20	2. no	2. no	1. normal	
5	1. normal	1. normal	2. no	2. no	2. no	2. no	36.3	88	104	67	20	2. no	2. no	1. normal	
6	1. normal	1. normal	2. no	2. no	2. no	2. no	36.3	88	104	67	20	2. no	2. no	1. normal	
7	1. normal	1. normal	2. no	2. no	2. no	2. no	36.3	88	104	67	20	2. no	2. no	1. normal	
8	1. normal	1. normal	2. no	2. no	2. no	2. no	36.3	88	104	67	20	2. no	2. no	1. normal	
9	1. normal	1. normal	2. no	2. no	2. no	2. no	37.5	96	102	60	20	2. no	2. no	1. normal	
10	1. normal	1. normal	2. no	2. no	2. no	2. no	37.5	96	102	60	20	2. no	2. no	1. normal	
11	1. normal	1. normal	2. no	2. no	2. no	2. no	37.5	96	102	60	20	2. no	2. no	1. normal	
12	1. normal	1. normal	2. no	2. no	2. no	2. no	37.5	96	102	60	20	2. no	2. no	1. normal	
13	1. normal	1. normal	2. no	2. no	2. no	2. no	37.4	76	128	80	20	2. no	2. no	1. normal	
14	1. normal	1. normal	2. no	2. no	2. no	2. no	37.4	76	128	80	20	2. no	2. no	1. normal	
15	1. normal	1. normal	2. no	2. no	2. no	2. no	37.4	76	128	80	20	2. no	2. no	1. normal	
16	1. normal	1. normal	2. no	2. no	2. no	2. no	37.4	76	128	80	20	2. no	2. no	1. normal	
17	1. normal	1. normal	2. no	2. no	2. no	2. no	37.7	82	133	76	20	2. no	2. no	1. normal	
18	1. normal	1. normal	2. no	2. no	2. no	2. no	37.7	82	133	76	20	2. no	2. no	1. normal	
19	1. normal	1. normal	2. no	2. no	2. no	2. no	37.7	82	133	76	20	2. no	2. no	1. normal	
20	1. normal	1. normal	2. no	2. no	2. no	2. no	37.7	82	133	76	20	2. no	2. no	1. normal	
21	1. normal	1. normal	2. no	2. no	2. no	1. yes	37.0	80	130	70	20	2. no	2. no	1. normal	
22	1. normal	1. normal	2. no	2. no	2. no	1. yes	37.0	80	130	70	20	2. no	2. no	1. normal	
23	1. normal	1. normal	2. no	2. no	2. no	1. yes	37.0	80	130	70	20	2. no	2. no	1. normal	
24	1. normal	1. normal	2. no	2. no	2. no	1. yes	37.0	80	130	70	20	2. no	2. no	1. normal	
25	1. normal	1. normal	2. no	2. no	1. yes	2. no	38.1	92	125	63	20	2. no	2. no	1. normal	
26	1. normal	1. normal	2. no	2. no	1. yes	2. no	38.1	92	125	63	20	2. no	2. no	1. normal	
27	1. normal	1. normal	2. no	2. no	1. yes	2. no	38.1	92	125	63	20	2. no	2. no	1. normal	
28	1. normal	1. normal	2. no	2. no	1. yes	2. no	38.1	92	125	63	20	2. no	2. no	1. normal	
29	1. normal	1. normal	2. no	2. no	2. no	2. no	38.6	125	122	71	20	2. no	2. no	1. normal	
30	1. normal	1. normal	2. no	2. no	2. no	2. no	38.6	125	122	71	20	2. no	2. no	1. normal	
31	1. normal	1. normal	2. no	2. no	2. no	2. no	38.6	125	122	71	20	2. no	2. no	1. normal	
32	1. normal	1. normal	2. no	2. no	2. no	2. no	38.6	125	122	71	20	2. no	2. no	1. normal	
33	1. normal	1. normal	2. no	2. no	2. no	2. no	38.0	106	93	51	24	2. no	2. no	1. normal	
34	1. normal	1. normal	2. no	2. no	2. no	2. no	38.0	106	93	51	24	2. no	2. no	1. normal	
35	1. normal	1. normal	2. no	2. no	2. no	2. no	38.0	106	93	51	24	2. no	2. no	1. normal	
36	1. normal	1. normal	2. no	2. no	2. no	2. no	38.0	106	93	51	24	2. no	2. no	1. normal	
37	1. normal	1. normal	2. no	2. no	2. no	2. no	37.3	57	148	87	20	2. no	2. no	1. normal	

