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WORKBOOK ON LEAN HEALTHCARE TRAINING

STEP-BY-STEP ANALYSIS USING IBM SPSS FOR EMERGENCY DEPARTMENT AND MEDICAL WARD



STEP-BY-STEP ANALYSIS USING IBM SPSS FOR EMERGENCY DEPARTMENT AND MEDICAL WARD

Institute for Health Management 2020

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The Lean Team of the Institute for Health Management would like to thank the Director General of Health Malaysia for his permission to publish this workbook.

This module will not have been materialized without the teamwork and efforts of Lean core team of Institute for Health Management. The team also would like to express gratitude to the Director of Institute for Health Management, without whom the publication of this "Workbook for Lean Healthcare Training: Step-by-Step Analysis using IBM SPSS for Emergency data and Medical Ward" would not have been a success.

"Knowing is not enough; we must apply. Willing is not enough; we must do"

Johann Wolfgang von Goethe



Assalamualaikum Warahmatullahi Wabarakatuh and Salam Sejahtera,

It is with great pleasure for me to write foreword for this "Workbook on Lean Healthcare Training: Step by Step Analysis using IBM SPSS for Emergency department and Medical ward". Through Lean Healthcare implementation, Ministry of Health (MOH) has managed to eliminate wastes in the hospital processes, thus improving the quality of care to the patients.

Since 2013, Lean Healthcare implementation expanded nationwide targeting the involvement of MOH hospitals at Emergency Department (ED) and Medical Wards (MW) in phases. As of 2017, a total of 52 MOH hospitals have been involved in implementing Lean Healthcare Initiative. Following the achievements in the Emergency department and Medical wards, MOH has expanded Lean healthcare initiatives to 10 hospitals with Orthopaedic and Ophthalmology specialist clinics in 2018 and later to other clinical disciplines in hospital. The progress of each Lean Healthcare initiative activities varies depending on many factors including leadership, strategy and teamwork of the staffs. Moving forward, implementation of services through better design and innovation in the Lean Healthcare initiative are key factors to ensure Lean Healthcare initiative sustainability.

I sincerely hope that this workbook will contribute in guiding hospitals who are involve in Lean Healthcare Initiative to work together towards a better service delivery to public. Let us all aim towards making the Malaysian Healthcare system as the best healthcare in the world.

YBrs. Dr. Hishamshah bin Mohd Ibrahim

Deputy Director- General of Health (Research & Technical Support) Ministry of Health Malaysia

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Foreword



Assalamualaikum Warahmatullahi Wabarakatuh and Salam Sejahtera,

Lean Healthcare Initiative was introduced in Ministry of Health since 2013 using agile approach to reduce waiting time of patients and currently 109 hospitals have implemented Lean methodology at various areas such as Emergency Department (ED), Medical Wards (MW), Outpatient Department (OPD) and specialist clinics. Institute for Health Management (IHM) has been playing an active and direct role in introducing Lean Healthcare Initiative which is applied by each and every hospital.

Apart from the contribution in terms of training, IHM is tasked for the publication aspect related to Lean Healthcare initiative. We are publishing this workbook for Lean Healthcare training in order to share the steps of data analysis using IBM SPSS software to evaluate the performances of hospital in Lean Healthcare implementation at Emergency department and Medical ward. We hope that this module will serve as a reference and guidance on monitoring, especially for the present and future hospitals which implementing Lean Healthcare. Through the findings of these data analysis, we aim for the hospitals to be able to understand and improve congestion by reducing the waiting time. IHM aspires in being part of the Lean Healthcare Implementation team and assist in expanding Lean Healthcare initiative nationwide.

Finally, I would like to congratulate everyone who had been directly and indirectly involved in the successful publication of this workbook. It is hope that this workbook will be useful as a guide in implementation and monitoring of Lean Healthcare initiative. Thank you.

Dr Nor Hayati binti Ibrahim Director Institute for Health Management (IHM)

National Institutes of Health (NIH) Ministry of Health (MOH)

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BACKGROUND OF LEAN HEALTHCARE

Lean in Ministry of Health (MOH)

Introduction of Lean healthcare to Ministry of Health public hospitals started in 2013 with Hospital Sultan Ismail (HSI), Johor as its pilot hospital. Lean methodology focused on reducing waiting time and congestion at specialist clinic i.e. Orthopaedic and Oncology specialist clinic by eliminating any non-value-added activities in the process. Following the implementation, improvement was seen with the reduction of 75% waiting time from first consultation until first treatment started at oncology clinic (1). Among the countermeasures are clearing backlog, increased machine utilisation, establish visual performance board to monitor patient flow and improve the clinic work process for better care to the patients.

As pilot project showed visible improvement within stipulated time, lean was expanded to Hospital Tengku Ampuan Rahimah (HTAR), Selangor with Emergency department (ED) and Medical Ward (MW) being the main focus as HTAR is known to be one of the busiest hospitals in Malaysia. These two departments were selected due to its congestion and longer waiting time experienced by patients. Emergency department are always at the frontline among the many services provided by the hospital. Year by year, the utilization of ED by the public has increased and this led to overcrowding. Not forgetting the Medical wards since most of the admitted patient will be under its care, MW receives around 33, 002 number of admissions in a year and average of 91 patients per day (2). With the capacity of 1100 beds in HTAR, bed occupancy rate (BOR) for Medical wards often exceeds 100%. With the introduction of lean methodology, the usual process in ED and MW was mapped using value stream mapping (VSM) and improvement was seen both in ED and MW. Average length of stay (LOS) reduced by 55% from 192 minutes to 88 minutes and medical bed occupancy rate decreased from 144.7 % to 82.2 % for female ward within 6 months of implementation (2,3)

Following its success in both HSI and HTAR, the ministry has promoted the expansion to 133 public that hospitals started with ED and MW(4). The training was done by consultants from MITEC, UniKL during the earlier implementation stage and followed by Institute for Health Management (IHM). Until now, 109 hospitals including state, major and minor specialist hospitals have been trained in lean healthcare.



Figure 1: Lean Healthcare implementation expansion to 133 Ministry of Health public hospitals



The Approach of Lean Healthcare Training in MOH

Lean healthcare training can be divided into three main stages with the implementation period involved minimum of 6 months. The stages are Stage 1; Training, Stage 2; On-site consultation and monitoring, and Stage 3; Analysis, reporting and presentation of report as seen in Figure 2. The participants were introduced to lean methodology during a three-day workshop at IHM which includes the development of current VSM and establishing the list of kaizen/improvements for their respective departments. Back in their respective hospitals, baselines data were collected and approved kaizen by the hospital Director were implemented. This will happen during Stage 2. After the implementation phase, the participants will enter Stage 3, where this stage is mostly for the confirmation of results and analysis of performance. During the early stage of implementation, the analysis is mostly done by IHM, however, as lean progresses further, there is a need in transferring the knowledge to the process owner.

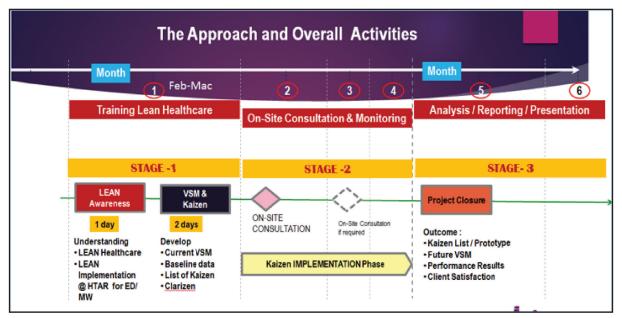


Figure 2: Overall approach of Lean healthcare training

2

SECTION 1: INTRODUCTION TO IBM SPSS

1.1 Descriptive statistics

Data analysis is the process of gathering data systematically and converting it into useful information. Descriptive statistics are commonly used in analysing Lean healthcare data in SPSS because it is useful to summarise all the data by combining tables, graphs and statistical results to better understanding the analysis. Through descriptive statistic, it enables the user to describe the characteristics of the data or sample studied. Example of data includes demographic data such as age, gender, ethnicity, education, weight, height, income, education etc. Below are several components in descriptive statistics that can be used (5):

i. Frequency distributions

iii. Presentation in figures

iv. Measures of central tendency

v. Measures of dispersion/spread

- o Calculate the frequency distributions by adding the number of data
- ii. Percentages, Proportions & Rates
- o Calculate the percentage by dividing the number of selected data by the total sample and multiply by 100.
 - o Calculate proportions by comparing the subgroup of the study to the whole. Proportions can be expresses as a ratio
 - o Calculate rate by expressing number of observations in terms of unit of time or size of population
 - o The use of histogram, line graph or scatter diagram to present data
 - o Used to describe the central position of a frequency distribution for group of data
 - o Central tendency can only be used for numerical data
 - o These are mean, median and mode
 - o Provides information about the variability of the data
 - o To describe the spread, a number of statistics are available. including standard deviation, range, percentiles and variance.

1.2 Overview on IBM SPSS interface

Statistical Package for Social Sciences (SPSS) is a statistical software used in statistical analysis for analyzing and displaying information using a variety of techniques. Due to its user-friendly features, SPSS are easily accessible by all skill levels and it can help in providing better results with minimal error. In lean, IBM SPSS software can be used to analyze our data (6,7). SPSS can be divided into three windows:

Windows	Suffix	Function
Data editor	.sav	 can be divided into data view and variable view. used to visualize, analyze and manipulate data.
Output viewer	.spv	• contains the result of any statistical procedure performed in data editor
Syntax editor	.sps	 allow user to write commands that runs SPSS procedures enables user to perform task that is repetitious or difficult to do using drop down menus

When opening SPSS, data editor and output window will be displayed by default. In data editor, there are two views; data view and variable view. The data view will display data for analysis (Figure 3). Users can also enter data manually in this data view. Variable view displays information about variables in the opened data (but not the data themselves), such as variable names, types, and labels, etc (Figure 4). Output viewer display the log of action taken in the analysis and the output. It consists of two frames; left side recorded log and right-side display result/output.

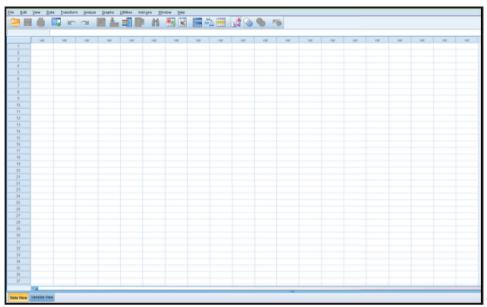


Figure 3: Data view in data editor

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4	-															
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Figure 4: Variable view in data editor

1.3 Working with Data in SPSS

In this lean data analysis, we will use:

- a) File
- b) Transform
- c) Analyze

1.3.1 File

> New

If user wants to create new data, just click **File > New > Data** and it will open new empty screen. User can then add any data into it.

> Open data

In order to use SPSS, user has an option to open pre-existing dataset or create new data in the data view. If user need to open pre-existing data, user can use go to File and click open. User can open Excel, Stata, SAS, CSV, tab-delimited without converting to SPSS data type.

> Save and Save As data

If user wants to save new entry in the dataset, just click File > Save. If the new additional data with different file name, user can use Save As tab. Just click File > Save As and new window will prompt you to input file name and intended location.

1.3.2 Transform

> Date and time wizards

This tab simplifies data associated to date and time values. In lean, data are usually in this format. User can click Transform > Date and time wizard. There are six options to be selected (Figure 5).

- a) Learn how dates and time are represented It provides a brief overview on date and time wizard.
- b) Create a date/time variable from a string containing a date or time If you have a string variable in the form of date and time i.e. dd/mm/yyyy or hh:mm, you can change it to the exact date/ time format.
- c) Create a date/time variable from variables holding parts of dates or times It allows user to create new date/time variable from the data.
- d) Calculate with dates and times This option is used when user wants to calculate, either add or substract value from date and time. For example, user can calculate time duration using this option.
- e) Extract a part of a date or time variable This option allows you to extract part of a date/time variable, such as the day of the month from a date/time variable, which is in the form of mm/ dd/yyyy.
- f) Assign periodicity to a dataset this option is used to create date/time variable with sequential dates.

6

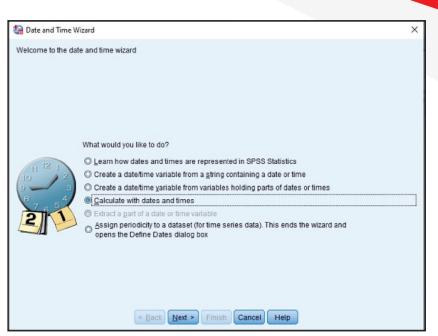


Figure 5: Date and time wizard

1.3.3 Analyze

This tab is use to analyse data for result or output. In analyse tab, we will only use *Descriptive statistics* for this lean healthcare analysis.

• Frequencies

This feature provides statistics and graphical displays useful for describing many variables. It will produce frequency table consists of frequency counts, percentage, mode, median, mean, standard deviation, variances, minimum and maximum value of intended variable. Output will be organized by variable where it has statistical table and frequency table for the variable. This can be used for both categorical and continuous variable. Frequencies can also produce histogram with or without normal distribution on the graph.

	<u>A</u> nalyze	<u>G</u> raphs	<u>U</u> tilities	Add	l- <u>o</u> ns	<u>W</u> indow	<u>H</u> elp)
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Figure 6: Frequency tab under Descriptive statistics



	Variable(s):	Statistics
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💑 EDArvT		
ConsD		<u>F</u> ormat.
DonsT ConsT	•	Style
a Disposition		
🔒 DisD		
💑 DisT		
🚑 EDadmitD		
Display frequency table		

Figure 7: Frequencies window

1. Variable(s): The variables need to be analysed using Frequencies procedure. You can add several variables to this box.

2. Statistics: It contains various descriptive statistics mostly suitable for numeric variables. Most of these statistics are identical to the one in Descriptives, Compare means and Explore. The only exception is the Percentile values. It allows user to specify which percentiles to report.

