

Group 3: Hepatocellular Carcinoma (HCC) and Fibro Scan

- การคัดกรองมะเร็งเซลล์ตับ (HCC) ในคนไข้ที่ติดเชื้อไวรัสตับอักเสบบีเรื้อรัง
- กลุ่มตัวอย่างคือ คนไข้ที่มีอายุระหว่าง 20-60 ปี
- การศึกษานี้เพื่อศึกษาปัจจัยที่สัมพันธ์กับค่า Fibro Scan ในการมาตรวจติดตามใน visit ที่ 13

HN: [hn] ()

[visit_list] (pt type=)

VN_DATE: [visit_date_lab] () 📅

LABORATORY VALUES

CHEMISTRY

| Test Name | S | Result Value | Unit | Normal Value |
|-----------|-------------|--------------|-------|--------------|
| SGPT | [lab1_1] () | [lab1_2] () | U/L | [<40] |
| AFP | [lab2_1] () | [lab2_2] () | ng/ml | [<7] |

Comment on abnormal clinically significant findings. [comment_chem]

IMMUNOLOGY

| Test Name | S | Result Value | Unit | Normal Value |
|---------------------|-------------|--------------|-------|--------------|
| HBV-viral load | [lab3_1] () | [lab3_2] () | IU/ml | |
| HBV log equivalence | [lab4_1] () | [lab4_2] () | | |
| HBeAg | [lab5_1] () | [lab5_2] () | | [0.9-1] |

HN: [hn] ()

VN_DATE: [v5_fibo_date] () 📅

FIBOSCAN VALUES

Stiffness(KPa) [v5_fibo1] ()

IQR(KPa) [v5_fibo2] ()

Success Rate [v5_fibo3] () (%)

[button2] [v5_fibo4]

(Generate Summary)

Hepatocellular Carcinoma (HCC) and Fibro Scan

Data Example :

| | Patient_No | lab_visit_vs13 | lab1_vs13 | lab1_2_vs13 | lab2_2_vs13 | lab3_2_vs13 | lab4_2_vs13 | lab5_3_vs13 | fibro1_vs13 |
|-----|------------|----------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 0 | 1 | 13 | 26/11/2015 | 12.0 | 3.0 | 1028 | 3.01 | Negative | 5.1 |
| 1 | 3 | 13 | 21/9/2015 | 14.0 | 8.1 | 356 | 2.55 | Negative | 3.6 |
| 2 | 4 | 13 | 9/12/2015 | 31.0 | 5.9 | 15097 | 4.18 | Negative | 3.8 |
| 3 | 5 | 13 | 23/9/2015 | 19.0 | 1.8 | 2542 | 3.41 | Negative | 4.0 |
| 4 | 10 | 13 | 31/8/2015 | 17.0 | 3.0 | 13652 | 3.06 | Negative | 4.9 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 800 | 2089 | 13 | 18/1/2016 | 15.0 | 2.8 | < 20 | 3.70 | Negative | 3.3 |
| 801 | 2113 | 13 | 23/12/2015 | 13.0 | 1.8 | 240 | 1.30 | Negative | 3.3 |
| 802 | 2139 | 13 | 16/12/2015 | 12.0 | 5.4 | 124490 | 2.85 | Negative | 4.3 |
| 803 | 2158 | 13 | 21/1/2016 | 24.0 | 4.2 | 63658 | 1.88 | Negative | 5.6 |
| 804 | 2383 | 13 | 15/12/2015 | 22.0 | 1.1 | < 20 | 1.30 | Negative | 3.9 |

805 rows × 9 columns

Data Description

| Column | Description | Data type | Scale of measurement |
|----------------|---|-----------|----------------------|
| Patient_No | เลขประจำตัวผู้ป่วย | int64 | Nominal Scale |
| lab_visit_vs13 | การมาตรวจติดตามใน visit ที่ 13 | int64 | Nominal Scale |
| lab1_vs13 | วันที่ส่งผลตรวจทางคลินิก | object | - |
| lab1_2_vs13 | ค่า SGPT (Serum Glutamic Pyruvate Transaminase) - U/L | float64 | Ratio Scale |
| lab2_2_vs13 | ค่า AFP (Alpha-Fetoprotein) - ng/ml | float64 | Ratio Scale |
| lab3_2_vs13 | ค่า HBV-viral load - IU/ml | object | Ratio Scale |
| lab4_2_vs13 | ค่า HBV log equivalence | float64 | Ratio Scale |
| lab5_3_vs13 | ค่า HBeAg (Hepatitis B e-antigen) | object | Nominal Scale |
| fibo1_vs13 | ค่าความยืดหยุ่นของเนื้อตับ - KPa | float64 | Ratio Scale |