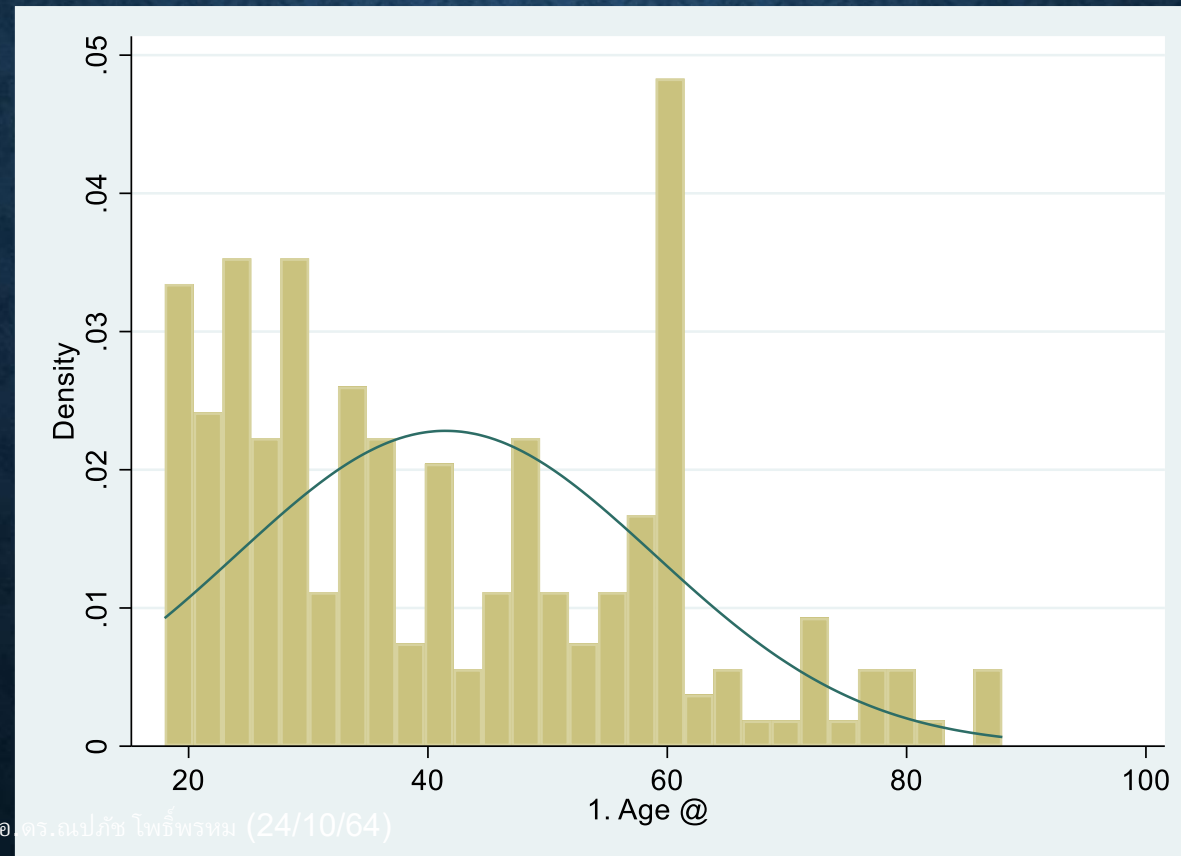


# CHECKING FOR NORMAL DISTRIBUTION

- Construct the histogram
- Construct the normal probability plot
- Compare mean and median
- Compare mean and standard deviation