Explore

Explore is best used to deeply investigate a single numeric variable, with or without a categorical grouping variable. It can produce a large number of descriptive statistics, as well as confidence intervals, normality tests, and plots. The Explore procedure produces detailed univariate statistics and graphs for numeric scale variables for an entire sample, or for subsets of a sample. User can select this function by clicking Analyze > Descriptive Statistic > Explore. A window will pop up and user need to select the intended variable and insert into dependent list box and click OK.

	Dependent List:	Statistics
🔓 EDArvD 🖆		Diete
EDArvT		Plots
🔓 ConsD		Options
💑 ConsT	Eactor List:	
a Disposition		
🔒 DisD	\$	
💑 DisT		
EDadmitD	Label Cases by:	
💑 EDadmitT 🔤		
Display		
◎ Both	Plots	

Figure 8: Explore window

1. Dependent list: the continuous numeric variables that user wishes to analyse.

2. Factor list: this will produce individual summaries of the numeric variables with respect to each category (Optional)

3. Label cases by: ID variable with "names" for each variable. If not specified, SPSS will use the row number to label each data (Optional)

4. **Statistics:** Choices of statistic reports. Choices are Descriptives (by default), M- estimators, Outliers and Percentiles.

1.3.4 Output

• Frequencies

Two tables will appear in the output window. **Statistics** will report the number of missing and non-missing data in the data set. **Frequency** table will contain four columns of summary measurement(8).

1. Frequency The cumulative number of data in each category.

2. Percent: The percentage of all data including both missing and non-missing data.

3. Valid percent: The percentage of data in the category excluding the non-missing data.

4. **Cumulative percent:** Total percentage of the data that has been accounted for up to the row. It can be computed by adding the numbers in the Valid percent column above the current row.

• Explore

Case processing summary will show how many valid data there were. The Descriptives table will have detailed descriptive statistics for each of the continuous variable, including skewness and kurtosis.

SECTION 2: STEP BY STEP ANALYSIS OF DATA

2.1 Preparation of Data in Microsoft Excel

In Lean, data are usually collected using a prepared template for ED and MW (Appendix 1). This template was prepared during early stage of Lean implementation in 2015 with the aim to facilitate the hospitals in collecting data in a systematic manner. The data collector roles are crucial in making sure that the data collected are valid and reliable. If there is any problem with the data, data collection needs to be re-done again.

AGUE LEAN HEALTHCARE INITIATIVES IN EMERGENCY OF PARTMENT AND MEDICAL WARD INIVISITY OF HEALTH HOSPITALS RN PESAKIT: 10-00-02210-00-06 JABATAN KECEMASAN ZOB HIjau	AGAE LEAN HEALTHCARE INITIATIVES IN EMERGENCY DEPARTMENT AND MEDICAL WARD I MINISTY OF HEALTH HOSPITALS RN PESAKIT: 07/06/27/05/000000
JABATAN KECEMASAN Zon mjau (Zon Merah dan Kuning Perlu Isi 3B dan 4 sabaja)	JABATAN KECEMASAN Zon Hijau (Zon Merah dan Kuning Perlu Isi 3B dan 4 sahaja)
TEMPAT TARIKH MASA	TEMPAT TARIKH MASA
1. Tiba di Kecemasan (Triage Perlama) 070316	I. Tiba di Kecemasan (Trige Pertana) 12 03 16 18 30
2. Konsultasi (Penaki tuba di bilik dokor) 073316	2. Konsultasi (Pesakit tibe di bilik doktor) $\begin{bmatrix} 2 & 2 & 3 \\ 2 & 2 & 3 \end{bmatrix}$ (b 1 & b 1) $\begin{bmatrix} 2 & 2 & 3 \\ 2 & 3 \end{bmatrix}$
3. Ketuar (Keputan olin Doktor Johnga-Keenatan)	3. Keluar (Keputusm oleh Doktor Jahuan Kacomstan)
(A) Discaj (B) Masuk Wad	(A) Discaj
- Termasuk kes rujukan (SEMUA	(B) Masuk Wad - Termasuk kes rujukan (SEMUA
C) Tinda Semasa dipanggil (CNA)	(C) Tlada Semasa dipanggil (CNA)
4. Kemasukan ke Wad (Pesakit tiba di kati)	4. Keenasukan ke Wad
SILA rujuk BELAKANG borang ini untuk panduan mengisi borang.	
Jika borang ini dijumpai, sila pulangkan ke Jabatan Kecemasan.	SILA rujuk BELAKANG borang ini untuk panduan mengisi borang.
	Jika borang ini dijumpai, sila pulangkan ke Jabatan Kecemasan.

Figure 9: Examples of rejected data collection form due to incomplete and invalid data

In Lean, data are usually collected in date and time format. Next, the data need to be entered and cleaned to eliminate any duplicates or missing value in Microsoft Excel prior to analysis in SPSS. User can refer to Table 2-3 for format of each data to be entered in Microsoft Excel.

Below is an example of data entry in Microsoft Excel according to the given format (Figure 10).

RN	EDArvD	EDArvT	ConsD	ConsT	Disposition	DisD	DisT	EDAdmitD	EDAdmitT	ArvBedD	ArvBedT
887478	13/7/17	22:25:00	14/7/17	2:27:00	CNA		CNA				
87759	13/7/17	23:03:00	14/7/17	3:23:00	CNA		CNA				
670388	13/7/17	23:44:00	14/7/17	3:27:00	CNA		CNA				
887490	14/7/17	0:18:00	14/7/17	3:29:00	CNA		CNA				
134328	14/7/17	0:28:00	14/7/17	3:47:00	CNA		CNA				
887494	14/7/17	0:51:00	14/7/17	3:53:00	CNA		CNA				
887492	14/7/17	0:34:00	14/7/17	3:49:00	CNA		CNA				
16393	14/7/17	1:05:00	14/7/17	3:15:00	CNA	14/7/17	3:15:00				
792899	13/7/17	22:18:00	14/7/17	2:00:00	CNA						
468174	14/7/17	3:20:00	14/7/17	5:00:00	CNA	14/7/17	5:00:00				
887726	15/7/17	16:16:00	15/7/17	16:36:00	CNA	15/7/17					
884182	15/7/17	10:31:00	15/7/17	11:52:00	DISCHARGE	15/7/17	12:09:00				
814855	15/7/17	11:41:00	15/7/17	12:19:00	DISCHARGE	15/7/17	13:05:00				
823168	15/7/17	11:41:00	15/7/17	12:31:00	DISCHARGE	15/7/17	13:15:00				
282525	15/7/17	9:43:00	15/7/17	10:30:00	DISCHARGE	15/7/17	10:40:00				
409912	15/7/17	11:48:00	15/7/17	12:45:00	DISCHARGE	15/7/17	13:00:00				
192271	15/7/17	15:15:00	15/7/17	17:20:00	DISCHARGE	15/7/17	17:40:00				
222391	15/7/17	17:23:00	15/7/17	17:45:00	DISCHARGE	17/7/17	18:15:00				
887970	16/7/17	21:01:00	16/7/17	22:45:00	DISCHARGE	16/7/17	23:00:00				
337115	16/7/17	23:46:00	17/7/16	1:50:00	DISCHARGE	17/7/16	4:22:00				
887992	17/7/17	0:20:00	17/7/16	2:29:00	DISCHARGE	17/7/16	4:54:00				
887989	17/7/16	0:09:00	17/7/16	2:25:00	DISCHARGE	17/7/16	3:01:00				
887983	16/7/17	23:19:00	17/7/16	1:04:00	DISCHARGE	17/7/16	1:12:00				
885665								10/7/17	10:22:00	11/7/17	0:18:00
139015								10/7/17	12:45:00	10/7/17	19:30:00
479691								10/7/17	18:30:00	11/7/17	22:30:00
574818								10/7/17	18:48:00	10/7/17	23:10:00
267569								10/7/17	20:20:00	10/7/17	23:30:00
87347								10/7/17	22:05:00	11/7/17	3:50:00
607318								10/7/17	22:00:00	11/7/17	10:00:00
518542								10/7/17	12:07:00	10/7/17	20:15:00

Figure 10: Example of data entry in Microsoft Excel

Microsoft Excel is a good tool to enter any data and its format is compatible with SPSS. User can open any Microsoft Excel (xls) file just by selecting the type of file from file type in SPSS. In Microsoft Excel, the data should be organised in one sheet, the first row should be the variable name i.e EDArvD, ConsT, Disposition and ArvBedD. Kindly make sure that the variable name can be easily read and contain no spaces. Underscore character can be used as a replacement for space. In this analysis, we will use the variables as shown in the table below (Table 2-3).

2.1.1 Emergency Department (ED) Variables

				lepartment (ED) variables	
No	Variables (Excel/SPSS)	Format (Excel)	Format/Type (SPSS)	Label (SPSS)	Value (SPSS)
1.	HospitalID		String	Hospital ID Code	
2.	RN		String	Patient Registration no	
3.	EDArvD		Date (dd. mm.yyyy)	Date patient arrive at ED	
4.	EDArvT	hh:mm:ss	Date (hh:mm:ss)	Time patient arrive at ED	
5.	ConsD		Date (dd. mm.yyyy)	Date patient receive consultation	
6.	ConsT	hh:mm:ss	Date (hh:mm:ss)	Time patient receive consultation	
7.	DisD		Date (dd. mm.yyyy)	Date patient discharge from ED	
8.	DisT	hh:mm:ss	Date (hh:mm:ss)	Time patient discharge from ED	
9.	Disposition		Ordinal	After patient seen by doctor at ED	1: discharge 2: warded 3: CNA
10.	EDAdmitD		Date (dd. mm.yyyy)	Date ED doctor decides to admit	
11.	EDAdmitT	hh:mm:ss	Date (hh:mm:ss)	Time ED doctor decide to admit	
12.	ArvBedD		Date (dd. mm.yyyy)	Date patient arrive on bed in ward	
13.	ArvBedT	hh:mm:ss	Date (hh:mm:ss)	Time patient arrive on bed in ward	
			New Variables Crea	ited (Emergency Department)	
14.	ATC		Date (hh:mm:ss)	Arrival to Consultation USE SYNTAX / COMMAND	
15.	LOS		Date (hh:mm:ss)	Length of Stay – USE SYNTAX / COMMAND	
16.	BWT		Date (hh:mm:ss)	If BWT within 24 hours – USE SYNTAX / COMMAND	
17.	oneday		ordinal	variable to see if waiting time more than 24 hours- KEY IN MANUALLY ON DATA VIEW AS 24:00	
18.	ATCnew		Date (hh:mm)	Arrival to Consultation new – USE SYNTAX / COMMAND	
19.	LOSnew		Date (hh:mm)	Length of Stay new - USE SYN- TAX / COMMAND	

Table 2: Emergency department (ED) variables

20.	BWTnew	Date (hh:mm:ss)	BWTNew created if waited more than 24 hours.	
21.	ATCdatediff	numeric	Arrival to consultation date different for more than 24 hrs	0-Within 24 hours 1-After 24 hours 2-After 48 hours
22.	LOSdatediff	numeric	Length of Stay date different for more than 24 hrs	0-Within 24 hours 1-After 24 hours 2-After 48 hours
23.	BWTdatediff	numeric	Bed Waiting Time date different for more than 24 hrs	0-Within 24 hours 1-After 24 hours 2-After 48 hours

2.1.2 Medical Ward (MW) Variables

No	No Variables Format		Type (SPSS)	Labels (SPSS)	Value (SPSS)
	(Excel/SPSS)	(Excel/ SPSS)			
1.	HospitalID		String	Hospital ID Code	
2.	RN		String	Patient Registration no.	
3.	DecDcD	dd/mm/ yyyy	Date (dd.mm.yyyy)	Date decision to discharge made by doctor	
4.	DecDcT	hh:mm:ss	Date (hh:mm)	Time decision to discharge made by doctor	
5.	LeaveBedD	dd/mm/ yyyy	Date (dd.mm.yyyy)	Date patient leave bed	
6.	LeaveBedT	hh:mm:ss	Date (hh:mm)	Time patient leave bed	
7.	BedCleanD	dd/mm/ yyyy	Date (dd.mm.yyyy)	Date bed cleaned & ready for next patient	
8.	BedCleanT	hh:mm	Date (hh:mm)	Time bed cleaned & ready for next patient	
			New Variables	Created (Medical Ward)	
9	DT		Date (hh:mm)	Patient discharge from Medical Ward (within 24 hours) - – USE SYNTAX / COMMAND	
10	oneday		Date (hh:mm)	Patient Discharged after 24 Hours	
11	DTDateDiff		ordinal	Patient Discharge same day or different day/s - USE SYNTAX / COMMAND	0 - within 24 hours 1 - > 24 hours 2 - > 48 hours
12	DTnew		Date (hh:mm)	Patient discharge from medical ward within 24 hours or more than 24 hours USE SYNTAX / COM- MAND	
13	BTT		Date (hh:mm)	Bed turnaround time within 24 hours – USE SYNTAX / COM- MAND	

		,		
14	BTTDateDiff	ordinal	Bed Turnaround time on within 24 hours or after 24 hours USE SYN- TAX / COMMAND	0 - within 24 hours 1 - > 24 hours
15	PTTpow	Data (bhimmiss)	Einal data for PTT LISE SYNTAY /	2 - > 48 hours
15	BTTnew	Date (hh:mm:ss)	Final data for BTT- USE SYNTAX / COMMAND	

2.2: Importing data from Microsoft Excel to SPSS

There are several methods to import data from Microsoft Excel to SPSS. Here, two options are provided for you to import your data to SPSS.

2.2.1 Microsoft Excel to SPSS

Data can be import directly provided if the format is correct and cleaned properly from any duplicates and error. If the data is not yet formatted, user need to follow few steps before importing the data.

Open the Microsoft Excel file (*.xls) and **rename all the variables** according to the variable name as in Table 2 and 3.