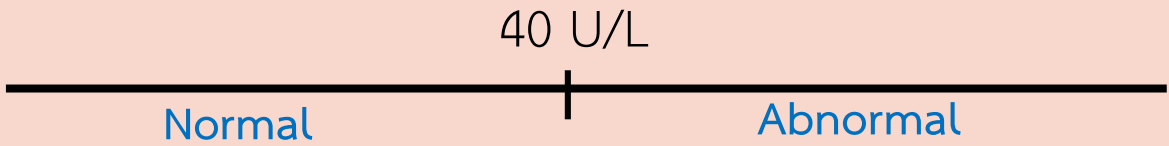
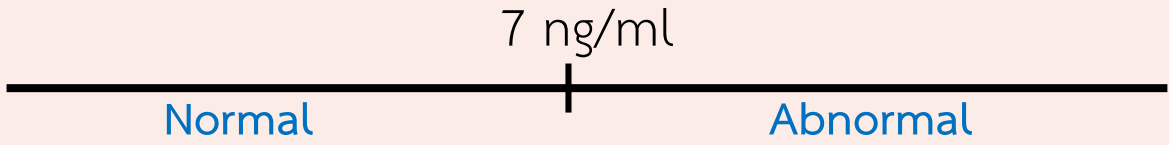
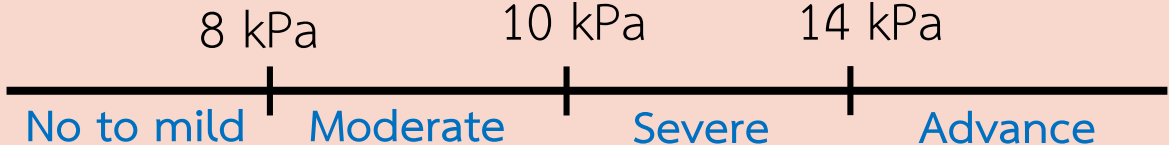
Data Description

| Key Words | Meaning |
|---|---|
| Serum Glutamic Pyruvate Transaminase : SGPT | โปรตีน Serum Glutamic Pyruvate Transaminase เพื่อตรวจการทำงานของตับ |
| Alpha-Fetoprotein : AFP | Tumor marker ใช้ในการตรวจหามะเร็งตับ |
| Hepatitis B e-antigen : HBeAg | Antigen ใช้ในการตรวจไวรัส HBV ในระยะแบ่งตัวในตับ |
| HBV-viral load | ค่าปริมาณไวรัส HBV ในเลือด |
| HBV log equivalence | ค่า $\log \frac{(viral\ load)_n}{(viral\ load)_{n-1}}$ |
| Fibro scan (Stiffness) | วัดความยืดหยุ่นของเนื้อตับ |

Data Pre-processing

1. Drop null value
2. Change columns name
3. Change Data Type of *Patient No* from int64 to string and change *visit date* from object to Date
4. Replace data of *HBV Viral Load* (<20 or >170M) and change data type to int
5. Replace space from data in *HBeAg* column
6. Add column to classify group of data

Classification of Data

| Value | Range |
|---|--|
| Serum Glutamic Pyruvate Transaminase : SGPT |  <p>40 U/L</p> <p>Normal Abnormal</p> |
| Alpha-Fetoprotein : AFP |  <p>7 ng/ml</p> <p>Normal Abnormal</p> |
| Stiffness |  <p>8 kPa 10 kPa 14 kPa</p> <p>No to mild Moderate Severe Advance</p> |

Data after processing

| | Patient_No | Lab_Visit | Date | SGPT | AFP | HBV_Viral_Load | HBV_log_equivalence | HBeAg | Stiffness | SGPT_Cat | AFP_Cat | Stiffness_Cat |
|-----|------------|-----------|------------|------|-----|----------------|---------------------|----------|-----------|----------|----------|---------------|
| 0 | 1 | 13 | 2015-11-26 | 12.0 | 3.0 | 1028 | 3.01 | Negative | 5.1 | Normal | Normal | No to Mild |
| 1 | 3 | 13 | 2015-09-21 | 14.0 | 8.1 | 356 | 2.55 | Negative | 3.6 | Normal | Abnormal | No to Mild |
| 2 | 4 | 13 | 2015-09-12 | 31.0 | 5.9 | 15097 | 4.18 | Negative | 3.8 | Normal | Normal | No to Mild |
| 3 | 5 | 13 | 2015-09-23 | 19.0 | 1.8 | 2542 | 3.41 | Negative | 4.0 | Normal | Normal | No to Mild |
| 4 | 10 | 13 | 2015-08-31 | 17.0 | 3.0 | 13652 | 3.06 | Negative | 4.9 | Normal | Normal | No to Mild |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 800 | 2089 | 13 | 2016-01-18 | 15.0 | 2.8 | 0 | 3.70 | Negative | 3.3 | Normal | Normal | No to Mild |
| 801 | 2113 | 13 | 2015-12-23 | 13.0 | 1.8 | 240 | 1.30 | Negative | 3.3 | Normal | Normal | No to Mild |
| 802 | 2139 | 13 | 2015-12-16 | 12.0 | 5.4 | 124490 | 2.85 | Negative | 4.3 | Normal | Normal | No to Mild |
| 803 | 2158 | 13 | 2016-01-21 | 24.0 | 4.2 | 63658 | 1.88 | Negative | 5.6 | Normal | Normal | No to Mild |
| 804 | 2383 | 13 | 2015-12-15 | 22.0 | 1.1 | 0 | 1.30 | Negative | 3.9 | Normal | Normal | No to Mild |