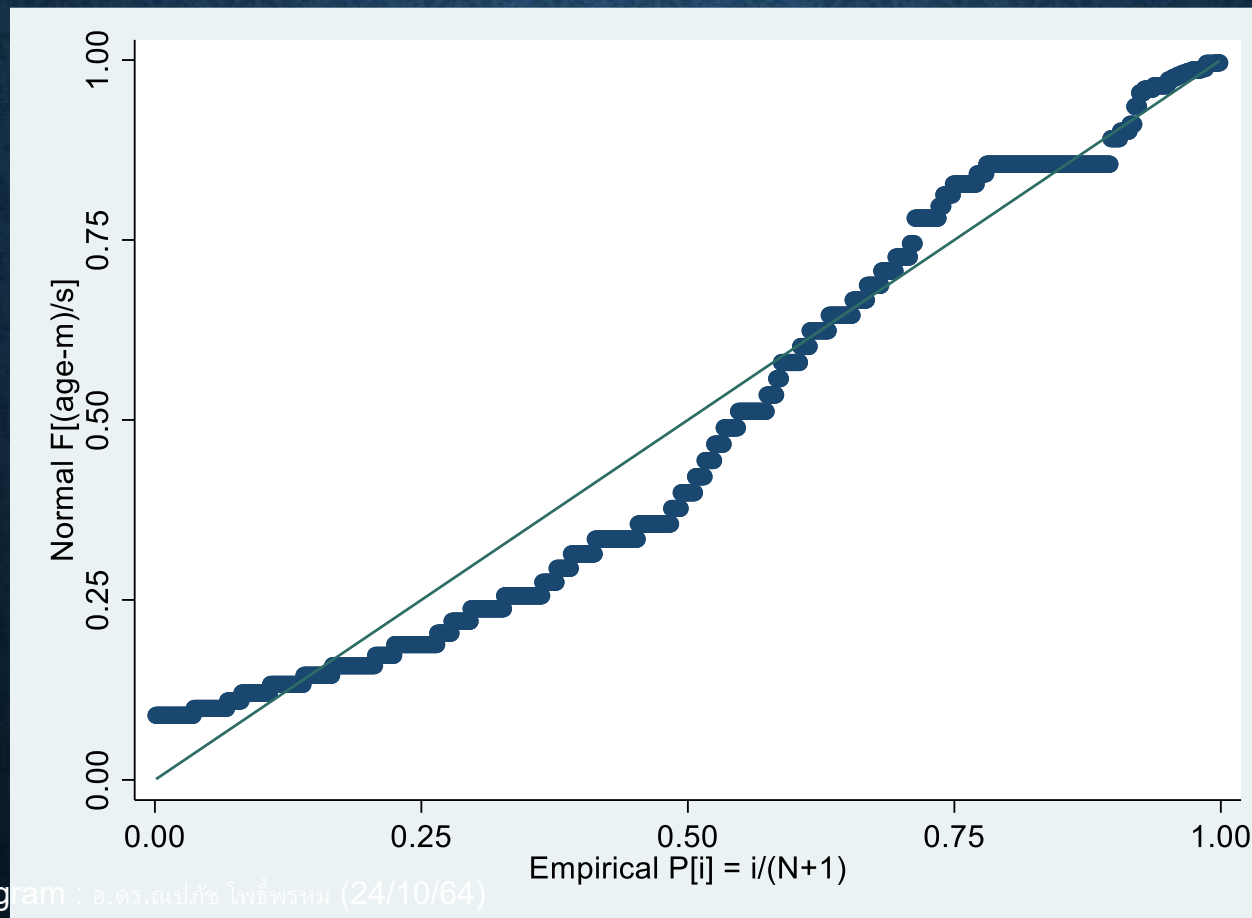
# CONSTRUCT THE HISTOGRAM

- histogram age, norm



# CONSTRUCT THE NORMAL PROBABILITY PLOT

- `pnorm age`





# COMPARE MEAN WITH MEDIAN & COMPARE MEAN WITH STANDARD DEVIATION

- sum age, details

```
. sum age, det
```

1. Age @

Percentiles			Smallest		
1%	18		18		
5%	19		18		
10%	21		18	Obs	892
25%	26		18	Sum of Wgt.	892
50%	37			Mean	41.47534
			Largest	Std. Dev.	17.48466
75%	58		88	Variance	305.7132
90%	63		88	Skewness	.5576089
95%	73		88	Kurtosis	2.375658
99%	87		88		

# INDEPENDENT OR STUDENT T-TEST

Data Editor (Edit) - [dataset APP 14-10-21]																
File Edit View Data Tools																
<div>Index100[1]100</div>																
	dm	ht	otdisease	allergy	bodytemp	pr	sbp	dbp	rr	pale	icteric	inspec	bowel	tender	reb	
1	2. no	2. no	2. no	2. no	37.2	97	144	72	20	2. no	2. no	1. normal	1. Normal	2. no	2. no	
2	2. no	2. no	2. no	2. no	37.2	97	144	72	20	2. no	2. no	1. normal	1. Normal	2. no	2. no	
3	2. no	2. no	2. no	2. no	37.2	97	144	72	20	2. no	2. no	1. normal	1. Normal	2. no	2. no	
4	2. no	2. no	2. no	2. no	37.2	97	144	72	20	2. no	2. no	1. normal	1. Normal	2. no	2. no	
5	2. no	2. no	2. no	2. no	36.3	88	104	67	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
6	2. no	2. no	2. no	2. no	36.3	88	104	67	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
7	2. no	2. no	2. no	2. no	36.3	88	104	67	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
8	2. no	2. no	2. no	2. no	36.3	88	104	67	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
9	2. no	2. no	2. no	2. no	37.5	96	102	60	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
10	2. no	2. no	2. no	2. no	37.5	96	102	60	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
11	2. no	2. no	2. no	2. no	37.5	96	102	60	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
12	2. no	2. no	2. no	2. no	37.5	96	102	60	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
13	2. no	2. no	2. no	2. no	37.4	76	128	80	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
14	2. no	2. no	2. no	2. no	37.4	76	128	80	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
15	2. no	2. no	2. no	2. no	37.4	76	128	80	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
16	2. no	2. no	2. no	2. no	37.4	76	128	80	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
17	2. no	2. no	2. no	2. no	37.7	82	133	76	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
18	2. no	2. no	2. no	2. no	37.7	82	133	76	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
19	2. no	2. no	2. no	2. no	37.7	82	133	76	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
20	2. no	2. no	2. no	2. no	37.7	82	133	76	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
21	2. no	2. no	2. no	1. yes	37.0	80	130	70	20	2. no	2. no	1. normal	1. Normal	2. no	2. no	
22	2. no	2. no	2. no	1. yes	37.0	80	130	70	20	2. no	2. no	1. normal	1. Normal	2. no	2. no	
23	2. no	2. no	2. no	1. yes	37.0	80	130	70	20	2. no	2. no	1. normal	1. Normal	2. no	2. no	
24	2. no	2. no	2. no	1. yes	37.0	80	130	70	20	2. no	2. no	1. normal	1. Normal	2. no	2. no	
25	2. no	2. no	1. yes	2. no	38.1	92	125	63	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
26	2. no	2. no	1. yes	2. no	38.1	92	125	63	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
27	2. no	2. no	1. yes	2. no	38.1	92	125	63	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
28	2. no	2. no	1. yes	2. no	38.1	92	125	63	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
29	2. no	2. no	2. no	2. no	38.6	125	122	71	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
30	2. no	2. no	2. no	2. no	38.6	125	122	71	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
31	2. no	2. no	2. no	2. no	38.6	125	122	71	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
32	2. no	2. no	2. no	2. no	38.6	125	122	71	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	
33	2. no	2. no	2. no	2. no	38.0	106	93	51	24	2. no	2. no	1. normal	1. Normal	1. yes	2. no	
34	2. no	2. no	2. no	2. no	38.0	106	93	51	24	2. no	2. no	1. normal	1. Normal	1. yes	2. no	
35	2. no	2. no	2. no	2. no	38.0	106	93	51	24	2. no	2. no	1. normal	1. Normal	1. yes	2. no	
36	2. no	2. no	2. no	2. no	38.0	106	93	51	24	2. no	2. no	1. normal	1. Normal	1. yes	2. no	
37	2. no	2. no	2. no	2. no	37.3	57	143	87	20	2. no	2. no	1. normal	1. Normal	1. yes	1. ye	