1	HospitalID	RN	EDAND	EDArvT	ConsD	ConsT		Disposition	DisD	DisT	EDAdmitD	EDAdmitT	AnBedD	ArvBedT
2	ED201601	75009	13/8/2015	8:31:00	13/8/2015	1	9:05:00	Admit to ward	including referral)		13/8/2015	14:50:00		
3	ED201601	75500	13/8/2015	8:56:00	13/8/2015	1	9:06:00	Discharge	13/8/2015	12:20	00			
4	ED201601	45018	13/8/2015	8:58:00	13/8/2015	1	9:00:00	Discharge	13/8/2015	9:15:	00			
5	ED201601	75223	13/8/2015	10:04:00	13/8/2015	1	0:15:00	Discharge	13/8/2015	13:00	00			
6	ED201601	75359	13/8/2015	10:02:00	13/8/2015	10	0:20:00	Admit to ward	including referral)		13/8/2015	13:40:00		
7	ED201601	135297	13/8/2015	10:07:00	13/8/2015	1	2:00:00	Discharge	13/8/2015	14:45	00			
8	ED201601	75399	13/8/2015	10:14:00	13/8/2015	13	2:00:00	Discharge	13/8/2015	14:35:	00			
9	ED201601	75477	13/8/2015	10:12:00	13/8/2015	12	2:15:00	Discharge	13/8/2015	17:40	00			
10	ED201601	75209	13/8/2015	10:18:00	13/8/2015	1	2:30:00	Discharge	13/8/2015	12:40	00			

Figure 11: Example of excel data after rename variable

Then, proceed with highlighting all the column containing time value and right click to change the cell format to **24 hours (hh:mm:ss). This applies to all columns with TIME format** (Figure 12).

		в	I 🗏 🖄 - 🗛 -	- **** ***		
С	D		r	F	G	
	EdArvT	*	Cuţ	ConsT	Disposition	DisD
17/8/201	5 21		Copy	0:00:00	Discharge	
13/8/201	5 14	2	Paste Options:	16:10:00	Discharge	
17/8/201	5 20		Ē	22:11:00	Discharge	
17/8/201	5 17	1	Paste Special	17:29:00	Discharge	
17/8/201	5 17			18:53:00	Discharge	
17/8/201	5 1		Insert	13:07:00	Discharge	
17/8/201	5 23		<u>D</u> elete	23:13:00	Call not around (CN	
17/8/201	5 9		Clear Contents	23:40:00	Discharge	
17/8/201	5 10	1	Format Cells	11: D	ight alight and	chaaa
17/8/201	5 9		Column Width	5.	ight click and	choos
17/8/201	5 10		Hide	11: fo	ormat cells	
17/8/201	5 22		Unhide	22:5		
17/8/201	5 21	.40.0		22:15:00	Discharge	
17/8/201	5 21	1:30:0	00	22:05:00	Discharge	
17/8/201	5 21	1:21:0	00	22:15:00	Discharge	
17/8/201	5 21	1:00:0	00	21:55:00	Discharge	
17/8/201	5 16	5:30:0	00	18:00:00	Discharge	

Figure 12: Format cells for column with time value

5:00	Format Cells						? ×	(
5:00	Number Alignment	Font	Border	Fill	Protection				
4:00	Category:								
0:00	General A	Sample	:						
1:00	Currency	ConsT							
3:00	Accounting Date	Type:							
9:00	Time Percentage	*1:30:55	PM				^		
4:00	Fraction	01:30:5							
9:00	Text	13:30:5 1:30 PM	-					11	
0:00	Special Custom	01:30 PM							
9:00	1		ocation): (Malaysia)					al.	
2:00	1	English	(manaysha)	-	Click the ti	ne forma	t }	1	
4:00	1			li	n 24 hours	(hh:mm:	ss)		
5:00	1			\mathcal{L}					
1:00	1								
0:00	Time formats display da an asterisk (*) respond								
0:00	operating system. Form								
0:00									
1:00						OK	Connect	5	
4:00						OK	Cancel	_	
0.00	10/7/47	45.4	0.000	CLIAR		10/7	7147		

Figure 13: Selection of the correct time format

After finish formatting, user need to close the Excel file first before opening it in SPSS. Step for importing data directly from Excel is as below:

In SPSS, click Open > File > Select the location of file > Select files of type to "Excel (.xls) > Select file > Open.

🍓 Open Data		>
Look in: 📙 E	Bengkel Data Analy 🔽 🔯 🔯 🎫	
Borang Da Exercise 1 Exercise 2 Exercise 3 Exercise 4 Slide Pres		
File <u>n</u> ame:		<u>Open</u>
Files of type:	SPSS Statistics (*.sav)	Paste
Encoding:	SPSS Statistics (*.sav) SPSS Statistics Compressed (*.zsav) SPSS PC- (*.cvs)	Cancel <u>H</u> elp
	Excel (*.xls, *.xlsx, *.xlsm)	
	Lotus (*.w*)	
	Sylk (*.slk) dBase (*.dbf)	

Figure 14: Selection of type of files

		- IBM SPSS Statistics I									
le <u>E</u> dit	View Data	Transform Analy	_			Add-gns Windo					
a 1	🖨 🛄	5 3	K 📥 🗉	P 4	a 👬	😰 🔜 🏹	2 📰 🖬		A85		
5:V2											
	RN	EDArvD	EDArvT	ConsD	ConsT	Disposition	DisD	DisT	EDAdmitD	EDAdmitT	1
1	871632	10.07.2017	6:47	10.07.2017	9:20	DISCHARGE	10.07.2017	9:35			
2	323922	10.07.2017	9:32	10.07.2017	11:30	DISCHARGE	10.07.2017	12:35			
3	886543	10.07.2017	12:07	10.07.2017	13:00	DISCHARGE	10.07.2017	14:30			
4	884946	10.07.2017	8:15	10.07.2017	9:08	DISCHARGE	10.07.2017	9:40			
5	163594	10.07.2017	9:20	10.07.2017	11:20	DISCHARGE	10.07.2017	11:40			
6	632856	10.07.2017	9:25	10.07.2017	10:50	DISCHARGE	10.07.2017	10:55			
7	886484	10.07.2017	9:55	10.07.2017	11:45	REFERRED	10.07.2017	12:20			
8	886502	10.07.2017	10:24	10.07.2017	13:50	DISCHARGE	10.07.2017	14:55			
9	886412	10.07.2017	7:20	10.07.2017	8:15	REFERRED	10.07.2017	9:40			
10	886447	10.07.2017	8:51	10.07.2017	9:50	DISCHARGE	10.07.2017	10.10			
11	886456	10.07.2017	9:13	10.07.2017	10:50	DISCHARGE	10.07.2017	13:30			
12	886481	10.07.2017	9:49	10.07.2017	11:15	DISCHARGE	10.07.2017	12:30			
13	886476	10.07.2017	9:44	10.07.2017	11:30	REFERRED	10.07.2017	12:45			
14	5704	10.07.2017	10:29	10.07.2017	12:30	DISCHARGE	10.07.2017	13:30			
15	792489	10.07.2017	11:20	10.07.2017	14:00	DISCHARGE	10.07.2017	14:50			
16	886549	10.07.2017	12:39	10.07.2017	14:30	DISCHARGE	10.07.2017	15:00			
17	886800	11.07.2017	10:52	11.07.2017	12:00	REFERRED	11.07.2017	12:00			
18	886821	11.07.2017	11:54	11.07.2017	12:30	DISCHARGE	11.07.2017	15:00			

Figure 15: Example of file open directly from Microsoft Excel

2.2.2 Comma Separated Value (CSV) files to SPSS

Comma Separator Value is a delimited text file that uses comma to separate values. Data stored in (.csv). Files with the extension .csv are called *comma-delimited* files; in this type of file, the observations are separated (*or delimited*) by a comma. CSV file stores tabular data (number and text) in plain text. CSV file are commonly used because many programs support the variations on CSV for data import. Alternatively, user can store data in CSV and open it using SPSS software (9).

Steps to import data using Comma Separated value (.csv) files type:

Open your file in Excel format. Save file in new files of type Save as > Save as type CSV- (MS-DOS). For Macbook user, save as CSV (Macintosh). After you have saved the file in *.csv format, close to Excel file (Figure 16).

The normer	asta ca tanta compante an m
Save as type:	Excel Workbook 🗸
Authors:	Excel Workbook Excel Macro-Enabled Workbook
	Excel Binary Workbook
	Excel 97-2003 Workbook CSV UTF-8 (Comma delimited)
	XML Data
 Hide Folders 	Single File Web Page
01030	Web Page Excel Template
	Excel Macro-Enabled Template
	Excel 97-2003 Template
	Text (Tab delimited) Unicode Text
	UNIL Spreadsheet 2003
	Microsoft Excel 5.0/95 Workbook
	CSV (Comma delimited) Formatted Text (Space delimited)
	romated lext (space delimited) Text (Macintosh)
	Text (MS-DOS)
	CSV (Macintosh)
	CSV (MS-DOS) DIF (Data Interchange Format)
	SYLK (Symbolic Link)
	Excel Add-in
	Excel 97-2003 Add-in PDF
	XPS Document
	Strict Open XML Spreadsheet
	OpenDocument Spreadsheet

Figure 16: Save as CSV (.csv) file type



Start by clicking File > Open > Data to open *.csv files in SPSS. The Open Data window will appear. In the Files of type list, the option "Text (*.txt, *.dat, *.csv)" is selected by default. Locate your file and click on it to select it, then click OK (Figure 17).

— 🤄 Open Data		×
Look <u>i</u> n:	Bengkel Data Analy 🔽 🔯 🔯 🖽 🗸	
Borang D Exercise Exercise Exercise Exercise Exercise Slide Pres	2 3 4	
File <u>n</u> ame:		Open
Files of type:	SPSS Statistics (*.sav)	Paste
<u>Encoding:</u> <u>Minimize</u>	Excel (*.xis, *.xisx, *.xism) Lotus (*.w*) Sylk (*.sik)	Cancel <u>H</u> elp
	dBase (*.dbf) SAS (*.sas7bdat, *.sd7, *.sd2, *.ssd01, *.ssd04, *.xpt) Stata (*.dta) Text (*.txt, *.dat, *.csv, *.tab)	
	All Files (*.*)	

Figure 17: Open CSV file (.csv) type in SPSS

New window will pop-up showing Text Import Wizard. This window provides a preview of the data in your *.csv file. The next step is to indicate whether the data matches a predefined format, which would be a format saved from a previous *.csv file imported with the Text Import Wizard. In most cases there will not be a predefined format. Follow these steps in the Text Import Wizard to import the text data (Figure 18).

ta Te	xt Import Wizard - Step 1 of 6
0.28 840 1 81 28.5 630 2400 0 73 40 33 632 10200 0 83 31 08 633 870 0 02 31 17 635 1744 283 41 91	Welcome to the text import wizard! This wizard will help you read data from your text file and specify information about the variables.
	Does your text file match a predefined format?
P10	op\Bengkel Data 24 jan 2018\ED data for exercise 2_csv.csv 20
3 323922,10/07/201 4 886543,10/07/201 5 884946,10/07/201 6 163594,10/07/201	7,6:47:00,10/7/2017,9:20:00,DISCHARGE,10/7/201 7,9:32:00,10/7/2017,11:30:00,DISCHARGE,10/7/20 7,2:07:00,10/7/2017,13:00:00,DISCHARGE,10/7/20 7,8:15:00,10/7/2017,9:08:00,DISCHARGE,10/7/201 7,9:20:00,10/7/17,11:20:00,DISCHARGE,10/7/17,11 7,9:25:00,10/7/17,10:50:00,DISCHARGE,10/7/17,10
8 886484,10/07/201 9 886502,10/07/201 10 886412,10/07/201	7,9:55:00,10/7/17,11:45:00,REFERRED,10/7/17,12 7,10:24:00,10/7/17,13:50:00,DISCHARGE,10/7/17, 7,7:20:00,10/7/17,8:15:00,REFERRED,10/7/17,9:44 7,8:51:00,10/7/17,9:50:00,DISCHARGE,10/7/17,10
< Back	Next > Finish Cancel Help

Figure 18: Text import wizard for CSV file - Step 1

If your data match a predefined format, click Yes and then browse for and upload the file that defines the format. (This would be the case if you had already imported a text data file into SPSS in the past that was formatted exactly the same way, and had chosen to save the import format during the last step of the Text Import Wizard.)

If your data do not match a predefined format, click **No**, then click **Next**.

ta Text Import Wizard - Step 2 of 6	×
How are your variables arranged?	
Are variable names included at the top of your file?	
4 884946,10/7/2017,10/7/2017,8:15:00,9:08:00,discharged,10/7/2017, 5 163594,10/7/17,10/7/17,9:20:00,11:20:00,DISCHARGED,10/7/17,11:40 6 632856,10/7/17,10/7/17,9:25:00,10:50:00,DISCHARGED,10/7/17,10:55 7 0.00000000000000000000000000000000000	L.

Figure 19: Text import wizard – Step 2

If your data did not match a predefined format, you will need to tell SPSS how your data is formatted. In the "How are your variables arranged" area, click the button that matches your data's format: **Delimited: Variable values are delimited (or separated) in the file by a special character, such as a comma or a tab.** Fixed width: Variables are aligned in fixed width columns. In the "Are variable names included at the top of your file" area, click Yes, then click Next (Figure 19).



Text Import Wizard - Delimited Step 3 of 6	×
The first case of data begins on which line number?	
How are your cases represented?	
Each line represents a case	
◎ A specific number of variables represents a case: 21	
F How many cases do you want to import?	_
All of the cases A	
\bigcirc A random <u>p</u> ercentage of the cases (approximate): 10 \Leftarrow %	
□ Data preview	_
0 10 20 30 40 50 60	
1 871632,10/7/2017,10/7/2017,6:47:00,9:20:00,DISCHARGED,10/7/2017, 2 323922,10/7/2017,10/7/2017,9:32:00,11:30:00,discharged,10/7/201 3 886543,10/7/2017,10/7/2017,12:07:00,13:00:00,discharged,10/7/201 4 884946,10/7/2017,10/7/2017,8:15:00,9:08:00,discharged,10/7/2017, 5 163594,10/7/17,10/7/17,9:20:00,11:20:00,DISCHARGED,10/7/17,11:40	
< Back Next > Finish Cancel Help	

Figure 20: Text import wizard - Step 3

Click the buttons, and as necessary the values, that best describe your data for each of the following headings. If your dataset starts with a variable at first row/line 1, your data should begin at line 2. Click Next when you are finished (Figure 20).

