

# A STATISTICAL ANALYSIS ON DENGUE CASES AND DEATHS IN INDIA

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**Abstract:** The main aim of the paper is to use statistics in real life to analysis the result. Under statistics we have used many methods to solve the problem using Minitab. This paper is to find the dengue cases and deaths in the world. This paper further explores how to solve such social problems in statistics.

**Keywords:** Statistics, Minitab, Dengue cases, Deaths

## INTRODUCTION

Statistics is a branch of mathematics dealing with the collection, organisation, analysis and interpretation of data. Statistics has vast application in our day to day life both directly and indirectly. In applying statistics to, e.g., a scientific, industrial or social problem, it is begin with a statistical population or a statistical modal process to be studied. Dengue is a virus diseases.it is transmitted by the infective bite of female mosquito. Dengue haemorrhage fever is a more severe form of diseases which may cause death.Aedes aegypti, is a mosquito that can spread dengue fever.

## REVIEW OF LITERATURE

Manish Dev Sharma and Koshal Kumar (2018) constructed the “Characterization of Dengue Virus by Molecular and Serological Medical in clinical Isolates” and its Association with Disease Monitoring. Paula R, Bouzas, Nuria Ruiz –Fuentes (2019) are constructed with “Forecasting counting and time statistics of compound cox Processess “and also focus on intensity phase type process, delations and simultaneous events. Sushmita Das and Asim Sarfraz (2017) designing “Impediments of reporting dengue cases in India.” Carmen Montes – Gijon are also constructed with “Forecasting counting and time statistics of compound cox Processess” Narotam Sharma (2018) constructed the the “Characterization of Dengue Virus by Molecular and Serological Medical in clinical Isolates” and its Association with Disease Monitoring. Nitesh Jaiswal and Pradee (2017) das designing the “Impediments of reporting dengue cases in India”.Margarida Maria de Lima Pompeu (2016) designed the “Postmortem Diagnosis of Dengue as an Epidemiological Surveillance Tool”.

## DENGUE

Dengue is a virus diseases.it is transmitted by the infective bite of female mosquito. Aedes aegypti, is a mosquito that can spread dengue fever. Dengue haemorrhage fever is a more severe form of diseases which may cause death. The dengue virus is carried and spread by mosquitoes in the genus Aedes, which includes a number of mosquito species.

## TYPES OF DENGUE

The dengue virus are the members of the genus virus. These small 50nm virus contain single stranded RNA. There are four virus serotypes

- DEN-1
- DEN-2
- DEN-3
- DEN-4

## SYMPTOMS

- Abrupt onset of high fever
- Severe frontal headache
- Pain behind the eyes which worsens with eye movement
- Muscle and joint pain
- Nausea and vomiting

## TRANSMISSION CYCLE OF DENGUE

- The virus is inoculated into humans with the mosquito saliva
- The virus localizes and replicates in various target organs ,for example local lymph nodes and the liver
- The mosquito ingests blood containing the virus
- The virus replicates in the mosquito midguts, the ovaries, nerve tissue and fat body.it then escapes into the body cavity and later infects the salaivary glands

- The virus replicates in the salivary glands and when the mosquito bites another human, the cycle continues

**PROBLEM**

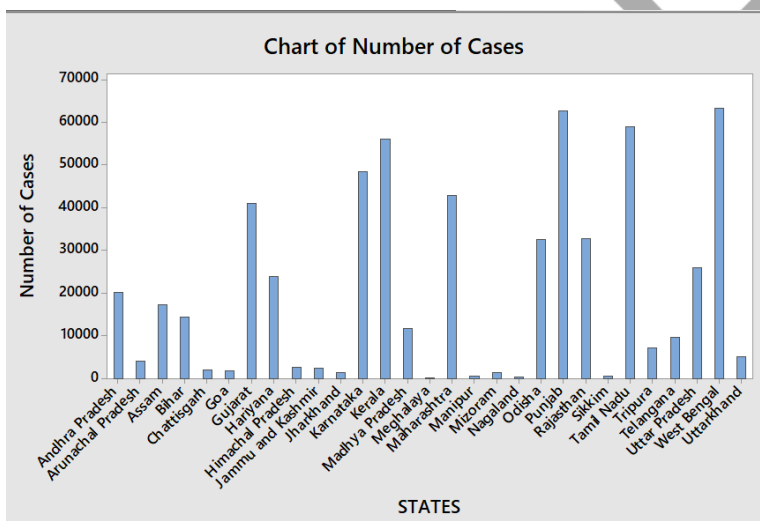
1) To construct the bar chart for number of dengue cases and number of deaths in India during the year 2006-2017 using minitab17.