Variables

Filter variables here

☒ Name

Label

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☒ dcoll

Date of collection @

lc

☒ site

Site of Study @

b

☒ diagsc

Diagnosed as uncompli...

b

☒ agesc

Age more than 18 and l...

b

☒ pregsc

Non pregnancy. @

b

☒ thaisc

Understanding Thai lan...

b

☒ immunsc

Did not receive immun...

b

☒ autosc

Non-autoimmune disea...

b

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Non history of end stag...

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Variables

Snapshots

Properties

Variables

Name

Label

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Format

Value label

Notes

Data

Frame

default

Filename

dataset APP 14-10-21.dta

Label

form 1

Notes

Variables

89

Observations

904

Size

324.88K

Memory

64M

Sorted by

id



# ข้อตกลงเบื้องต้น

- ประชากร 2 กลุ่ม ที่เป็นอิสระต่อกัน
  - ข้อมูลเป็นแบบ **continuous data**
  - การกระจายเป็นแบบ **normal distribution**
- \*\*หากไม่เป็นไปตามข้อตกลงเบื้องต้นให้ใช้ Mann Whitney U test, Wilcoxon Rank sum test\*\***

# EXAMPLE

- Researchers wanted to test if the mean/median age of these patients is different among recurrence appendicitis patients

*H0: The mean/median age between the patients who have recurrence of appendicitis and who did not is not different.*

*Ha: The mean/median age between the patients who have recurrence of appendicitis and who did not is different.*



# STATA COMMAND

## i) Variance ratio test

- `sdtest age, by(recurrence)`

### Variance ratio test

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0. no	867	41.49942	.5975564	17.59497	40.3266	42.67225
1. yes	25	40.64	2.668882	13.34441	35.1317	46.1483
combined	892	41.47534	.5854296	17.48466	40.32635	42.62432

ratio = `sd(0. no) / sd(1. yes)` f = 1.7385  
Ho: ratio = 1 degrees of freedom = 866, 24

Ha: ratio < 1  
Pr(F < f) = 0.9495

Ha: ratio != 1  
2\*Pr(F > f) = 0.1009

Ha: ratio > 1  
Pr(F > f) = 0.0505



# STATA COMMAND

## ii) Student t-test

- `ttest age, by(recurrence)`

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
0. no	867	41.49942	.5975564	17.59497	40.3266    42.67225
1. yes	25	40.64	2.668882	13.34441	35.1317    46.1483
combined	892	41.47534	.5854296	17.48466	40.32635    42.62432
diff		.8594233	3.548865		-6.105697    7.824543

diff = mean(0. no) - mean(1. yes)

Ho: diff = 0

t = 0.2422  
degrees of freedom = 890

Ha: diff < 0      Ha: diff != 0      Ha: diff > 0

Pr(T < t) = 0.5956      Pr(|T| > |t|) = 0.8087      Pr(T > t) = 0.4044

# CONCLUSION

- The p value is 0.8087 which is greater than the level of significance.
- Therefore, we cannot reject the null hypothesis and conclude that the mean age of among recurrence of appendicitis is not different.