785 rows × 12 columns

Descriptive Statistics

Frequency and Proportion of Categorical Variables : HBeAg (Positive, Negative)

| | HBeAg_count | HBeAg_proportion |
|----------|-------------|------------------|
| Negative | 747 | 0.951592 |
| Positive | 38 | 0.048408 |

Descriptive Statistics

Measure of location :

| | SGPT | AFP | HBV_Viral_Load | HBV_log_equivalence | Stiffness |
|---------------|-------------|------------|-----------------------|----------------------------|------------------|
| Min | 5 | 0.6 | 0 | 1.3 | 1.9 |
| Max | 176 | 492.8 | 1.70E+08 | 8.23 | 13.8 |
| Mean | 24.810191 | 3.598981 | 5.66E+06 | 2.882981 | 4.878344 |
| Median | 20 | 2.5 | 475 | 2.63 | 4.6 |
| Mode | 15 | 2.2 | 0 | 1.3 | 3.5 |

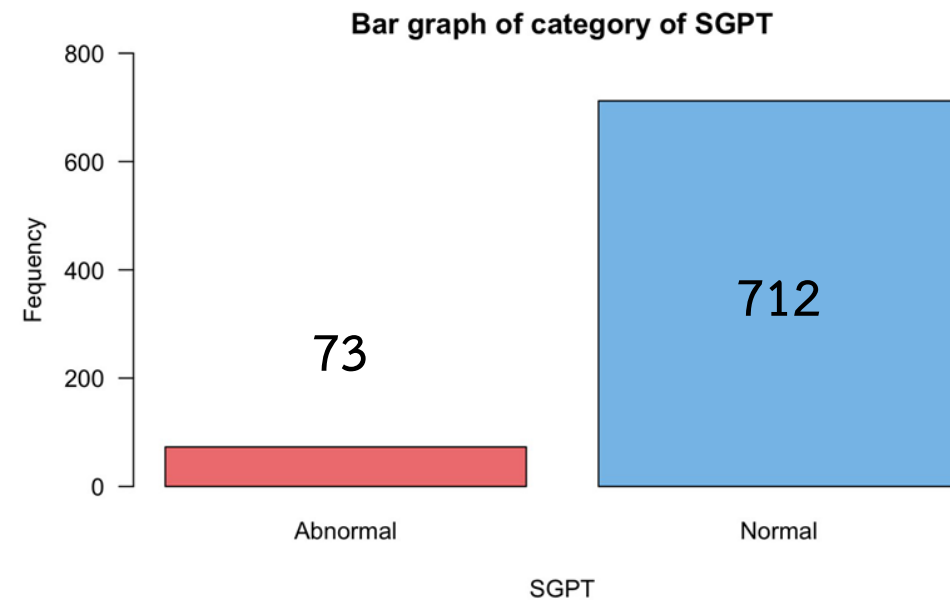
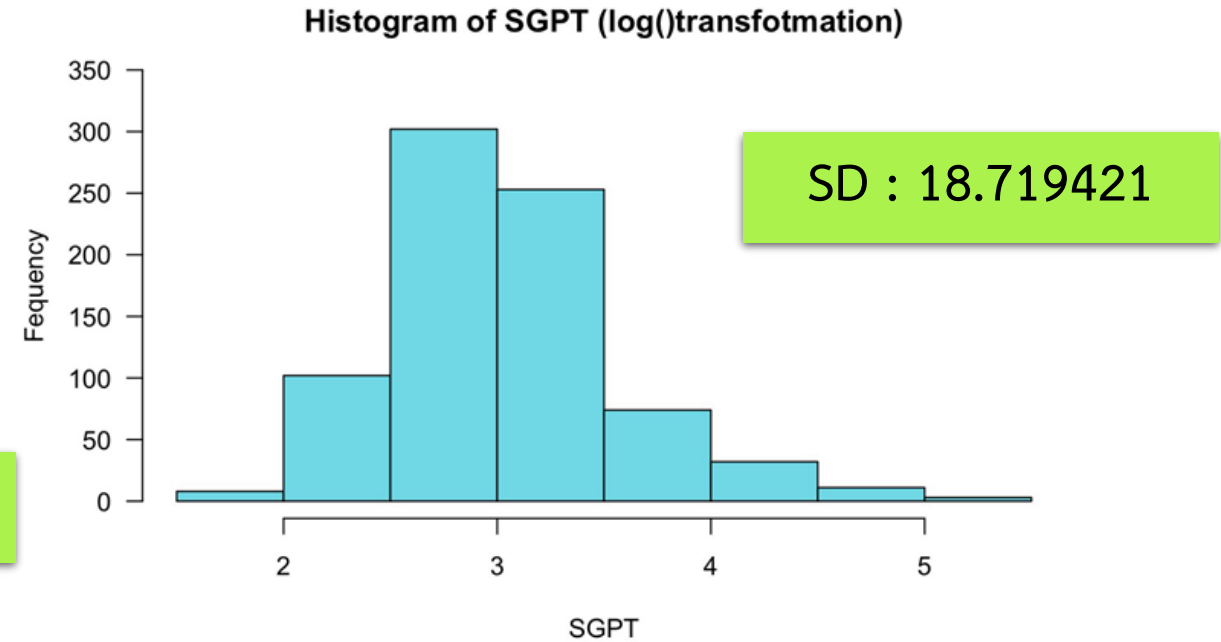
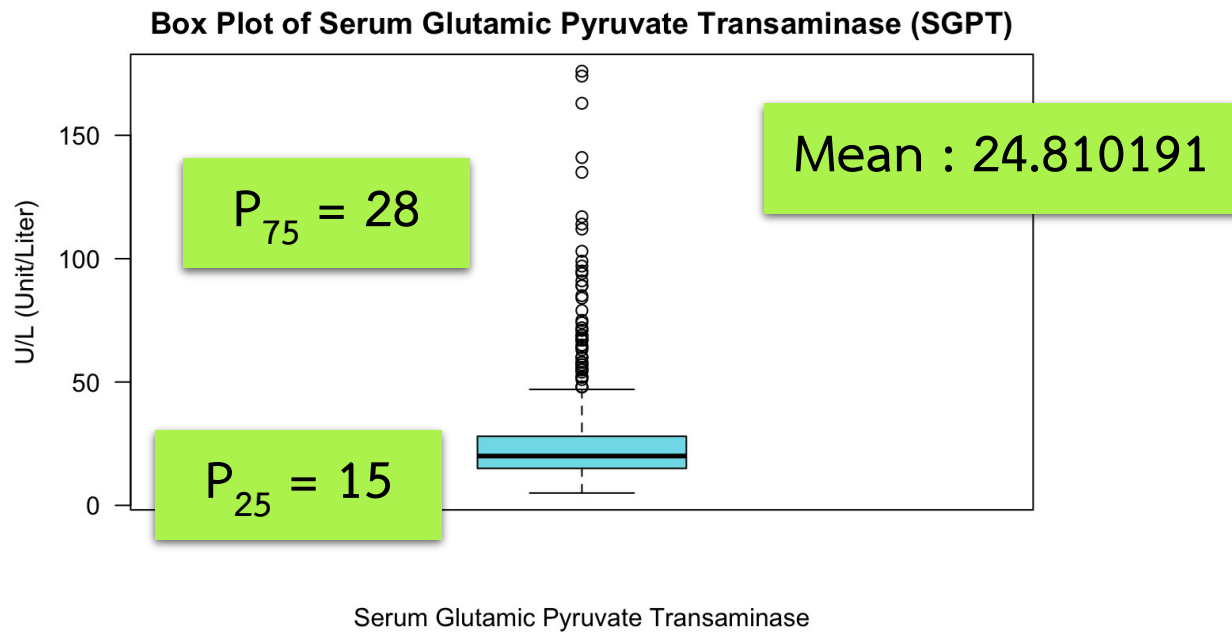
Descriptive Statistics