In the "Which delimiters appear between variables" area, select the check box that reflects the delimiter used in your data. The delimiter is what is used **to separate values from each other within the data**. The options include Tab, Space, Comma, Semicolon, Other. If the text file is a **.csv file**, then the **delimiter is a comma** (Figure 21).

If you do not know which delimiter is used in the text file, refer to document that is associated with your data or the data owner.

Vhieh delie					test evelifier 0		
<u>T</u> ab	niters appear b	Space	les?	None	e text qualifier?		
Comma Semicolon							
Othe <u>r</u> :			 Single <u>a</u>uote <u>D</u>ouble quote 				
							◎ Ot <u>h</u> er:
)ata previe	1	ConsD	EDANT	ConsT	Disposition DisD		
RN	EDArvD	ConsD	EDArvT 6:47:00	ConsT 9-20-00	Disposition DisD		
RN 871632	EDArvD 10/7/2017	10/7/2017	6:47:00	9:20:00	DISCHARG 10/7/2		
RN	EDArvD		22/	9:20:00 11:30:00	DISCHARG 10/7/2 discharged 10/7/2		
RN 871632 323922	EDArvD 10/7/2017 10/7/2017	10/7/2017 10/7/2017	6:47:00 9:32:00	9:20:00	DISCHARG 10/7/2 discharged 10/7/2 discharged 10/7/2		
RN 871632 323922 886543	EDArvD 10/7/2017 10/7/2017 10/7/2017	10/7/2017 10/7/2017 10/7/2017	6:47:00 9:32:00 12:07:00	9:20:00 11:30:00 13:00:00	DISCHARG 10/7/2 discharged 10/7/2 discharged 10/7/2		
RN 871632 323922 886543 884946	EDArvD 10/7/2017 10/7/2017 10/7/2017 10/7/2017	10/7/2017 10/7/2017 10/7/2017 10/7/2017	6:47:00 9:32:00 12:07:00 8:15:00	9:20:00 11:30:00 13:00:00 9:08:00	DISCHARG 10/7/2 discharged 10/7/2 discharged 10/7/2 discharged 10/7/2		
RN 871632 323922 886543 884946 163594	EDArvD 10/7/2017 10/7/2017 10/7/2017 10/7/2017 10/7/17	10/7/2017 10/7/2017 10/7/2017 10/7/2017 10/7/2017 10/7/17	6:47:00 9:32:00 12:07:00 8:15:00 9:20:00	9:20:00 11:30:00 13:00:00 9:08:00 11:20:00	DISCHARG 10/7/2 discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1		
RN 871632 323922 886543 884946 163594 632856	EDArvD 10/7/2017 10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17	10/7/2017 10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17	6:47:00 9:32:00 12:07:00 8:15:00 9:20:00 9:25:00	9:20:00 11:30:00 13:00:00 9:08:00 11:20:00 10:50:00	DISCHARG 10/7/2 discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1 DISCHARG 10/7/1		
RN 871632 323922 886543 884946 163594 632856 886484	EDArvD 10/7/2017 10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17	10/7/2017 10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17	6:47:00 9:32:00 12:07:00 8:15:00 9:20:00 9:25:00 9:55:00	9:20:00 11:30:00 13:00:00 9:08:00 11:20:00 10:50:00 11:45:00	DISCHARG 10/7/2 discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1 DISCHARG 10/7/1 REFERRED 10/7/1		
RN 871632 323922 886543 884946 163594 632856 886484 886502	EDArvD 10/7/2017 10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17	10/7/2017 10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17	6:47:00 9:32:00 12:07:00 8:15:00 9:20:00 9:25:00 9:55:00 10:24:00	9:20:00 11:30:00 9:08:00 11:20:00 10:50:00 11:45:00 13:50:00	DISCHARG 10/7/2 discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1 DISCHARG 10/7/1 REFERRED 10/7/1 DISCHARG 10/7/1		
RN 871632 323922 886543 884946 163594 632856 886484 886502 886412	EDArvD 10/7/2017 10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17	10/7/2017 10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17	6:47:00 9:32:00 12:07:00 8:15:00 9:20:00 9:25:00 9:55:00 10:24:00 7:20:00	9:20:00 11:30:00 9:08:00 11:20:00 10:50:00 11:45:00 13:50:00 8:15:00	DISCHARG 10/7/2 discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1 DISCHARG 10/7/1 DISCHARG 10/7/1 DISCHARG 10/7/1 REFERRED 10/7/1 REFERRED 10/7/1 REFERRED 10/7/1		
RN 871632 323922 886543 884946 163594 632856 886484 886502 886412 886447	EDArvD 10/7/2017 10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17	10/7/2017 10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17	6:47:00 9:32:00 12:07:00 8:15:00 9:20:00 9:25:00 9:55:00 10:24:00 7:20:00 8:51:00	9:20:00 11:30:00 9:08:00 11:20:00 10:50:00 11:45:00 13:50:00 8:15:00 9:50:00	DISCHARG 10/7/2 discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1 DISCHARG 10/7/1 DISCHARG 10/7/1 DISCHARG 10/7/1 REFERRED 10/7/1 DISCHARG 10/7/1 DISCHARG 10/7/1 DISCHARG 10/7/1		

Figure 21: Text import wizard - Step 4

This step in Figure 22 allows you to specify the format for each variable in the data file. In the "Specifications for variable(s) selected in the data preview" area, SPSS explains that the default format selected for each variable.

In the Data Preview area, SPSS displays a preview of how your data will appear in SPSS once the import is complete. You can select any of the variable names (columns) in order to alter the data format. Here, you can change the format of your dataset according to the intended format (Figure 22).

Text Import	Wizard - Step	5 of 6				×
Specification	s for variable(s) selected in t	the data previ	iew		
If a colu string. The len	mn contains i gth (number o t in the first 20	nined from the multiple data ty of characters) f 0 records. If su	pes in the fir	st 200 records ables is deterr	s, tr Select the	
Variable nam	ne:		Original	Name:		
EDArvD			EDArvD		K	
Data format:						
Date/Time		T dd-mm	m-yyyy	▲		
		dd-mmr mm/dd/ mm/dd/ dd.mm.	уууу уу			
- Data preview						
RN	EDArvD	ConsD	EDArvT	ConsT	Disposition	DisD
871632	10/7/2017	10/7/2017	6:47:00	9:20:00	DISCHARG.	. 10/7/2 📥
323922	10/7/2017	10/7/2017	9:32:00	11:30:00	discharged	10/7/2
886543	10/7/2017	10/7/2017	12:07:00	13:00:00	discharged	10/7/2
884946	10/7/2017	10/7/2017	8:15:00	9.08.00	discharged	10/7/2
	< <u>B</u>	ack <u>N</u> ext >	Finish	Cancel He	lp	

Figure 22: Text import wizard - Step 5

Finally, you can choose to save the file format that you just defined for the current data file in case you need to use it for future file importations. This file is known as **predefined file**.

A preview of your data appears at the bottom of the dialog box. If you are satisfied with the way the preview looks, click Finish to finalise the import (Figure 23).

		You have	successfully	y defined the f	ormat of your text file.
		_ Would y	ou like to sa	ve this file forr	mat for future use?
wart	var2 var3 v	◯ <u>Y</u> es			Save As
1 628	840 1	O No			
2 630	2400 0				
3 632	10200 0	r Would y	ou like to pa	ste the syntax	?
4 633	820 0	O Yes			
•	2				Cache data loc
		No			
		Press the	e Finish butto	on to complete	e the text import wizard.
ata previev	V				
RN	EDArvD	ConsD	EDArvT	ConsT	Disposition DisD
074000		10/7/00/17	0.47.00		
871632	10/7/2017	10/7/2017	6:47:00	9:20:00	DISCHARG 10/7/2 4
323922	10/7/2017	10/7/2017	9:32:00	11:30:00	discharged 10/7/2
323922	10/7/2017	10/7/2017	9:32:00	11:30:00	discharged 10/7/2 discharged 10/7/2 discharged 10/7/2
323922 886543	10/7/2017 10/7/2017	10/7/2017 10/7/2017	9:32:00 12:07:00	11:30:00 13:00:00	discharged 10/7/2 discharged 10/7/2
323922 886543 884946 163594 632856	10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17	10/7/2017 10/7/2017 10/7/2017	9:32:00 12:07:00 8:15:00 9:20:00 9:25:00	11:30:00 13:00:00 9:08:00 11:20:00 10:50:00	discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1 DISCHARG 10/7/1
323922 886543 884946 163594	10/7/2017 10/7/2017 10/7/2017 10/7/17	10/7/2017 10/7/2017 10/7/2017 10/7/17	9:32:00 12:07:00 8:15:00 9:20:00	11:30:00 13:00:00 9:08:00 11:20:00	discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1 DISCHARG 10/7/1 REFERRED 10/7/1
323922 886543 884946 163594 632856 886484 886502	10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17	10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17	9:32:00 12:07:00 8:15:00 9:20:00 9:25:00 9:55:00 10:24:00	11:30:00 13:00:00 9:08:00 11:20:00 10:50:00 11:45:00 13:50:00	discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1 DISCHARG 10/7/1 REFERRED 10/7/1 DISCHARG 10/7/1
323922 886543 884946 163594 632856 886484	10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17	10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17	9:32:00 12:07:00 8:15:00 9:20:00 9:25:00 9:55:00	11:30:00 13:00:00 9:08:00 11:20:00 10:50:00 11:45:00	discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1 DISCHARG 10/7/1 REFERRED 10/7/1
323922 886543 884946 163594 632856 886484 886502	10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17	10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17	9:32:00 12:07:00 8:15:00 9:20:00 9:25:00 9:55:00 10:24:00	11:30:00 13:00:00 9:08:00 11:20:00 10:50:00 11:45:00 13:50:00	discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1 DISCHARG 10/7/1 REFERRED 10/7/1 DISCHARG 10/7/1
323922 886543 884946 163594 632856 886484 886502 886412	10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17	10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17	9:32:00 12:07:00 8:15:00 9:20:00 9:25:00 9:55:00 10:24:00 7:20:00	11:30:00 13:00:00 9:08:00 11:20:00 10:50:00 11:45:00 13:50:00 8:15:00	discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1 DISCHARG 10/7/1 REFERRED 10/7/1 DISCHARG 10/7/1 REFERRED 10/7/1
323922 886543 884946 163594 632856 886484 886502 886412 886447 886456 886481	10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17	10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17	9:32:00 12:07:00 8:15:00 9:20:00 9:25:00 9:55:00 10:24:00 7:20:00 8:51:00	11:30:00 13:00:00 9:08:00 11:20:00 10:50:00 11:45:00 13:50:00 8:15:00 9:50:00	discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1 DISCHARG 10/7/1 REFERRED 10/7/1 DISCHARG 10/7/1 REFERRED 10/7/1 DISCHARG 10/7/1
323922 886543 884946 163594 632856 886484 886502 886412 886412 886447 886456	10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17	10/7/2017 10/7/2017 10/7/2017 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17 10/7/17	9:32:00 12:07:00 8:15:00 9:20:00 9:25:00 9:55:00 10:24:00 7:20:00 8:51:00 9:13:00	11:30:00 13:00:00 9:08:00 11:20:00 10:50:00 11:45:00 13:50:00 8:15:00 9:50:00 10:50:00	discharged 10/7/2 discharged 10/7/2 discharged 10/7/2 DISCHARG 10/7/1 DISCHARG 10/7/1 REFERRED 10/7/1 DISCHARG 10/7/1 DISCHARG 10/7/1 DISCHARG 10/7/1

Figure 23: Text import wizard - Step 6

The modified file will appear in SPSS data view.

2.3 Data transformation and Analysis in SPSS

Data transformation is the process of converting data from one format to another; typically, from the format of a source to the required format. Before we can proceed with the analysis, we need to transform and create new variable for the original data set. The steps for data transformation are as below:

Select your file. Make sure the file type is in excel, otherwise the software will not be able to detect your file. Click **Open > Variable view**.

Look in: Exercise		Ⅲ ▼	
ED data for exerci I MW data for exerci			
File <u>n</u> ame:	*.xls, *.xlsx, *.xlsm) File t		_
Encoding:	in Ex	Cance	_

Figure 24: Opening Excel file in SPSS

0	E201001	. 17.00	2015	9.11.00	17.00.2015
9	E201601	. 17.08	.2015	10:20:00	17.08.2015
10	E201601	. 17.08	.2015	9:28:00	17.08.2015
11	E201601	. 17.08	.2015	10:20:00	17.08.2015
12	E201601	. 17.08	.2015	22:29:00	17.08.2015
13	E201601	. 17.08	.2015	21:40:00	17.08.2015
14	E201601	. 17.08	.2015	21:30:00	17.08.2015
15	E201601	. 17.08	.2015	21:21:00	17.08.2015
16	E201601	. 17.08	.2015	21:00:00	17.08.2015
17	E201601	. 17.08	.2015	16:30:00	17.08.2015
18	E201601	. 17.08	.2015	22:30:00	17.08.2015
19	E201601	. 17.08	2015	21:40:00	17.08.2015
20	E201601	17.08	2015	20:51:00	17.08.2015
21	E201601	Variable view	015	16:04:00	17.08.2015
22	E201601		2015	18:38:00	17.08.2015
23	E201601	. 17.08	.2015	22:20:00	17.08.2015
	4				
ata View	Variable View				

Figure 25: Variable view in SPSS

In case the date is not displayed properly in the SPSS, copy and paste the data to the column in SPSS. In variable view, you can **change the type to date format (dd.mm.yyyy) and time variables to date format (hh:mm:ss)**.