# PAIRED T-TEST



# ข้อตกลงเบื้องต้น

- ประชากร 2 กลุ่ม ที่เป็นอิสระต่อกัน
- ข้อมูลเป็นแบบ **continuous data**
- การกระจายเป็นแบบ **normal distribution**

\*\*\*\*หากไม่เป็นไปตามข้อตกลงเบื้องต้นให้ใช้ **Wilcoxon matched signed ranks test\*\*\*\***

# EXAMPLE

- Researchers wanted to test if the mean utility score of appendicitis patients before and after 7 days of received treatment are different.

*H0: The mean of utility score before and after 7 days of received treatment in the appendicitis patients are not different.*

*Ha: The mean of utility score before and after 7 days of received treatment in the appendicitis patients are different.*



# STATA COMMAND

- `ttest base_Utility== after_Utility`

## Paired t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
base_U~y	904	.4218142	.0062965	.1893128	.4094568	.4341715
after_~y	904	.6341018	.0125648	.377781	.6094421	.6587614
diff	904	-.2122876	.0132227	.3975608	-.2382384	-.1863369

```
mean(diff) = mean(base_Utility - after_Utility)          t = -16.0548
Ho: mean(diff) = 0                                         degrees of freedom = 903

Ha: mean(diff) < 0          Ha: mean(diff) != 0          Ha: mean(diff) > 0
Pr(T < t) = 0.0000          Pr(|T| > |t|) = 0.0000          Pr(T > t) = 1.0000
```



# CONCLUSION

- The p value is less than 0.001 which is less than the level of significance.
- So, we reject the null hypothesis and conclude that the mean difference of utility score is not equal to zero.
- Alternatively, the mean utility score of appendicitis patients before and after receiving treatment are different.

# ANALYSIS OF VARIANCE (ANOVA)



# ข้อตกลงเบื้องต้น

- ประชากรมากกว่า 2 กลุ่ม ที่เป็นอิสระต่อกัน
- ข้อมูลเป็นแบบ **continuous data**
- การกระจายเป็นแบบ **normal distribution**

**\*\*หากไม่เป็นไปตามข้อตกลงเบื้องต้นให้ใช้ Kruskal Wallis test\*\***



# EXAMPLE

- Researchers wanted to test if the mean weights of appendicitis patients among the treatment (i.e., open, LAP, beta-lactamase, quinolone and cephalosporin) are different.

$$H_0 : \mu_{\text{open}} = \mu_{\text{LAP}} = \mu_{\text{beta}} = \mu_{\text{qui}} = \mu_{\text{cep}}$$

$H_A$ : Not all  $\mu$ 's are identical

# STATA COMMAND

- oneway weight intervention, tabulate

intervention	Summary of 3. Weight @				
	Mean	Std. Dev.	Freq.		
Open	61.1	12.2	552		
Laparosco	66.6	13.7	32		
Betalacta	61.1	11.8	72		
Quinolone	61.0	11.4	52		
Cef_Metro	62.6	12.9	196		
Total	61.6	12.4	904		
Analysis of Variance					
Source	SS	df	MS	F	Prob > F
Between groups	1153.23427	4	288.308566	1.89	0.1107
Within groups	137396.545	899	152.832642		
Total	138549.779	903	153.432757		
Bartlett's test for equal variances: chi2(4) = 2.3822 Prob>chi2 = 0.666					

ta program : อ.ดร.ณภัช โพธิ์พชรหม (24/10/64)



# CONCLUSION

- The p value from Bartlett's test is 0.666, which is greater than significance level, so we fail to reject the null hypothesis.
- We conclude that the variances of the patients weights among five different treatment groups are not different.
- The p value from ANOVA is 0.1107 which is less than the level of significance.
- Conclusion, we can not reject the null hypothesis and conclude that the mean weight of appendicitis patients is no different.



# LOGISTIC REGRESSION

# LOGISTIC REGRESSION ANALYSIS VS CORRELATION

## Correlation

- Strength of Association
- NOT for cause-effect analysis
- NOT for Predictive purpose

## Regression

- Strength of Association
- Cause-effect analysis
- Predictive model



# EXAMPLE

- Determine the risk factors which associated with overall morbidity!!

Outcome: having morbidity and non-having morbidity

Predictors:

- Gender
- Age
- WBC
- Intervention



# **SAMPLE SIZE ESTIMATION**

TWO

# β-Lactam vs Non-β-Lactam Antibiotics and Surgical Site Infection in Colectomy Patients

Check for updates

Jonathan P Kuriakose, MS, Joceline Vu, MD, Monita Karmakar, MS, Jerod Nagel, PharmD, Shitanshu Uppal, MBBS, Samantha Hendren, MD, MPH, FACS, Michael J Englesbe, MD, FACS, Raj Ravikumar, MD, Darrell A Campbell, MD, FACS, Greta L Krapohl, PhD, RN

**BACKGROUND:** Surgical site infections (SSIs) represent a significant preventable source of morbidity, mortality, and cost. Prophylactic antibiotics have been shown to decrease SSI rates, and β-lactam antibiotics are recommended by national guidelines. It is currently unclear whether recommended β-lactam and recommended non-β-lactam antibiotic regimens are equivalent with respect to SSI risk reduction in colectomy patients.