Measure of spread :

| | SGPT | AFP | HBV_Viral_Load | HBV_log_equivalence | Stiffness |
|-------------------------|-------------|------------|-----------------------|----------------------------|------------------|
| 0th Percentile | 5 | 0.6 | 0 | 1.3 | 1.9 |
| 25th Percentile | 15 | 1.8 | 4.70E+01 | 1.63 | 3.7 |
| 50th Percentile | 20 | 2.5 | 4.75E+02 | 2.63 | 4.6 |
| 75th Percentile | 28 | 3.5 | 3.42E+03 | 3.49 | 5.5 |
| 100th Percentile | 176 | 492.8 | 1.70E+08 | 8.23 | 13.8 |
| Variance | 349.970342 | 309.139413 | 8.50E+14 | 2.476043853 | 2.549187066 |
| Range | 171 | 492.2 | 1.70E+08 | 6.93 | 11.9 |
| STD | 18.719421 | 1.974146 | 2.916568e+07 | 1.574548 | 1.597635 |

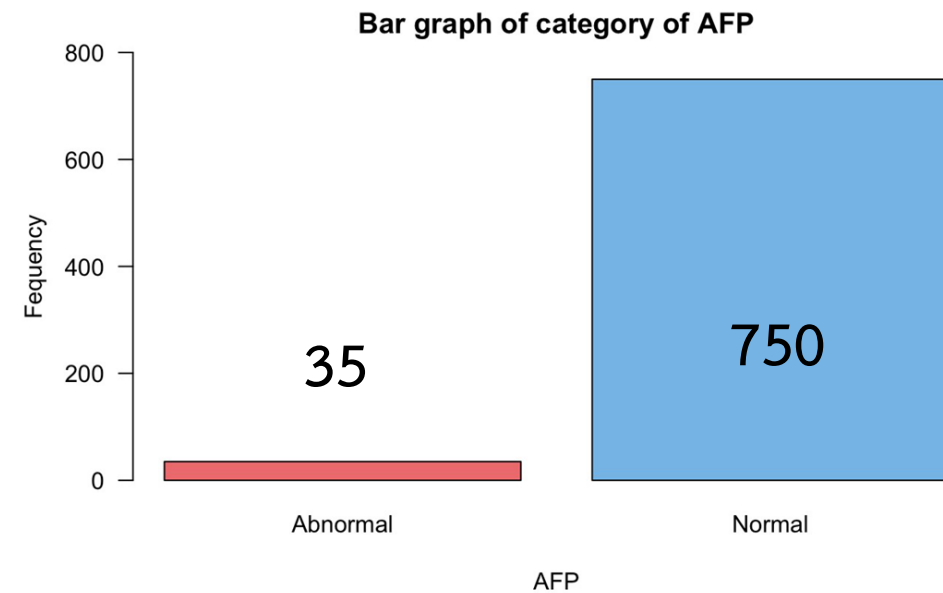
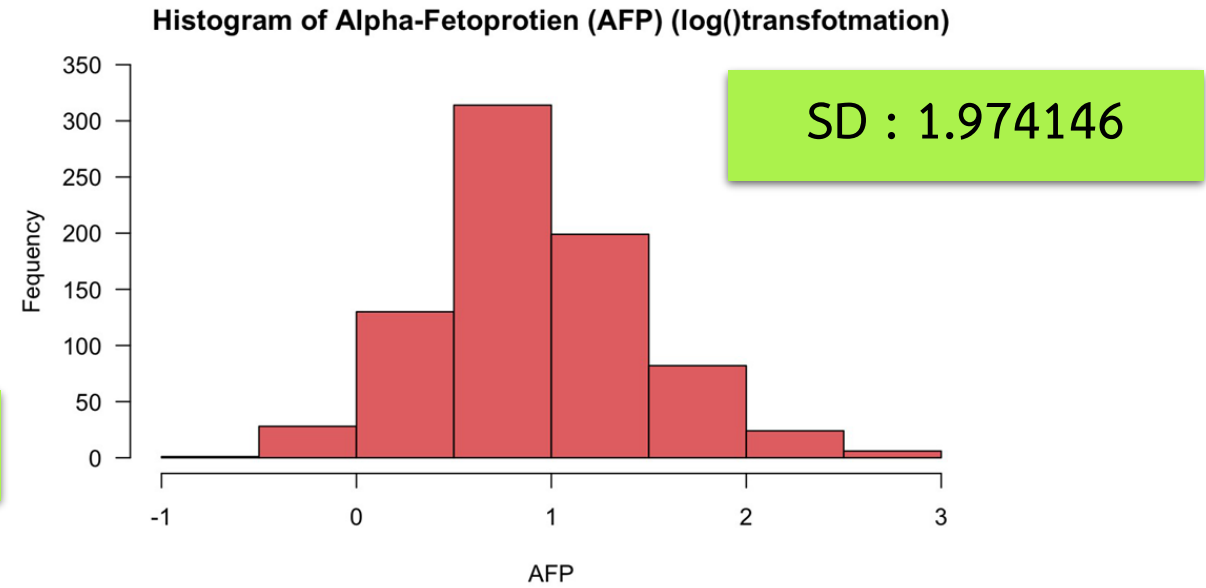
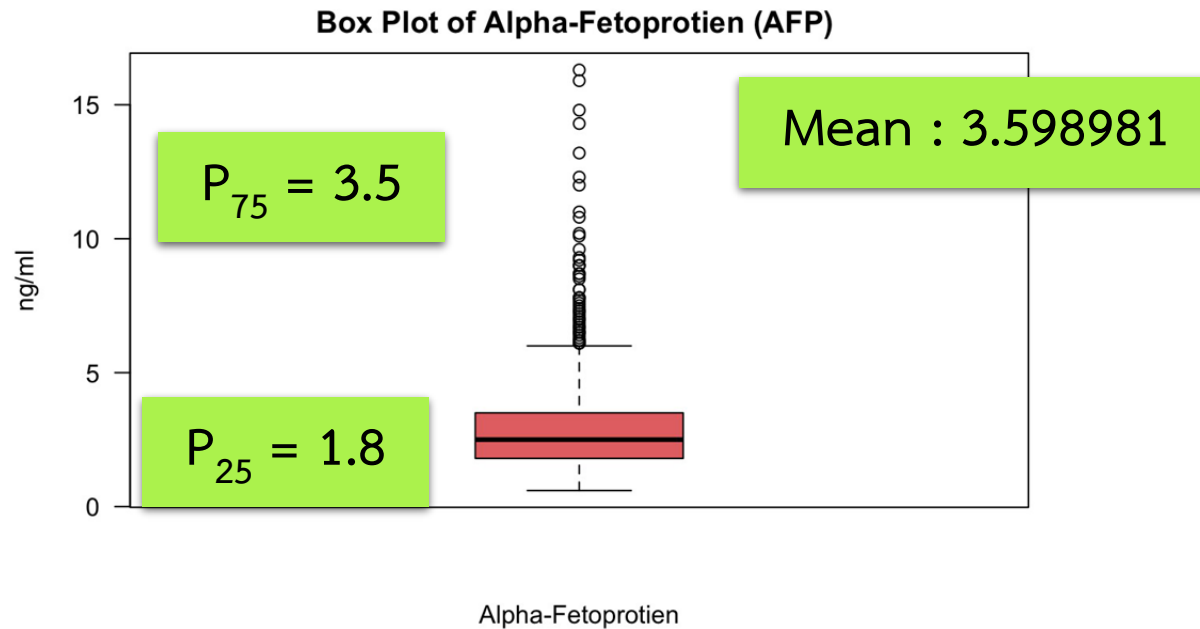
Data Exploration