	Yew Data	Iransform	0	ype	220	aphs Utilities Add-ons Window	Help					
2		📮 🖛 🖌		/	F	# 📕 🖬 📥			ABG			
	Name	Туре	Width	Decimals		Label	Values	Missing	Columns	Align	Measure	Role
1	HospitalID	String	9	0	Hospital	D	None	None	10	IIIE Left	🚓 Nominal	> Input
2	RN	Numeric	12	0	Patient	registration number	None	None	7	Right Right	A Scale	> Input
3	EdAn/D	Date	10	0		ED - Date	None	None	11	I Right	# Scale	> Input
- 4	EdArvT	Date	8	0		ED - Time	Nona	None	11	Right	🧳 Scale	> Input
5	ConsD	Date	10	0	Consul	🚱 Variable Type			×	E Ros	🖋 Scale	> Input
6	ConsT	Date	8	0	Consul	O Numeric		d.mm.yyyy	-	I Right	& Scala	V Innut
7	Disposition	String	34	0	Dispos	O Comma	dd.mm.w			I Left	📑 Chan	ge dat
8	DisD	Date	10	0	Discha	O Dot				Righ Righ	format for	
9	DisT	Date	8	0	Discha	O Scientific notation		yy/mm/dd				
10	EDadmitD	Date	10	0	Admiss	() Date	yyddd			Righ	1	1 1
11	EDadmitT	Date	8	0	Admiss	O Dollar	yyyyddd g Q yyyy		Right Right	🚺 date (dd.	
12	ArvBedD	Date	10	0	Admit t	O Custom currency		Qw		Right)
13	ArvBedT	Date	8	0	Admit t	O String		mmm yyyy			🔰 mm.y	yyy)
14					mmm w 111			O Sping mmm yy O Restricted Numeric (integer with leading zeros)				ate
15						The Numeric type honors the digit grouping setting, while the Restricted						
16												nm:ss)
17												
18						OK	ancel Help					
19								-				
20												
21												

Figure 26: Change the type and format of data in variable view

The following instructions show a step-by-step example to transform data or variables for Emergency department and Medical ward. We need to create new variables before analysing from the original data set.

2.3.1 Emergency department

2.3.1.1 Transformation data

Example:

Create New variable \rightarrow Arrival to Consultation (ATC): duration of time from patient arrival until patient enters doctor's room for consultation

Before analysis, ATC need to be created in the dataset since it is a new variable. By using the Transform tab, select Date and Time Wizard (Figure 27). A new window will appear as shown in Figure 28.

	ta da	ta ED v1	l.sav [Dat	taSet1] - I	BM SPSS Statis	tics Data Ec	litor				
	Eile	Edit	View	<u>D</u> ata	Transform	<u>A</u> nalyze	Direct Marke	ting <u>G</u> raphs	Utilities	Add-o	ns <u>W</u> indow <u>H</u>
					Computer Program		ansformation		•	¥	- -
				J	Count Va	alues within	Cases				
			Hos	pitalID	Shift Val	Jes			Cons	D	ConsT
_	1		E20160)1	Recode	into Domo	Variables		18.0	8.2015	0:00:00
1	2	2	E20160)1	Recode	into <u>s</u> ame	Variables		13.0	8.2015	16:10:00
	3	}	E20160)1	Recode	into Differe	nt Variables		17.0	8.2015	22:11:00
	4	Ļ	E20160)1	🛐 Automat	c Recode			17.0	8.2015	17:29:00
	5	;	E20160)1	🕂 Create D	ummy Vari	ables		17.0	8.2015	18:53:00
	6	;	E20160)1	Visual B	inning	_		17.0	8.2015	13:07:00
	7	'	E20160)1	C Optimal	Binning	(T	'ransform >	> Date	8.2015	23:13:00
	8	}	E20160)1	Anonymi	-		nd Time W		8.2015	23:40:00
	9)	E20160)1						8.2015	11:28:00
	1	0	E20160)1		Data for M	odeling	, ,	17.0	8.2015	9:50:00
	1	1	E20160)1	🕅 Ran <u>k</u> Ca	ses			17.0	8.2015	11:28:00
	1	2	E20160)1	🛗 Date and	d Time Wiza	ard		17.0	8.2015	22:58:00
	1	3	E20160)1	Create T	i <u>m</u> e Series			17.0	8.2015	22:15:00
	14	4	E20160)1	Replace	Missing <u>V</u> a	alues		17.0	8.2015	22:05:00
ſ	1/	5	E20160)1	@				17.0	8 2015	22-15-00

Figure 27: Choose Date and Time wizard under Transform tab.

First, select Option 4 to calculate with dates and times and click Next.

The Discolar Company and the Discolar Company	×
Welcome to the date and time wizard	
What would you like to do? () Learn how dates and times are represented in SP () Create a date/time variable from a string containin () Create a date/time variable from variables holding parts of dates or times () Create a date/time variable from variables holding parts of dates or times () Create a date/time variable from variables holding parts of dates or times () Extract a part of a date or time variable () Extract a part of a date or time variable () Extract a part of a date or time variable () Extract a part of a date or time variable () Assign periodicity to a dataset (for time series data). This ends the wizard and opens the Define Dates dialog box	
< Back Next > Finish Cancel Help	

Figure 28: Date and Time wizard window

After selecting Option 4, proceed by selecting Option 3 to subtract two durations and click Next in step 1 of 3 Date and Time wizard.

🔚 Date and Time Wizard - Step 1 of 3	×
Do Calculations on Dates	
Do Calculations on Dates Choose one of the following tasks and press Next Option 3 > Next	
< Back Next > Finish Cancel Help	

Figure 29: Calculation on dates

In order to calculate the difference between two durations e.g ATC, we need to select the required variables from our data. As shown in Figure 30, select Consultation date for Duration 1 and Arrival in ED date for Duration 2. Following that, click Next.

🔚 Date and Time Wiz	izard - Step 2 of 3	×			
Calculate the difference between two duration variables.					
The result will be a duration variable. Only duration variables are shown in the variables list below.					
	Variables: Image: Second S				

Figure 30: Selection of variable for calculation of differences in date

Rename the result variable to ATC and variable label to Arrival to Consultation. Make sure the output format is in hh:mm. Then, select paste the syntax and click Finish.

ᄓ Date and Time	Vizard - Step 3 of 3	×
Calculation:	ConsT - EDArvT New variable: ATC	
	Result Variable:	Output Format:
	Variable Label: Arrival to Consultation Execution © <u>C</u> reate the variable now © <u>P</u> aste the syntax in	
	< <u>B</u> ack <u>Next</u> > Finish Ca	ncel Help

Figure 31: Rename new variable as Arrival to Consultation

27

Syntax window containing the command will appear. Highlight the command and click run selection. Your new variable, ATC will appear in the data view (Figure 32 and 33).

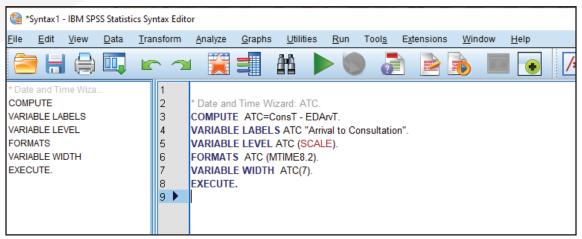


Figure 32: Syntax window with command for calculating date and time difference

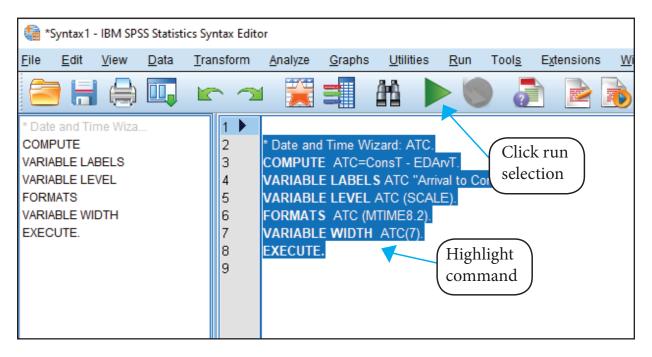


Figure 33: Highlight the command and click Run

Right click at the ATC column and sort descending to view the outlier's data. If there is a negative value, data owner **MUST** decide whether to remove or delete the data or check for any error in data entry (Figure 34). If there is an error in data entry, correction must be made by counterchecking from original data sheet. Once finished, proceed with the next step.

								Visible: 1	4 of
					ArvBedT	ATC	var	var	
						0:03			
						0:02			
			Visible: 14 d	of 14 Variables		0:00			
vBedT	ATC	Var	var	var		0:00			
VDeut	-21	Cut		Ydi 🔺		0:00			
	-21				S	0:00			
-	2	Copy				-0:05			
8	1	Paste				-9:39			
	0	Clear				-10:15			
	1	Insert Variabl				-10:24			
	12					-10:25			
	0	Sort Ascendir	g		1. C.	-10:42			
	14	Sort Descend	ling		14	-10:48			
	1	Descriptive St	atistics			-10:48			
-	-				1	-11:27			
		Spelling				-14:20			
		08	(Decide t	o delete/	-21:19			
		29		change	,	-21:24			
12	0:	35	(Change		-21:34			
1	0:	35				-21:41			
	0:	54				-21:49			1
		55				-22:09			
		30				-22:10			-

Figure 34: Sorting the data to find any outliers data.

In variable view, right click at the empty row and choose insert variable. Named the variable oneday and change type to date with format hh:mm. Click OK.

8	DisT	Date	5	0	None None	8 🗏 Right	💊 💉 Scale
9	EDAdmitD	Date	10	0	🕼 Variable Type	×	🕻 🧳 Scale
10	EDAdmitT	Date	5	0			Scale 🛷
11	ArvBedD	Date	10	0	◎ <u>N</u> umeric	yyyy-mm-dd hh:mm:ss 🖆	Scale 🔗 🖉
12	ArvBedT	Date	5	0	© <u>C</u> omma	yyyy-mm-dd hh:mm:ss.ss mm:ss	Scale 🖉
13	ATC	Date	8	2	© <u>D</u> ot	mm:ss.ss	🖌 🔗 Scale
14	oneday	Numeric	8	2	○ Scientific notation	hh:mm	Unknown
15					Oate	hh:mm:ss	
16					O Dollar	hh:mm:ss.ss	
17					○ C <u>u</u> stom currency	ddd hh:mm ddd hh:mm:ss	
18					© St <u>r</u> ing	ddd hh:mm:ss.ss	
19	1				O Restricted Numeric (integer with leading zeros)	Monday, Tuesday,	
20					· • • • • • • • • • • •		
21	1				The Numeric type honors the digit grouping s Numeric never uses digit grouping.	etting, while the Restricted	
22							
23					OK Cancel H	Help	
24							-

Figure 35: Insertion of new variable - Oneday in the data set

In Data View, type 24:00 in the first line in column oneday. Then, copy and paste until the end of the row with data. Variable oneday is created to assist in the analysis process later and it refers to one day time duration which is 24 hours.



DAdmitT	ArvBedD	ArvBedT	ATC	oneday	var	var
1		1	12:27	24:00		
	13.08.2015	9:45:00.00	4:13	24:00		
	1	12	3:31	24:00		
			3:18	24:00		
		1	2:57	24:00		
			2:55	24:00		
		12	2:38	24:00		
			2:31	24:00		
			2:28	24:00		
19:15:00.00			2:26	24:00		
			2:26	24:00		
			2:22	24:00		
21:50:00.00			2:17	24:00		

Figure 36: Column oneday with 24:00 as time format

After finish creating new variable oneday, proceed with next step. Click Transform and choose Date and Time Wizard. Click Option 3 to calculate with dates and times and click Next.

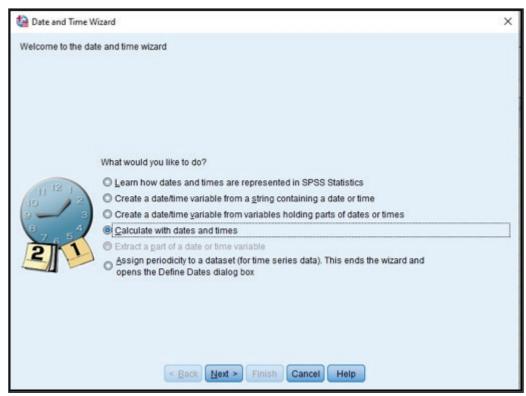


Figure 37: Date and time wizard to calculate date and time

Then, in Step 1 of 3, click Option 2 to calculate the number of time units between two dates and click Next (Figure 38).

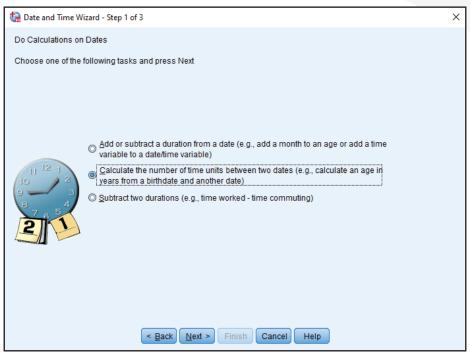


Figure 38: Calculation the number of time units between two dates

Select Consultation Date for Date 1 and Arrival Date for Date 2. **MAKE SURE** the unit is **DAYS** and choose option 1 (truncate to integer) for result treatment. Click Next.

Calculate the number of time units between two date or date/time variables. The result will be an integer variable. Any fractional part of a unit will be discarded. The result will be a duration variable. Only duration variables are shown in the variables list below. Variables are shown in the variables list below. Variables: Uate 1: Current date and t Current date and t Cur	🝓 Date and Time Wiz	ard - Step 2 of 3		×
duration variables are shown in the variables list below.	Calculate the number	r of time units between two	date or date/time variables.	
Current date and t ☆ DisD ☆ EDAdmitD ☆ ArvBedD				у
For month and year units, the result is based on average unit length unless truncation is used. \$TIME is the current date and time. < Back		Current date and t	ConsD minus Date2: ConsD minus Date2: ConsD Unit: Days Result Treatment Constant Treatment Constant free to integer Constant free to integ	

Figure 39: Selection of variable to calculate difference between time

Rename the result variable to ATC dated iff and variable label ATC dated ifference. Select option 2 to paste the syntax into the syntax window. Click Finish.