**STUDY DESIGN:** We conducted a retrospective cohort study of SSI rates between prophylactic intravenously administered recommended β-lactam and non-β-lactam in colectomy patients (25 CPT codes) collected by the Michigan Surgical Quality Collaborative from January 2013 to February 2018. Surgical site infection rates were compared as a dichotomous variable (no SSI vs SSI). Mixed-effects regression was used to compare the association between receiving a β-lactam or non-β-lactam antibiotic and likelihood of having an SSI.

**RESULTS:** Of 9,949 patients, 9,411 (94.6%) received β-lactam antibiotics and 538 (5.4%) received non-β-lactam antibiotics. Overall, there were 622 (6.3%) patients with SSIs. Of the patients receiving β-lactam antibiotics, SSIs developed in 571 (6.1%) compared with 51 (9.5%) patients in the non-β-lactam group. After applying mixed-effects logistic regression, prophylactic treatment with a non-β-lactam regimen was associated with significantly higher odds of surgical site infection (odds ratio 1.65; 95% CI 1.26 to 2.26;  $p < 0.01$ ).

**CONCLUSIONS:** Colectomy patients receiving β-lactam antibiotics had a lower likelihood of SSI compared with those receiving non-β-lactam antibiotics, even when antibiotics were compliant with national recommendations. Our findings suggest that surgeons should prescribe β-lactam antibiotics for prophylaxis whenever possible, reserving alternatives for those rare patients with true allergies or clinical indications for non-β-lactam antibiotic prophylaxis. (J Am Coll Surg 2019;229:487–496. © 2019 by the American College of Surgeons. Published by Elsevier Inc. All rights reserved.)

RTIONS

P1= 6.1%  
P2= 9.5%

Surgical site infection (SSI) represents a significant preventable source of morbidity, mortality, and cost.<sup>1-3</sup> With estimates of 1 million additional hospital days and \$1.5 billion

in added costs,<sup>3</sup> reducing SSIs is an imperative patient safety and quality improvement opportunity. For patients undergoing operations, the rate of SSI is approximately

CME questions for this article available at <http://jacsme.facs.org>

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# International Journal of Surgery

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## Randomised Controlled Trial

## A randomized controlled trial on irrigation of open appendectomy wound with gentamicin- saline solution versus saline solution for prevention of surgical site infection

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### ARTICLE INFO

#### Keywords:

Mesh terms); therapeutic irrigation  
Surgical wound infection  
Appendectomy  
Gentamicins  
Saline solution  
Randomized controlled trial

### ABSTRACT

**Background:** Surgical site infection (SSI) is one of the most common complications after abdominal surgery. The present trial examined the efficacy of saline irrigation of open appendectomy wound with or without topical antibiotics in prevention of SSI.

**Methods:** This was a double blind randomized trial on patients with acute appendicitis who underwent open appendectomy. Patients were randomly allocated to one of three equal groups; group I had layer-by-layer wound irrigation with gentamicin-saline solution, group II had wound irrigation with saline solution, and group III received no irrigation (Control group). The main outcome measures were the incidence of incisional SSI, surgical site occurrence (SSO), other complications, operation time, postoperative pain, and patients' satisfaction.

**Results:** 205 patients (113 female) of a mean age of 27.9 years were included. The average hospital stay and pain scores were similar in the three groups. Groups I and II had significantly lower rates of incisional SSI (4.3% Vs 2.9%; Vs 17.4%,  $p = 0.005$ ) and SSO (24.6% Vs 13.4% Vs 43.5%;  $p = 0.0003$ ) as compared to group III. Groups I and II had comparable rates of SSI and SSO. The three groups had similar rates of wound seroma, hematoma, and dehiscence. Groups I and II had significantly higher satisfaction with the procedure than group III.

**Conclusions:** Layer-by-layer irrigation of open appendectomy wound decreased the rates of incisional SSI and SSO significantly compared to the no-irrigation group. Adding gentamicin to saline solution was useless to improve the outcome and did not decrease rates of SSI or other complications.

# PROPORTIONS

International Journal of Surgery 81 (2020) 140–146

- Group I had layer by layer irrigation of the surgical wound with gentamicin-saline solution.
- Group II had layer by layer wound irrigation with normal saline 0.9% solution.
- Group III (Control group) did not receive wound irrigation.

Gr1 =4.3%  
Gr2 =2.9%  
Gr3 =17.4%





REVIEW ARTICLE



# Laparoscopic appendicectomy is superior to open sur for complicated appendicitis

Gaik S. Quah<sup>1</sup> · Guy D. Eslick<sup>1</sup> · Michael R. Cox<sup>1,2</sup>

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© Springer Science+Business Media, LLC, part of Springer Nature 2019

## Abstract

**Background** Over the last three decades, laparoscopic appendicectomy (LA) has bec plicated acute appendicitis. The role of laparoscopic surgery for complicated appen remains controversial due to concerns of an increased incidence of post-operative in compared to open appendicectomy (OA). The aim of this study was to compare the o cated appendicitis.