SGPT



Data Exploration

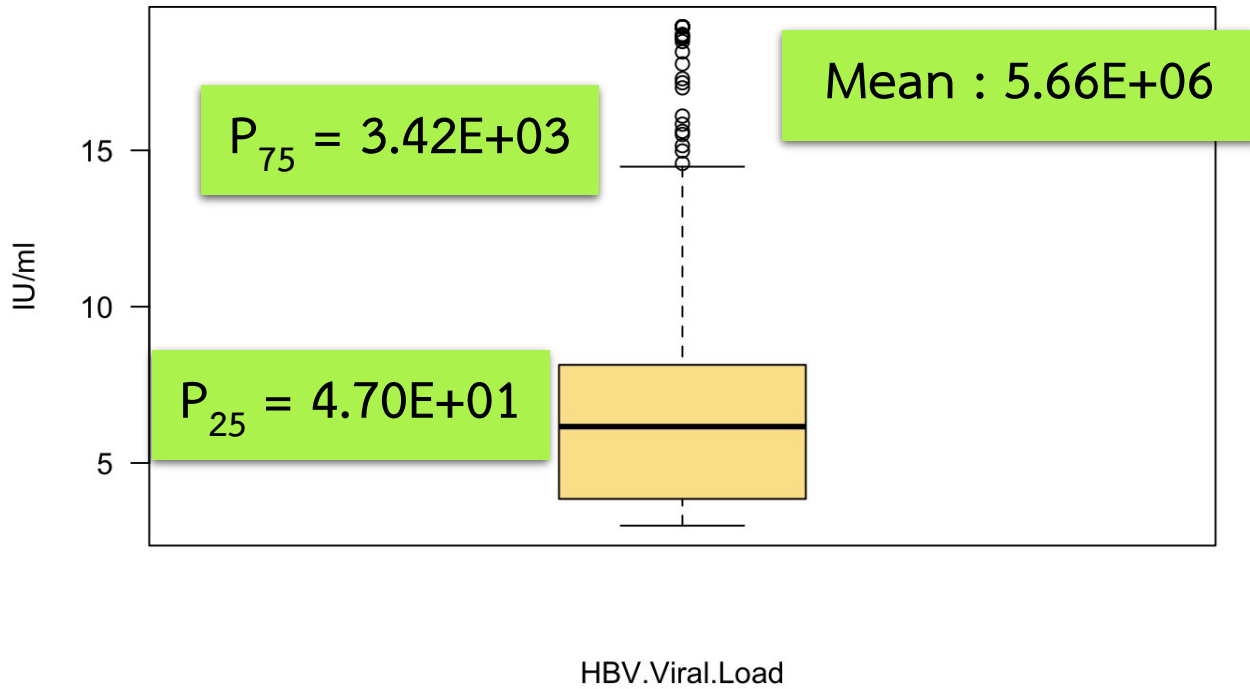
AFP



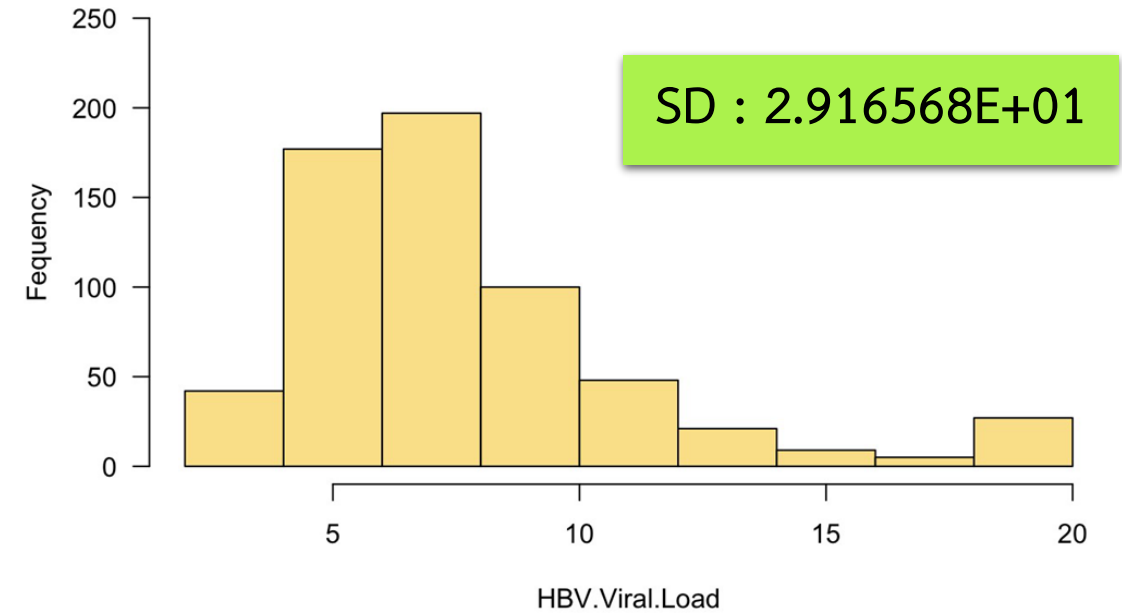
Data Exploration

HBV Viral Load