ᄓ 🔚 Date and Time Wi	izard - Step 3 of 3	×
Calculation:	ConsD - EDArvD	
	Result Variable: ATCdatediff Variable Label: ATCdatedifference Execution © Create the variable now © Create the variable now © Paste the syntax into	

Figure 40: Rename the new variable

The new syntax for variable ATCdatediff will appear in the syntax window. Highlight the ATCdatediff syntax and click Run Selection. It will create new variable ATCdatediff in your data view.

🍓 *Syntax1 - IBM SPSS Statistics Syntax Ed	itor
<u>File Edit V</u> iew <u>D</u> ata <u>T</u> ransform	Analyze <u>G</u> raphs <u>U</u> tilities <u>R</u> un Tool <u>s</u> E <u>x</u> tensions <u>W</u> indow <u>H</u> elp
🔄 🗄 🖨 🛄 🗠 🗠	
* Date and Time Wiza 1	run selection
COMPUTE 2	* Date and Time Wizard: ATC.
VARIABLE LABELS 3	COMPUTE ATC=ConsT - EDArvT.
VARIABLE LEVEL 4	VARIABLE LABELS ATC "Arrival to Consultation".
FORMATS 5	VARIABLE LEVEL ATC (SCALE).
VARIABLE WIDTH 6	FORMATS ATC (MTIME8.2). (New syntax for
EXECUTE. 7	VARIABLE WIDTH ATC(7). ATCdatediff.
* Date and Time Wiza 8	EXECUTE.
COMPUTE 9	
VARIABLE LABELS	
VARIABLE LEVEL 11	COMPUTE ATCdatediff=DATEDIF(ConsD, EDArvD, "days").
FORMATS 12	VARIABLE LABELS ATCdatediff "ATCdatedifference".
VARIABLE WIDTH 13	VARIABLE LEVEL ATCdatediff (SCALE).
EXECUTE. 14	FORMATS ATCdatediff (F5.0).
15	VARIABLE WIDTH ATCdatediff(5).
16	EXECUTE.
17	

Figure 41: Syntax for ATC date differences

The new variable **ATCdatediff** will appear on your data view in the form of number 1 and 0.

- 0 is for data without any date difference.
- 1 is for data with different in days (e.g arrive to ED 17 Aug 2016 2315 PM and consult doctor at 18 Aug 2016 0030 AM).



			,	-、			
ArvBedT	ATC	Oneday	ATCdatediff		var	١	/ar
	14:29	24:00	Q				
12:30:00	12:40	24:00	Q	AT	Cdatediffer	ence	
	12:30	24:00	0				
	12:03	24:00	0		1		
	7:25	24:00	0				
	6:43	24:00	0				
	6:13	24:00	0				
	5:47	24:00	0				
	5:40	24:00	0				
	E-24	24-00	0	L			

Figure 42: New variable ATC dated iff created in the Data set

Next, we will calculate the final value for ATC. Open the Syntax window and type the syntax below into the syntax window.

DO IF (ATCdatediff = 0). Compute ATCnew=ATC. ELSE IF (ATCdatediff = 1). Compute ATCnew=ATC+oneday. END IF. MISSING VALUES ATCnew (LO THRU 0). EXECUTE. VARIABLE LEVEL ATCnew (SCALE). FORMATS ATCnew (TIME5). VARIABLE WIDTH ATCnew(5). EXECUTE.

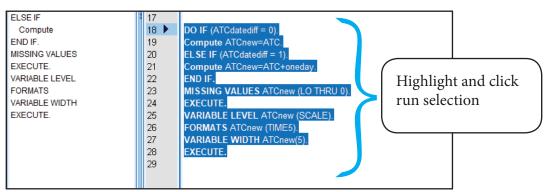


Figure 43: Highlight syntax and click Run to calculate the final ATC

Highlight and click run selection for syntax ATCnew. This will create the new variable ATCnew in the data view. This is the final value for ATC after calculation. We will use this variable to get the mean/average and throughput value.



				-		ew varial FCnew c	
T	Oneday	ATCdatediff	ATCnew		var	var	va
5	24:00	1	13:44				
4	24:00	1	13:35				
9	24:00	1	2:40				
4	24:00	1	2:35				
4	24:00	1	2:25				
1	24:00	1	2:18				
9	24:00	1	2:10				
9	24:00	1	1:50				
0	24:00	1	1:49				
1	24:00	1	1:38				
2	24:00	1	1:37				
4	24:00	1	1:25				
9	24:00	1	1:20				

Figure 44: New variable, ATCnew in data set

2.3.1.2 Data analysis

Arrival to Consultation (ATC)

We will analyse the data to obtain the average value for Arrival to Consultation (ATC). Click Analyze and then choose Descriptive Statistics and click Explore.

SS Statis	stics Data E	ditor						
form	<u>A</u> nalyze	Direct <u>M</u> arketing	<u>G</u> raphs	Uti	lities	Add- <u>o</u> ns	<u>W</u> inc	dow
	Re <u>p</u> o	rts		•				
1	D <u>e</u> sa	riptive Statistics		•	123	Erequencies.		9
	Custo	om Ta <u>b</u> les		۶.	10	Descriptives.		
C	Com	pare Means		۶.	.a. (Explore		dmit
scharg	<u>G</u> ene	ral Linear Model		۶.	_	 Crosstabs		
ll not a	Gene	ralized Linear Mode	ls	۲.		-		
scharg	Mixed	Models		•		FURF Analysi	IS	
scharg	Corre	late		•	E 100	<u>R</u> atio		
scharg	Regre	ession		•	🧖 E	P-P Plots		
charg					🛃 (Q-Q Plots		
charg		al Networks		•	00	-		1

Figure 45: Descriptive analysis for ATC

Explore window will show interface as in Figure 46. Click ATCnew and insert into dependent list on the right side. In display section, choose Statistics. If you choose Both, the result will show both Statistics and Plot in Output window. Finally, click OK to proceed.

34

)isD 08.20	DieT FDadmitD	FDadmitT	Click ATCnew into dependent list	ন
08.20 08.20 08.20 08.20 08.20 08.20 08.20	Discharge - Dat Discharge - Tim Discharge - Tim Admission to Me Admission to Me Admit to ward (in Admit to ward (in Arrival To Consu Oneday [Oneday]	Dependent List	Statistics 1:2 Plots 1:1 Plots 1:2 Options 1:3 Bootstrap 1:4 1:4 1:4 2:0 2:1	24 9 24 44 9 9 9 9 9
08.20 08.20 08.20 08.20	ATCdatedifferen		Click Statistics	2 4 9

Figure 46: Explore window for further analysis

The result will appear in the Output window. The mean value is the average time for the Arrival to Consultation, ATC (Figure 47). In addition, you can also observe the minimum and maximum range for your data.

		Case Proc	essing Su	immary			_		
			Cas	ses			The mean value shown is		
	Va	lid	Miss	sing		Т			time for ATC
	N	Percent	Ν	Percent	t N			0	1 hour 16 min
ATCnew	632	95.8%	28	4.29	6 6	60	· U		
						∖			
		D	escriptive	s					
					Statis	tic 🔺	S	td. Error]
ATCnew	Mean					1:16	5	0:03	_`
		dence Interval	Lower	Bound		1:09	9		1
	for Mean		Upper	Bound		1:23	3		
	5% Trimm	ed Mean				T:05	5		31
	Median					0:59	9		
	Variance				2750924	41.22	2		
	Std. Deviat	ion				1:27	7		
	Minimum					0:01			
	Maximum				1	14:29	9		
	Range				1	14:27	7		
	Interquartil	e Range				0:55	5		
	Skewness					5.702	2	.097	
	Kurtosis				42	2.513	3	.194	1

Figure 47: Descriptive analysis for Arrival to Consultation (ATC)- Average time

The next step is to find throughput value (e.g percentage patient being seen by doctor within 90 minutes for ATC), use the syntax provided in the syntax file. The syntax is as below:

DO IF (XDATE.TIME(ATCnew) <= 1.5*60*60). Compute Throughput_ATC=1. ELSE IF (XDATE.TIME(ATCnew) > 1.5*60*60). Compute Throughput_ATC=0. END IF. EXECUTE.

Highlight the syntax and click Run Selection.

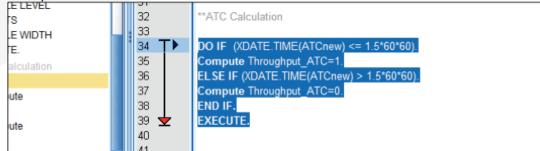


Figure 48: Paste the syntax to Syntax window

New variable named **Throughput ATC** will be created in your data view. The data will be shown as **1.00 = within 90 mins**, and **0.00 = more than 90 minutes**. Proceed with analysis by clicking **Analyze > Descriptive Statistics > Frequencies**

	Analyze > Descriptives > Frequencies									
S Stati	stics Data B	ditor							_	
rm	<u>A</u> nalyze	Direct <u>M</u> arketing	<u>G</u> raphs	U	lities Add- <u>o</u> ns	<u>W</u> ind	low <u>H</u> elp			
2	Rego Desc	orts criptive Statistics	K	۲ ۲	Erequencies.		2		ABG	
	Cust	om Ta <u>b</u> les		۲	Descriptives.				Visible	
)admi	Com	pare Means		۲	A Explore		ATCnew	Troughput_ATC	var	
	Gene	eral Linear Model		۲		1	13:44	.00		
	Gene	eralized Linear Mode	ls	۶.	W Crosstabs		13:35	.00		
	Mixed	dModels		•	TURF Analysi	IS I	2:40	.00		
	Corre	elate		•	<u> R</u> atio	1	2:35	.00		
	Regr	ession		•	🔁 P-P Plots	1	2:25	.00		
	Logli	near		•	🛃 Q-Q Plots		2:18	.00		
	Neur	al Networks		•	24:00	1	2:10	.00		
	Class	_		•	24:00	1	1:50	.00		
		ension Reduction		•	24:00	1	1:49	.00		
	Sc <u>a</u> le			۶	24:00	1	1:38	.00		

Figure 49: Analysis for Throughput ATC using Descriptive statistics

The result will be shown in the Output window. Use the value provided in the valid percent column. In this analysis, the result interpretation will be summarised as 75% of patients is seen within 90 minutes.

Trough N Mean	Statistics put_ATC Valid Missing	632 28 .7500	The percentage of throughput can be obtained by looking at valid percent value of 1.00 (e.g 1.00 = 75.0%)				
Std. De	eviation	.43336					
		Tro	ughput_AT(
		Tro Frequency	ughput_ATC	Valid Percent	Cumulative Percent		
Valid	.00						
Valid	.00	Frequency	Percent	Valid Percent	Percent		
Valid	/	Frequency 158	Percent 23.9	Valid Percent 25.0	Percent 25.0		
Valid	1.00 Total	Frequency 158 474	Percent 23.9 71.8	Valid Percent 25.0 75.0	Percent 25.0		

Figure 50:Results of descriptive analysis in Output window

Repeat and follow these steps for other variable such as **LOS (Length of Stay)** and **BWT (Bed Waiting Time)**. But this time you do not need to create the variable oneday again, as the same variable can be used for analyses. The new variables needed to be created is **LOS, LOSdatediff, LOSnew, BWT, BWTdatediff, and BWTnew.**

Call Not Attended (CNA)

The analysis of Call not attended (CNA) will be presented in the form of percentage value. The analysis will utilize the Disposition variable in the dataset (Figure 51). Begin the analysis by selecting **Analyze** > **Descriptive Statistics > Frequencies** (Figure 52)

			Vi	sible: 18 of 18 \	Variable
ısD	ConsT	Disposition	DisD	DisT	EDa
.08.2015	2:04:00	Discharge	19.08.2015	5:18:00	-
.08.2015	1:15:00	Call not around (CNA)		15:22:00	
.08.2015	2:00:00	Discharge	20.08.2015	2:50:00	
.08.2015	2:00:00	Discharge	20.08.2015	2:15:00	
.08.2015	2:15:00	Discharge	20.08.2015	2:27:00	
.08.2015	0:00:00	Discharge		11:20:00	
.08.2015	1:40:00	Discharge	20.08.2015	1:45:00	
.08.2015	1:21:00	Discharge	20.08.2015	3:22:00	
.08.2015	1:24:00	Discharge	19.08.2015	1:29:00	
.08.2015	0:55:00	Discharge	20.08.2015	1:50:00	
.08.2015	0:54:00	Admit to ward (including	-		

Figure 51: Disposition variable was used to analyse Call not attended

_												
1	v1.sav (Dat	aSet1]	- IBM SPSS	Statis	stics Data E	ditor						
	View	<u>D</u> ata	Transfor	rm	Analyze	Direct <u>M</u> arketing	<u>G</u> raphs	<u>U</u> ti	lities A	\dd- <u>o</u> ns	<u>W</u> in	dow <u>H</u> elp
				~	Re <u>p</u> o	rts		•		7		
				Descriptive Statistics			•	123 <u>F</u> red	quencies		ia 💷 🖬	
		2:15	5:00		Custo	om Ta <u>b</u> les		۶.	🔚 Des	criptives		
	Hospita	IID	RN		Comp	pare Means		۲.	A Expl	lore		Disposition
	E20160	1			<u>G</u> ene	ral Linear Model		•		sstabs		Discharge
	E20160	1	-		Gene	ralized Linear Model	s	۶.			_	Call not around (CNA
	E20160	1	-		Mixed	Models		•		RF Analysi	S	Discharge
	E20160		-		<u>C</u> orre	late		•	🚾 <u>R</u> ati	0		Discharge
	E20160	-			<u>R</u> egre	ession		۶.	🖻 Е-Р	Plots		Discharge
	E20160		-		L <u>og</u> lir	near		•	🛃 <u>Q</u> -Q			Discharge
	E20160	-			Neura	al Net <u>w</u> orks		•	08.2015			Discharge
	E20160	1			Class	ify			08.2015	1:2	1:00	Discharge

Figure 52: Frequency analysis for Call not attended

After Frequencies window appear, select Disposition in variable list on the left and click the arrow to bring it to variable box on the right (Figure 53). Next, click **Statistics > click mean and standard deviation** and click **Continue and OK**.