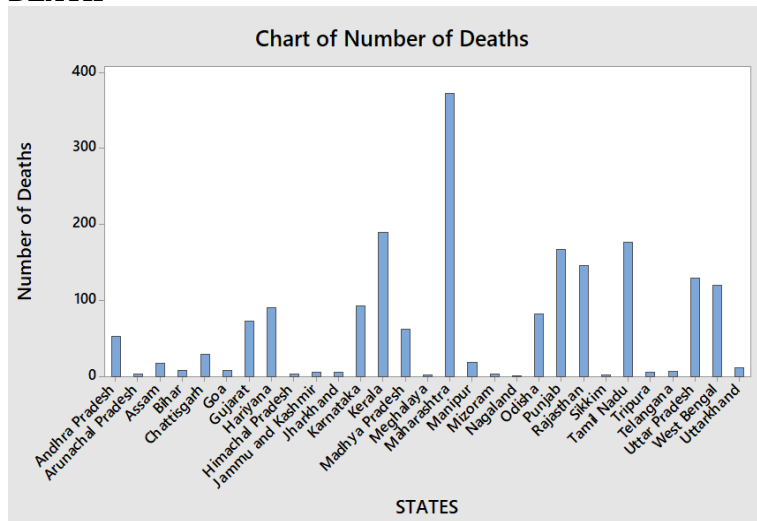
**INPUT:**

STATES	Number of dengue Cases	Number of deaths
Andhra Pradesh	20253	54
Arunachal Pradesh	4048	4
Assam	17364	18
Bihar	14505	8
Chattisgarh	2043	30
Goa	1948	8
Gujarat	40997	73
Haryana	23914	91
Himachal Pradesh	2620	4
Jammu & Kashmir	2519	6
Jharkhand	1518	6
Karnataka	48442	93
Kerala	56076	190
Madhya Pradesh	11812	63
Meghalaya	297	2
Maharashtra	42786	372
Manipur	586	19
Mizoram	1452	3
Nagaland	382	1
Odisha	32509	82
Punjab	62608	167
Rajasthan	32774	146
Sikkim	679	2
Tamil Nadu	58991	177
Tripura	7272	6
Telagana	9718	7
Uttar Pradesh	25978	129
West Bengal	63253	120
Uttarkhand	5164	12

**OUTPUT:**

**CASES**



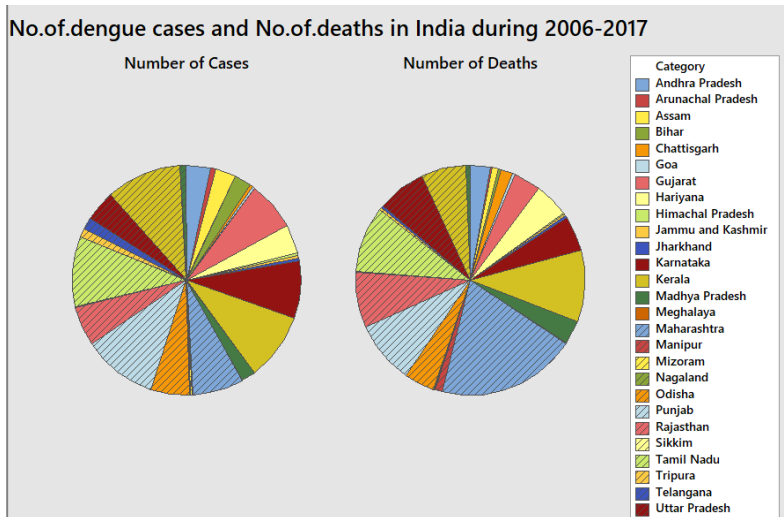
**DEATH**

2) To construct the Pie chart for number of dengue cases and number of deaths in India during the year 2006- 2017 using minitab17.

**INPUT:**

STATES	Number of dengue Cases	Number of deaths
Andhra Pradesh	20253	54
Arunachal Pradesh	4048	4
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West Bengal	63253	120
Uttarakhand	5164	12

**OUTPUT:**



3) To find the descriptive statistics for dengue cases and death in India during the year 2006 – 2007 using **spss**.

**INPUT:**

	year	no. of. cases	no. of. deaths
1	2006	13504	184
2	2007	6231	69
3	2008	15038	80
4	2009	41384	96
5	2010	216465	110
6	2011	17119	169
7	2012	43996	242
8	2013	67594	193
9	2014	36515	137
10	2015	80837	220
11	2016	118657	245
12	2017	129989	221

**OUTPUT**

**Descriptives**

[DataSet0]

**Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
year	12	2006	2017	2011.50	3.606
Valid N (listwise)	12				

4) To find the significance differences between number of dengue cases and number of deaths in India during the year 2006-2017 using Minitab 17 (Dependent sample t test).

**DATA:**

Year	Number of Cases	Number of Deaths
2006	13504	184
2007	6231	69
2008	15038	80
2009	41384	96
2010	21645	110
2011	17119	169
2012	43996	242
2013	67594	193
2014	36515	137
2015	80837	220
2016	118657	245
2017	129989	221

**SOLUTION:**

Null hypothesis:  $H_0: \mu_1 = \mu_2$

There is no significance difference between number of cases and number of deaths.