Box Plot of HBV.Viral.Load (log())transformation



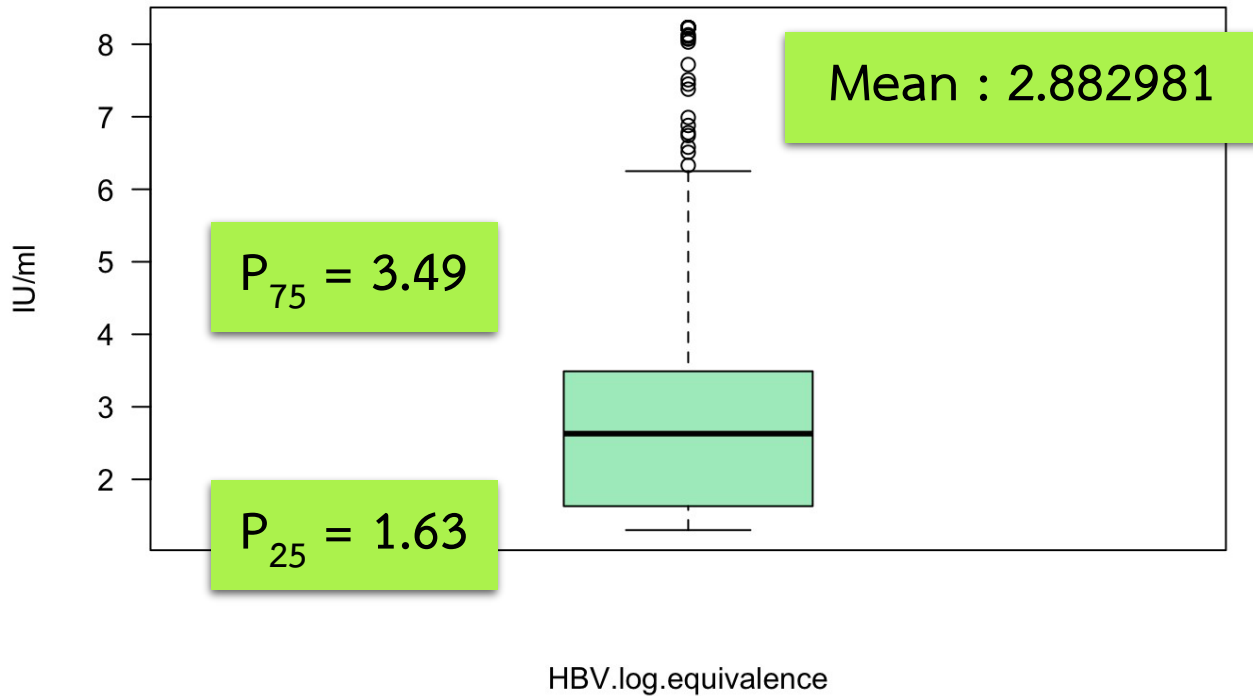
Histogram of HBV.Viral.Load (log()) transformation