Frequencies	×
Variab	le(s): <u>isposition</u> <u>Charts</u> <u>Format</u> Style
☑ Display frequency tables OK Paste Reset	Cancel Help

Figure 53: Selecting Disposition variable for analysis

ntile Values artiles at points for: 10 arcentile(s): Add Change Remove	equal groups	 Central Tendency – Mean Median Mode Sum 	Click Statist	
 d deviation 🕅 N	Ajnimum Aa <u>x</u> imum	Distribution Ske <u>w</u> ness	2) Click Mean and Standard Deviation	

Figure 54: Analysis for Frequencies

The result is shown in the output file as frequency table (Figure 55). Based on the example given, there are 27 number of **Call Not Around (CNA)** which equals to 4.1 %. Always see the valid percent column for results because it has excluded all the missing values in our data.

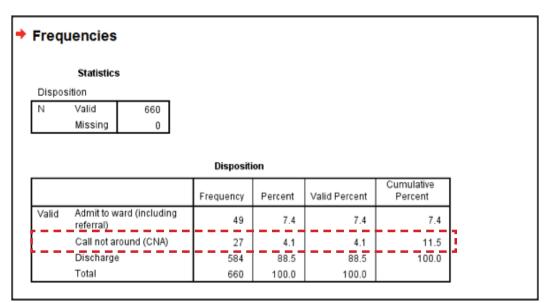


Figure 55: Result for Call not attended

NOTE: Keep the syntax for future use. In case you need to analyse similar set of data again, you just highlight and run selection. However, this action is only possible IF the variable name is the SAME with the syntax. In case the variable is different, you still can use the syntax but you need to CHANGE THE VARIABLE NAME on the syntax.

Example:

COMPUTE ATC= **Consultation - Arrival.** VARIABLE LABELS ATC "Arrival to consultation". VARIABLE LEVEL ATC (SCALE). FORMATS ATC (TIME5). VARIABLE WIDTH ATC(5). EXECUTE.



COMPUTE ATC= **ConsT - EdArvT**. VARIABLE LABELS ATC "Arrival To Consultation". VARIABLE LEVEL ATC (SCALE). FORMATS ATC (TIME5). VARIABLE WIDTH ATC(5). EXECUTE.

2.3.2 Medical Ward

3.3.2.1 Transformation data

Create New variable \rightarrow Discharge Time (DT): duration of time from doctor's decision to discharge patient until the time patient leaves bed (either going home/discharge lounge/referred to ward).

Before analysis, DT variable need to be created in the dataset since it is a new variable. By using Transform tab, select Date and Time Wizard. Then, choose Option 4 to calculate with dates and time. Next, click Next (Figure 56 and 57).

ita	Transform	<u>A</u> nalyze	Direct <u>M</u> arketing	<u>G</u> raphs
	Compute	e Variable		
	🛨 Program	mability Tra	ansformation	
24:00	Count Va	alues withir	Cases	
mp	Shi <u>f</u> t Valu	Jes		
ar-20 ar-20	Recode	into <u>S</u> ame	Variables	
ar-20 ar-20	🔤 <u>R</u> ecode i	into Differe	nt Variables	
ar-20	🛐 <u>A</u> utomati	ic Recode		
ar-20	+ Create D	ummy Vari	ables	
ar-20	Visual <u>B</u> i	inning		
ar-20	🔀 Optimal I	Binning		
ar-20	🕂 Anonymi	ze Variable	s	
ar-20	<u>P</u> repare	Data for M	odeling	•
ar-20 ar-20	Rank Ca	ses		
ar-20	🛗 Date and	d Time Wiza	ard	
ar-20		i <u>m</u> e Series		
ar-20	Replace	Missing <u>V</u> a	lues	
ar-20	🍘 Random	Number <u>G</u>	enerators	r
ar-20	Run Pen	ding Trans	forms	Ctrl+G
ar-20			001000.0	

Figure 56: Transform data using Date and Time wizard

a	Date and Time Wizard	×
Welcome to the da	ale and time wizard	
11 12 1 10 2 3 8 4 7 5 5	What would you like to do?	Landa
2	 Extract a part of a date or time variable Assign periodicity to a dataset (for time series data). This ends the wizard and opens the Define Dates dialog box Assign periodicity to a dataset (for time series data). This ends the wizard and opens the Define Dates dialog box Assign periodicity to a dataset (for time series data). This ends the wizard and opens the Define Dates dialog box Assign periodicity to a dataset (for time series data). This ends the wizard and opens the Define Dates dialog box Assign periodicity to a dataset (for time series data). This ends the wizard and opens the Define Dates dialog box 	

Figure 57: Calculate with dates and time

Then, choose Option 3 to subtract two durations and insert variable LeaveBedT into Duration 1 and DecDcT into Duration 2. Click Next.

Rename the new variable by typing DT on Result variable and type Discharge Time on variable label. Choose hh:mm:ss in the Output Format and click to paste the syntax into the syntax window and click Finish. Once the syntax window appears with the newly pasted syntax, highlight the item and click Run. The new variable, Discharge time will appear in data view (Figure 58-59).

1	Date and Time Wizard - S	tep 3 of 3	×
Calculation:	LeaveBedT - DecDcT		
		Output Format:	

Figure 58: Rename the new variable, Discharge time

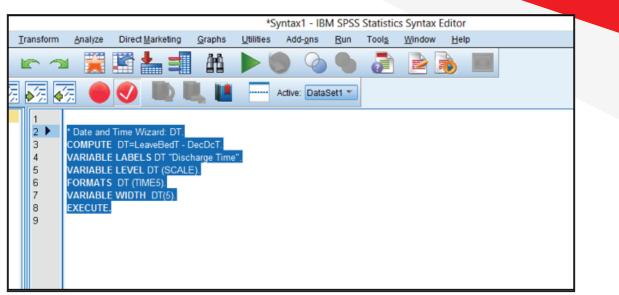


Figure 59: Syntax for Discharge time in Syntax window

We need to check for outliers such as missing data, illogical data or any negative value before we proceed with the analysis. First, click column DT and right click to sort all the value ascending (Figure 60).

oneday	DT			DT
24:00	4:	Cuţ		DI
24:00	2	Copy	0	-22:56
24:00	1:	Paste	ľ	22.00
24:00	5:	Cl <u>e</u> ar	0	-22:06
24:00	0:	🗾 Insert V <u>a</u> riable		
24:00	2	Sort Ascending	0	-6:14
24:00	41	Sort Descending	0	-1:09
24:00	4:			-1.09
24:00	1:	Descriptive Statistics	0	0:00
24:00	2:	👛 <u>S</u> pelling		0.00
24:00	0:	39	0	0:05
24:00	2:	00		
24:00	3:	35	0	0:15
24:00	2:	00		0.45
24:00	2:	29	0	0:15
24:00	2:	47	0	0-15

Figure 60: Sort all data in column DT to check for any discrepancies.

Once sorted, make a decision on each of the outliers either to delete or recheck again from original data source. If the negative value given is large number i.e -23:40, this might be due to the differences in date. Kindly proceed with the next step.

If the data consist of any negative value related to differences in date, we need to create new variable, DTDateDiff. First, click Transform and click Date and Time wizard. Select Option 4 to calculate with date and time (Figure 60)

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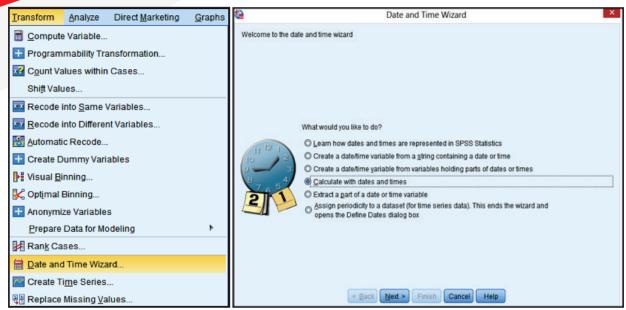


Figure 61: Date and Time wizard to create new variable, DTDateDiff

Then, click Next and select Option 2 to calculate the number of time units between two dates and proceed with Next (Figure 61).

1	Date and Time Wizard - Step 1 of 3
Do Calculations o	n Dates
Choose one of the	following tasks and press Next
H 12 1 10 2 3 8 7 6 5 4 7	 Add or subtract a duration from a date (e.g., add a month to an age or add a time variable to a date/time variable) Calculate the number of time units between two dates (e.g., calculate an age in years from a birthdate and another date) Subtract two durations (e.g., time worked - time commuting)
	< Back Next > Finish Cancel Help

Figure 62: Step 1 of 3 in Date and Time wizard

Insert LeaveBedD variable in Date 1 and DecDcD in Date 2 area. Ensure the unit is in Days and select Truncate to integer and click Next (Figure 63).

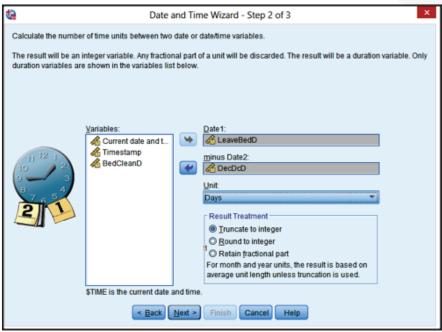


Figure 63: Step 2 of 3 in Date and Time wizard

Rename the result variable with DTDateDiff and variable label with a complete variable name. Finally select the option to paste the syntax into syntax window and click Finish (Figure 64).

ta	Date and Time Wizard - Step 3 of 3
Calculation:	LeaveBedD - DecDcD
	Result Variable: Units: DTDateDiff Days Variable Label: DT Date Difference DT Date Difference
	< Back Mext > Finish Cancel Help

Figure 64: Step 3 of 3 in Date and Time wizard

Syntax window will appear with the new syntax for calculation of date difference in discharge time (Figure 65).



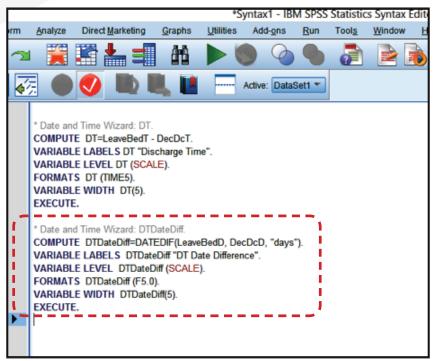


Figure 65: Syntax for DTDateDiff variable

Proceed by highlighting the syntax and click Run to execute the syntax. The result will appear as a new variable in data view.

Next, we will calculate the final value for DT. Open the Syntax window and type the syntax below into the syntax window.

* Date and Time Wizard: DTnew DATASET ACTIVATE DataSet1. DO IF (DTDateDiff=0). COMPUTE DTnew=DT. ELSE IF (DTDateDiff=1 & XDATE.TIME(DT)<=0). COMPUTE DTnew=DT+oneday*DTDateDiff. END IF. MISSING VALUES DTnew (LO THRU 0). EXECUTE. VARIABLE LEVEL DTnew (SCALE). FORMATS DTnew (TIME5). VARIABLE WIDTH DTnew(5). EXECUTE.

Highlight and click run selection for syntax DTnew. This will create the new variable ATCnew in the data view. This is the final value for DT after calculation. We will use this variable to get the mean/average and throughput value.

Before proceeding to the analysis part, create new variable labelled "oneday" in the data set. Follow the same steps taken in Section 2.3.1.1: Transformation data for Emergency department data.

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2.3.2.2 Data analysis

Discharge Time (DT)

We will analyse the data to obtain the average value for Discharge Time (DT). Click Analyze and then choose Descriptive Statistics and click Explore.

Analyze	Direct <u>M</u> arketing	<u>G</u> raphs	Uti	lities	Add- <u>o</u> ns	<u>W</u> in	dow
Re <u>p</u> o	rts		•				52
D <u>e</u> sc	riptive Statistics		•	123 F	requencies		⊜
Custo	om Ta <u>b</u> les		•	Pa <u>c</u>	escriptives		
Com	pare Means		•		xplore		еBe
<u>G</u> ene	ral Linear Model		•	_	Crosstabs		28.0
Gene	ralized Linear Mode	ls	•		URF Analys		26.0
Mixed	Models		•		-	//5	24.0
<u>C</u> orre	late		•		<u>R</u> atio		22.0
Regre	ession		•	፳ E	PP Plots		24.0
Loglin	near		•	🤧 <u>c</u>	<u>Q</u> -Q Plots		24.0
Neura	al Networks				5:45:00.00		27.0
Class	-			1	5:45:00.00		24.0
	-			10	6:00:00.00		24.0
Dime	nsion Reduction		P	4	1.40.00.00		22.0

Figure 66: Descriptive analysis for Discharge time

Explore window will show interface as in Figure 67. Click DTnew and insert into dependent list on the right side. In display section, choose Statistics. If you choose Both, the result will show both Statistics and Plot in Output window. Finally, click OK to proceed.

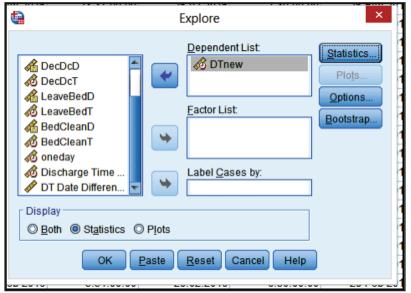


Figure 67: Explore window for analysis

The results will appear in the Output window. The mean value is the average time for DT (Figure 68). In addition, you can also observe the minimum and maximum range for the respective data.