**Methods** A systematic literature search following PRISMA guidelines was conducted and Cochrane Database for randomised controlled trials (RCT) and case–control stud for complicated appendicitis.

**Results** Data from three RCT and 30 CCS on 6428 patients (OA 3,254, LA 3,174) w difference in the rate of IAA (LA = 6.1% vs. OA = 4.6%; OR = 1.02, 95% CI = 0.71 appendicitis has decreased overall post-operative morbidity (LA = 15.5% vs. OA = 2  $p < 0.0001$ ), wound infection, (LA = 4.7% vs. OA = 12.8%; OR = 0.26, 95% CI: 0.19–4 tions (LA = 1.8% vs. OA = 6.4%; OR = 0.25, 95% CI: 0.13–0.49,  $p < 0.001$ ), post-op (LA = 3.1% vs. OA = 3.6%; OR = 0.65, 95% CI: 0.42–1.0,  $p = 0.048$ ) and mortality rat 95% CI: 0.04–0.61,  $p = 0.008$ ). LA has a significantly shorter hospital stay (6.4 days vs. tion of solid food (2.7 days vs. 3.7 days,  $p = 0.03$ ).

**Conclusion** These results clearly demonstrate that LA for complicated appendicitis significantly reduced morbidity, mortality and length of hospital stay compared with C dicitis at laparoscopy is not an indication for conversion to open surgery. LA should with complicated appendicitis.

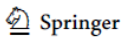
**Keywords** Laparoscopic appendicectomy · Open appendicectomy · Complicated appendicitis · Gangrenous appendicitis · Perforated appendicitis · Appendiceal abscess

## Secondary outcomes

Twenty-five studies reported the operative duration (OT) [26–30, 32, 34, 36–39, 42–46, 48–50, 52–57] which was similar (LA group 74.6 min  $\pm$  19.6 and OA group 82.2 min  $\pm$  24.7,  $p = 0.19$ ) (Table 4). Thirty studies reported the average LOS [26–30, 32–34, 36–39, 42–57] which was significantly shorter for the LA group (6.4  $\pm$  2.8 days) compared to the OA group (8.9  $\pm$  4.8 days) ( $p = 0.02$ ) (Table 4). Twelve studies reported the average time to resume normal diet [26–30, 32–34, 36–39, 42–57] which was significantly shorter for the LA group (2.7  $\pm$  0.9 days) compared with the OA group (3.7  $\pm$  1.1 days) ( $p = 0.03$ ) (Table 4). Eight studies reported the duration of IV antibiotics and there was no significant difference between LA and OA ( $p = 0.49$ ) (Table 4).

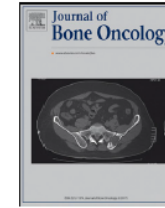
**Table 4** Secondary outcomes for combined RCT and CSS data

	# of studies	LA	OA	<i>p</i> value
Mean length of hospital stay (days)	30	6.4 $\pm$ 2.8	8.9 $\pm$ 4.8	0.02
Mean OT (min)	25	82.2 $\pm$ 24.7	74.6 $\pm$ 19.6	0.19
Solid food resumption (days)	12	2.7 $\pm$ 0.9	3.7 $\pm$ 1.1	0.03
IV Abx (day)	8	5.5 $\pm$ 1.8	6.3 $\pm$ 3.2	0.49



acute cholecystitis [60].

As the majority of the studies used in the present study were CCS, there may be some risks of bias of some form that may favours better outcomes in the LA group. One potential selection bias is the patient co-morbidities resulting in bias that may favour either LA or OA. As the patient characteristics in both groups including sex, gender, BMI and ASA scores were similar, a selection bias based on co-morbidities is most unlikely. Another potential bias is the nature or extent of disease may be different due to a selection bias that may favour one approach. Although there was a range of definitions for complicated appendicitis across the various studies, there was no significant difference in the distribution of disease between the LA and OA groups. Similarly, there was no significant difference in the duration of symptoms between LA and OA. The



## The minimally invasive endoscopic technique for the treatment of symptomatic benign bone lesions: Preliminary results from a retrospective study

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### ARTICLE INFO

#### Keywords:

Minimally invasive  
Endoscopy  
Benign bone lesion  
Clinical efficacy  
Surgical intervention

### ABSTRACT

**Objective:** The present study aimed to evaluate the short-term clinical feasibility and efficacy of the minimally invasive endoscopic technique (MIET) for the treatment of symptomatic benign bone lesions. **Materials and methods:** This single-institution retrospective study investigated 34 patients with benign bone lesions from December 2015 to June 2017. Patients involved in this study presented with various symptoms and signs, and all had clear indications for surgical intervention. All procedures were performed under endoscopic guidance with fluoroscopy visualization followed by complete curettage of tumor tissue. There were 19 males and 15 females, with a mean age of  $33.3 \pm 12.7$  years (range, 17–68 years). The lesions were located in the upper extremities (9, 26.5%) and pelvis (5, 14.7%). Primary outcomes were measured by visual analog scale (VAS), the Musculoskeletal Tumor Society (MSTS) stage and the 36-item Short-Form Health Survey (SF-36) scoring system.