Alternative Hypothesis:  $H_1: \mu_1 < \mu_2$ .

There is a significance difference between number of cases and number of deaths.

**OUTPUT****Paired T-Test and CI: No.of.Cases, No.of.Deaths**

Paired T for No.of.Cases - No.of.Deaths

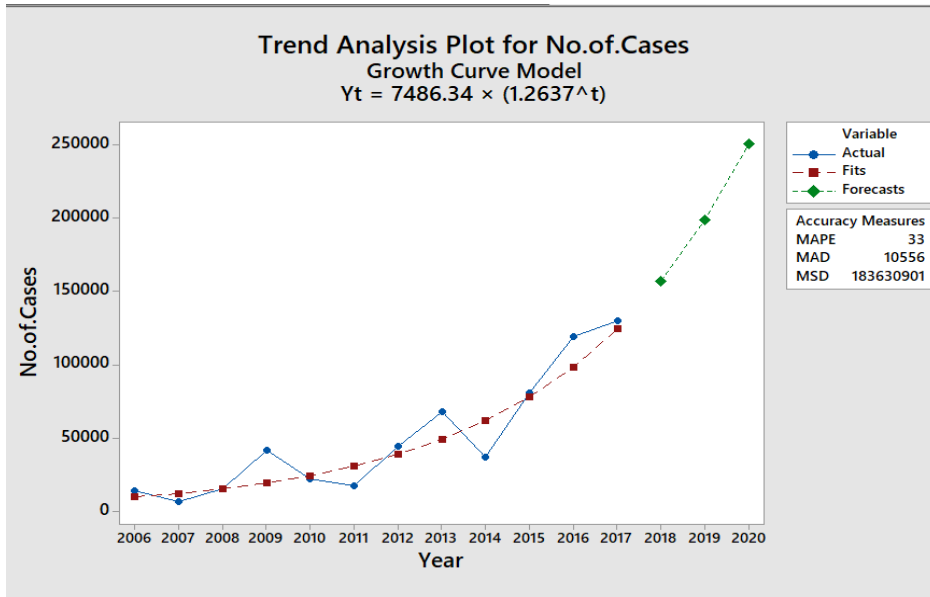
	N	Mean	StDev	SE Mean
No.of.Cases	12	49376	41577	12002
No.of.Deaths	12	164	64	18
Difference	12	49212	41532	11989

95% upper bound for mean difference: 70743

T-Test of mean difference = 0 (vs < 0): T-Value = 4.10 P-Value = 0.999

5) To fit the trend line for all the states in India from 2006-2017. Also estimate the number of cases for the next 3 years using minitab 17.

**INPUT:**



**OUTPUT:**

**Trend Analysis for No.of.Cases**

Data            No.of.Cases  
 Length        12  
 NMissing      0

Fitted Trend Equation  
 $Y_t = 7486.34 \times (1.2637^t)$

Accuracy Measures  
 MAPE            33  
 MAD             10556  
 MSD            183630901

Forecasts  
 Period    Forecast  
 2018      156908  
 2019      198284  
 2020      250572

**Trend Analysis Plot for No.of.Cases**

**CONCLUSION**

**SUMMARY:**

Project Topic: Dengue cases and deaths in India

Data: 2006-2017

Project done in: Statistics

Tools Used: Diagrammatic Representation, Descriptive Statistics, Dependent Sample t test, Correlation, Time Series.

- The average number of cases during the year 2006-2017 is 1702.61 for all the states in India.
- The average number of deaths during the year 2006-2017 is 5.39 for all the states in India.
- The total number of cases during the year 2006-2017 is 592509 for all the states in India.

- The total number of deaths during the year 2006-2017 is 1874 for all the states in India.
- The maximum number of dengue cases in India is 22865 for the year 2006-2017. The maximum number of deaths in India is 66 for the year 2006-2017.
- The minimum number of dengue cases in India is 0 for the year 2006-2017. The minimum number of deaths in India is 0 for the year 2006-2017.

#### DEPENDENT SAMPLE T – TEST:

Conclusion:

$sP = 0.002$  the P value is less than 0.05

Hence  $H_0$  is rejected and  $H_1$  is accepted.

Inference:

Hence p value is 0.002 which is less than 0.05

Therefore  $H_0$  is rejected at 5 percentage level and  $H_1$  is accepted.

There is a significant difference between number of dengue cases and number of deaths in India during the year 2006-2017.

#### CORRELATION:

The Pearson's correlation is 0.70 percentage so we can conclude that the number of dengue cases and the number of deaths is 70 percentage correlated in all the states of India during the year 2006-2017

#### REFERENCES

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- [4] Nitesh Jaiswal and Pradeep das (2017) designing the "Impediments of reporting dengue cases in India", IJRAR format, Volume 10, pages 494-498
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