		Statistic	Std. Error
DTnew	Mean	3:34	0:11
	-95% Centidense-IntervalLewer Bound-	· 3 : 1 1-	
	for Mean Upper Bound	3:57	
	5% Trimmed Mean	3:23	
	Median	3:00	
	Variance	85812128.57	
	Std. Deviation	2:34	
	Minimum	0:04	
	Maximum	14:15	
	Range	14:10	
	Interquartile Range	3:02	
	Skewness	1.150	.185
	Kurtosis	1.213	.367

Figure 68: Analysis result for Discharge time

The next step is to find throughput value (e.g percentage of patients being discharge within 240 minutes for DT), by using the syntax provided in the syntax file. The syntax is as below:

DO IF (XDATE.TIME(DTnew) <= 4*60*60). Compute ThroughputDT=1. ELSE IF (XDATE.TIME(DTnew) > 4*60*60). Compute ThroughputDT=0. END IF. EXECUTE.

Copy and paste the syntax in the syntax window. Highlight and click Run to execute. New variable named **Throughput DT** will be created in your data view. The data will be shown as **1.00 = within 240 mins**, and **0.00 = more than 240 minutes**. Proceed with analysis by clicking **Analyze > Descriptive Statistics > Frequencies** (Figure 69).

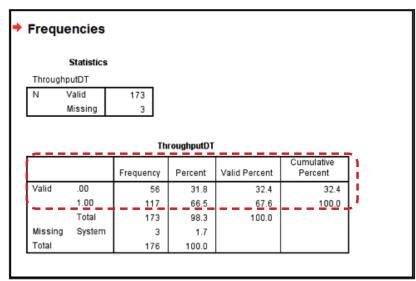


Figure 69: Frequency analysis for Throughput DT

Proceed with the analysis for Bed Turnaround Time (BTT) and Throughput BTT by using the same step as Discharge Time. Kindly refer to Appendix 3 for all syntax.

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Appendices

Appendix 1

Emergency deparment

RN PESAKIT:	Ι						1	Fo	r Offi	ice
JABATAN KECEMAS (Zon Merah dan Kunin					14 s	aha	ja)			
TEMPAT	TA	RIK	н			M	ASA			
1. Tiba di Kecemasan (Triage Pertama)										1
2. Konsultasi (Pesakit tiba di bilik doktor)										
3. Keluar (Keputusan oleh Doktor Jabatan Kecemasan)										
(A) Discaj]
(B) Masuk Wad - Termasuk kes]
rujukan (SEMUA ZON)										
(C) Tiada Semasa dipanggil (CNA)										-
4 Komensternie In Wed								1		1
4. Kemasukan ke Wad (Pesakit tiba di katil)										

FRONT

A. Pengenalan

Kementerian Kesihatan Malaysia sedang menjalankan Projek LEAN Agile Healthcare dengan kerjasama PEMANDU, Institut Penyelidikan Sistem Kesihatan dan UniKL. Objektif utama kajian ini adalah untuk meningkatkan kualiti perkhidmatan di hospital.

B. Panduan

1. Borang ini dibahagikan kepada EMPAT stesen untuk pengumpulan data di Jabatan Kecemasan:

	Definisi	Pegawai yang bertanggungjawab
a. Tiba di Kecemasan	Pesakit tiba di Jabatan Kecemasan (Triage Pertama)	Paramedik yang berada di triage
b. Konsultasi	Pesakit sampai di Bilik Doktor	Doktor yang merawat pesakit
c. Keluar	Doktor Jabatan Kecemasan membuat keputusan samaada untuk masuk ke wad/ rujukan/discaj	Doktor yang merawat pesakit
d. Kemasukan ke Wad	Pesakit tiba di katil	Jururawat yang bertugas di wad perubatan

2. Sila isikan masa dan tarikh yang TEPAT pada ruangan yang disediakan. Tarikh dalam format ddmmyy, masa dalam format 2400.

 Jika tarikh adalah sama untuk setiap kotak, hanya kotak pertama perlu diisi.

Medical Ward

EALTH WARD : MINI	I HEAI Y DEP ISTRY	ART	MEN	NT A	ND	MED	ICA	L		Т			· · · · · ·
RN PESAKIT:									For	Offic	e Us	e Only	
WAD PERUBAT	AN											,	
		TA	RIK	н				М	AS.	A			
1. Doktor membua keputusan untuk di													
2. Pesakit tinggalka katil (i.e balik rumah/ discha lounge)													
3. Katil Sedia (untuk pesakit lain)													
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	m Kes ening nagika	sihat katk in ke	tan d an l	ker dan cual	jasa Uni iti p	ma KL. erkł	PÉN Obj iidn	/Al jekt nata	ND if u n d	U, l tan i ho	Inst na l ospi	titut cajia ital.	an
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Sila isikan masa dan tarikh yang TEPAT pada ruangan yang disediakan.
 Jika tarikh adalah sama untuk setiap kotak, hanya kotak pertama perlu diisi.

Appendix 2

1. SPSS Data View - Emergency Department

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2. SPSS Data View - Medical Ward

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1. Syntax for Emergency department

NO.	SUBJECT	SYNTAX
1.	Creating ATC (Arrival to Consultation)	* Date and Time Wizard: ATC. COMPUTE ATC=ConsT - EDArvT. VARIABLE LABELS ATC. VARIABLE LEVEL ATC (SCALE). FORMATS ATC (TIME5). VARIABLE WIDTH ATC(5). EXECUTE.
2.	Creating ATCdatediff	* Date and Time Wizard: ATCdatediff. COMPUTE ATCdatediff=DATEDIF(ConsD, EDArvD, "days"). VARIABLE LABELS ATCdatediff "ATCdatedif- ference". VARIABLE LEVEL ATCdatediff (SCALE). FORMATS ATCdatediff (F5.0). VARIABLE WIDTH ATCdatediff(5). EXECUTE.
3.	Creating ATCnew	DO IF (ATCdatediff = 0). Compute ATCnew=ATC. ELSE IF (ATCdatediff = 1). Compute ATCnew=ATC+oneday. END IF. MISSING VALUES ATCnew (LO THRU 0). EXECUTE. VARIABLE LEVEL ATCnew (SCALE). FORMATS ATCnew (TIME5). VARIABLE WIDTH ATCnew(5). EXECUTE.
4.	Creating LOS (Length of Stay)	COMPUTE LOS= DisT - EDArvT. VARIABLE LABELS LOS "Length of stay". VARIABLE LEVEL LOS (SCALE). FORMATS LOS (TIME5). VARIABLE WIDTH LOS(5). EXECUTE.

5.	Creating LOSdatediff	* Date and Time Wizard: LOSdatediff. COMPUTE LOSdatediff=DATEDIF(DisD, EDArvD, "days"). VARIABLE LABELS LOSdatediff. VARIABLE LEVEL LOSdatediff (SCALE). FORMATS LOSdatediff (F5.0). VARIABLE WIDTH LOSdatediff(5). EXECUTE.
6.	Creating LOSnew	DO IF (LOSdatediff = 0). COMPUTE LOSnew=LOS. ELSE IF (LOSdatediff = 1). COMPUTE LOSnew=LOS+(oneday*LOSdate- diff). END IF. MISSING VALUES LOSnew (LO THRU 0). EXECUTE. VARIABLE LEVEL LOSnew (SCALE). FORMATS LOSnew (TIME5). VARIABLE WIDTH LOSnew(5). EXECUTE.
7.	Creating BWT (Bed Waiting Time)	* Date and Time Wizard: BWT. COMPUTE BWT= ArvBedT - EDAdmitT. VARIABLE LABELS BWT "Bed waiting time". VARIABLE LEVEL BWT (SCALE). FORMATS BWT (TIME5). VARIABLE WIDTH BWT(5). EXECUTE.
8.	Creating BWTdatediff	* Date and Time Wizard: BWTdatediff. COMPUTE BWTdatediff=DATEDIF(ArvBedD, EDAdmitD, "days"). VARIABLE LABELS BWTdatediff "BWT date difference". VARIABLE LEVEL BWTdatediff (SCALE). FORMATS BWTdatediff (F5.0). VARIABLE WIDTH BWTdatediff(5). EXECUTE.
9.	Creating BWTnew	DO IF (BWTdatediff = 0). Compute BWTnew=BWT. ELSE IF (BWTdatediff >= 1). COMPUTE BWTnew=BWT+(oneday*BWTda- tediff). FORMATS BWTnew(TIME6). END IF. EXECUTE.

10.	Creating Throughput_ATC	DO IF (XDATE.TIME(ATCnew) <= 1.5*60*60). Compute Throughput_ATC=1. ELSE IF (XDATE.TIME(ATCnew) > 1.5*60*60). Compute Throughput_ATC=0. END IF. EXECUTE.
11.	Creating Throughput_LOS	DO IF (XDATE.TIME(LOSnew) <= 2*60*60). Compute Throughput_LOS=1. ELSE IF (XDATE.TIME(LOSnew) > 2*60*60). Compute Throughput_LOS=0. END IF. EXECUTE.
12.	Creating Throughput BWT	DO IF (XDATE.TIME(BWTnew) <= 2*60*60). Compute Throughput_LOS=1. ELSE IF (XDATE.TIME(BWTnew) > 2*60*60). Compute Throughput_BWT=0. END IF. EXECUTE.
13.	Analyzing ATC	EXAMINE VARIABLES=ATCnew /PLOT NONE /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.
14.	Analyzing LOS	EXAMINE VARIABLES=LOSnew /PLOT NONE /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.
15.	Analyzing BWT and Dispo- sition	EXAMINE VARIABLES=BWTnew /PLOT NONE /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL. FREQUENCIES VARIABLES=Disposition
		/ORDER=ANALYSIS.
16.	Analyzing ThroughputATC	FREQUENCIES VARIABLES=Throughput_ATC /ORDER=ANALYSIS.
17.	Analyzing ThroughputLOS	FREQUENCIES VARIABLES=Throughput_LOS /ORDER=ANALYSIS.

2. Syntax for Medical ward

NO.	SUBJECT	SYNTAX
1.	Creating DT (Discharge Time)	* Date and Time Wizard: DT. COMPUTE DT=LeaveBedT - DecDcT. VARIABLE LABELS DT "Discharge Time". VARIABLE LEVEL DT (SCALE). FORMATS DT (TIME5). VARIABLE WIDTH DT(5). EXECUTE.
2.	Creating DTDateDiff	* Date and Time Wizard DTDateDiff. COMPUTE DTDateDiff=DATEDIF(LeaveBedD, DecDcD, "days"). VARIABLE LABELS DTDateDiff. VARIABLE LEVEL DTDateDiff (SCALE). FORMATS DTDateDiff (F5.0). VARIABLE WIDTH DTDateDiff (5). EXECUTE.
3.	Creating DTnew	* Date and Time Wizard: DTnew DATASET ACTIVATE DataSet1. DO IF (DTDateDiff=0). COMPUTE DTnew=DT. ELSE IF (DTDateDiff=1 & XDATE.TIME(DT)<=0). COMPUTE DTnew=DT+oneday*DTDateDiff. END IF. MISSING VALUES DTnew (LO THRU 0). EXECUTE. VARIABLE LEVEL DTnew (SCALE). FORMATS DTnew (TIME5). VARIABLE WIDTH DTnew(5). EXECUTE.
4.	Creating BTT (Bed Turnaround Time)	* Date and Time Wizard: BTT. COMPUTE BTT= BedCleanT - LeaveBedT. VARIABLE LABELS BTT "Bed turnaround time". VARIABLE LEVEL BTT (SCALE). FORMATS BTT (TIME5). VARIABLE WIDTH BTT(5). EXECUTE.

5.	Creating BTTDateDiff	* Date and Time Wizard: BTTDateDiff. COMPUTE BTTDateDiff=DATEDIF(BedCleanD, LeaveBedD, "days"). VARIABLE LABELS BTTDateDiff. VARIABLE LEVEL BTTDateDiff (SCALE). FORMATS BTTDateDiff (F5.0). VARIABLE WIDTH BTTDateDiff(5). EXECUTE.
6.	Creating BTTnew	* Date and Time Wizard: BTTnew. DATASET ACTIVATE DataSet1. DO IF (BTTDateDiff = 0). Compute BTTnew=BTT. ELSE IF (BTTDateDiff = 1 & XDATE.TIME(BTT) <= 0). Compute BTTnew=BTT+oneday*BTTDateDiff. END IF. MISSING VALUES BTTnew (LO THRU 0). EXECUTE. VARIABLE LEVEL BTTnew (SCALE). FORMATS BTTnew (TIME5). VARIABLE WIDTH BTTnew(5). EXECUTE.
7.	Creating ThroughputDT	DO IF (XDATE.TIME(DTnew) <= 4*60*60). Compute ThroughputDT=1. ELSE IF (XDATE.TIME(DTnew) > 4*60*60). Compute ThroughputDT=0. END IF. EXECUTE.
8.	Creating ThroughputBTT	DO IF (XDATE.TIME(BTTnew) <= 0.5*60*60). Compute ThroughputBTT=1. ELSE IF (XDATE.TIME(BTTnew) > 0.5*60*60). Compute ThroughputBTT=0. END IF. EXECUTE.
9.	Analyzing DTnew	EXAMINE VARIABLES=DTnew /PLOT NONE /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.

10.	Analyzing BTTnew	EXAMINE VARIABLES=BTTnew /PLOT NONE /STATISTICS DESCRIPTIVES /CINTERVAL 95 11 /MISSING LISTWISE /NOTOTAL.
11.	Analyzing ThroughputDT	DATASET ACTIVATE DataSet1. FREQUENCIES VARIABLES=ThroughputDT /ORDER=ANALYSIS.
12.	Analyzing ThroughputBTT	DATASET ACTIVATE DataSet1. FREQUENCIES VARIABLES=ThroughputBTT /ORDER=ANALYSIS.

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