**Results:** Of the 34 patients included in this study, all completed follow-up examinations, with a mean follow-up duration of  $22.4 \pm 7.6$  months (range, 13–35 months). Significantly improved VAS, MSTS and SF-36 scores were observed at 3 months after the initial treatment ( $P < 0.001$ ), suggesting enhanced pain relief and improved functional recovery and quality of life following surgery. All procedures were technically successful, with the exception of 3 cases (8.8%) manifesting access site numbness; these patients recovered within the follow-up period through symptomatic treatment alone. Only 2 patients (5.9%; one osteoblastoma and one enchondroma) experienced local recurrence and underwent standard open curettage within the follow-up period. All patients showed functional stability without any major complications.

**Conclusion:** The MIET is an effective and safe alternative treatment for symptomatic benign bone lesions. The short-term efficacy of MIET was favorable and associated with improved pain palliation, quality of life and functional recovery.

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Table 2

Preoperative and postoperative data regarding surgical efficacy according to the VAS, MSTS and SF-36 scores.

	Pre	Pos	t value	P value
VAS score	$4.9 \pm 1.4$	$0.3 \pm 0.5$	18.6053	$< 0.001$
MSTS score	$17.8 \pm 2.8$	$25.5 \pm 1.9$	−20.0909	$< 0.001$
SF-36 score	$61.1 \pm 6.2$	$79.7 \pm 5.5$	−26.6391	$< 0.001$

Pre: Preoperatively, Pos: Postoperatively, VAS: Visual analog scale, MSTS: Musculoskeletal Tumor Society, SF-36: 36-item Short-Form Health Survey.



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OF MEANS

Randomised Controlled Trial

A randomized controlled trial on irrigation of open appe with gentamicin- saline solution versus saline solution fo surgical site infection

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ABSTRACT

**Background:** Surgical site infection (SSI) is one of the m present trial examined the efficacy of saline irrigation antibiotics in prevention of SSI.

**Methods:** This was a double-blind randomized trial on patients with acute appendicitis who underwent open appendectomy. Patients were randomly allocated to one of three equal groups; group I had layer-by-layer wound irrigation with gentamicin-saline solution, group II had wound irrigation with saline solution, and group III received no irrigation (Control group). The main outcome measures were the incidence of incisional SSI, surgical site occurrence (SSO), other complications, operation time, postoperative pain, and patients’ satisfaction.

**Results:** 205 patients (113 female) of a mean age of 27.9 years were included. The average hospital stay and pain scores were similar in the three groups. Groups I and II had significantly lower rates of incisional SSI (4.3% Vs 2.9%; Vs 17.4%, p = 0.005) and SSO (24.6% Vs 13.4% Vs 43.5%; p = 0.0003) as compared to group III. Groups I and II had comparable rates of SSI and SSO. The three groups had similar rates of wound seroma, hematoma, and dehiscence. Groups I and II had significantly higher satisfaction with the procedure than group III.

**Conclusions:** Layer-by-layer irrigation of open appendectomy wound decreased the rates of incisional SSI and SSO significantly compared to the no-irrigation group. Adding gentamicin to saline solution was useless to improve the outcome and did not decrease rates of SSI or other complications.



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**Table 2**  
Outcome of the three groups.

Variable	Gentamicin-saline (N = 69)	Saline (N = 67)	No irrigation (N = 69)	P value
Mean operation time in minutes	55.1 (SD 8.7)	55.6 (SD 8.2)	50.2 (SD 8.4)	<0.001
Surgical site infection (%)	3 (4.3)	2 (2.9)	12 (17.4)	0.005
Seroma (%)	12 (17.4)	6 (8.9)	15 (21.7)	0.11
Hematoma (%)	2 (2.8)	1 (1.5)	1 (1.4)	0.84
Wound dehiscence (%)	0	0	2 (2.8)	0.22
Total surgical site occurrence (%)	17 (24.6)	9 (13.4)	30 (43.5)	<0.001
Other complications (%)	2 (2.8)	3 (4.4)	1 (1.4)	0.45
Mean hospital stay in days	1.1 (SD 0.26)	1.05 (SD 0.24)	1.14 (SD 0.3)	0.18

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**Table 3**  
Patient-reported outcomes of the three groups.

Variable	Gentamicin-saline (N = 69)	Saline (N = 67)	No irrigation (N = 69)	P value
Pain visual analogue score	4.04 (SD 1.4)	3.68 (SD 1.2)	4.13 (SD 1.6)	0.83
Satisfaction				<0.001
Satisfied (%)	52 (75.3)	59 (88)	41 (59.4)	
Partly satisfied (%)	12 (17.4)	6 (9)	13 (18.8)	
Unsatisfied (%)	5 (7.2)	2 (3)	15 (21.7)	

4. Discussion