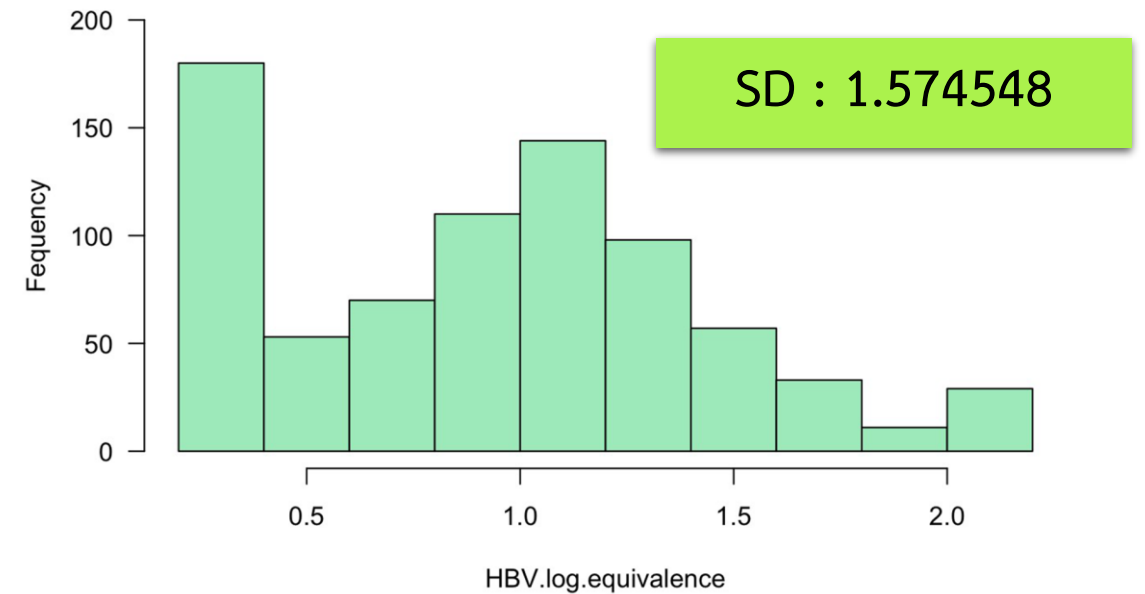
Data Exploration

HBV Viral Load Equivalence

Box Plot of HBV.log.equivalence

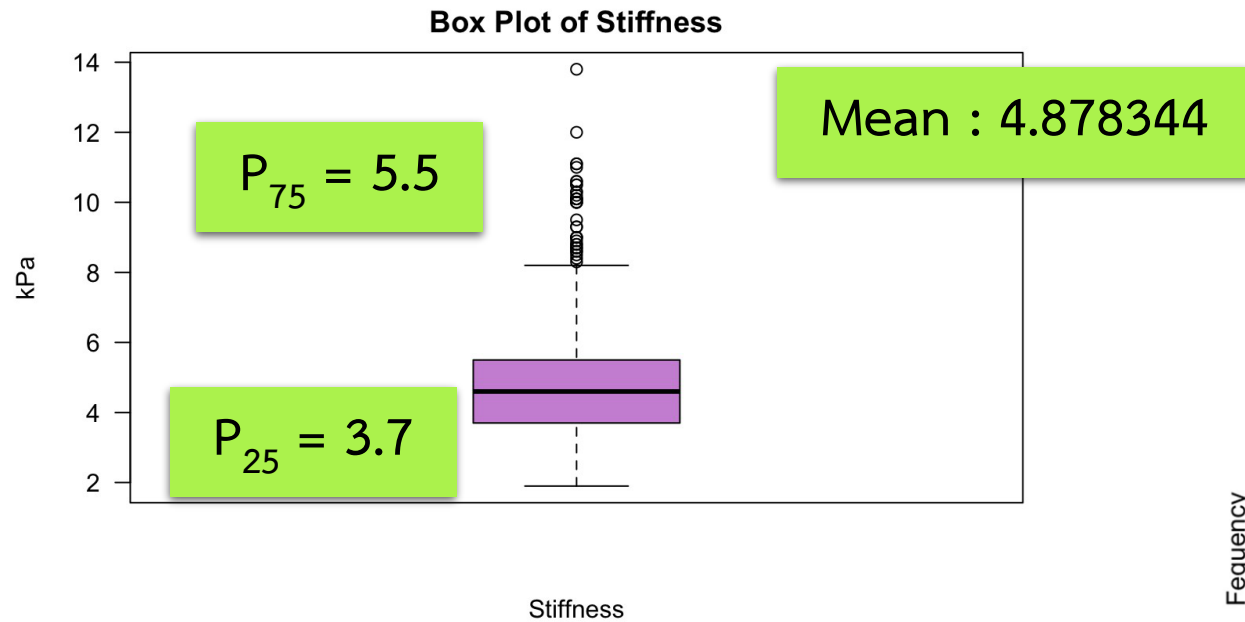


Histogram of HBV.log.equivalence (log()) transformation

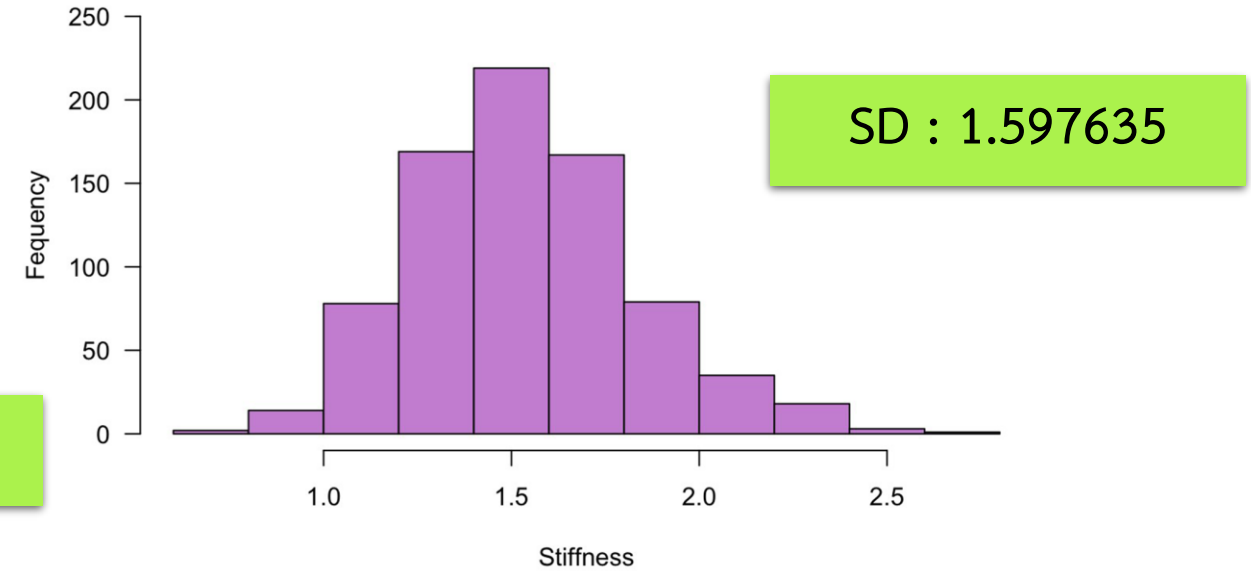


Data Exploration

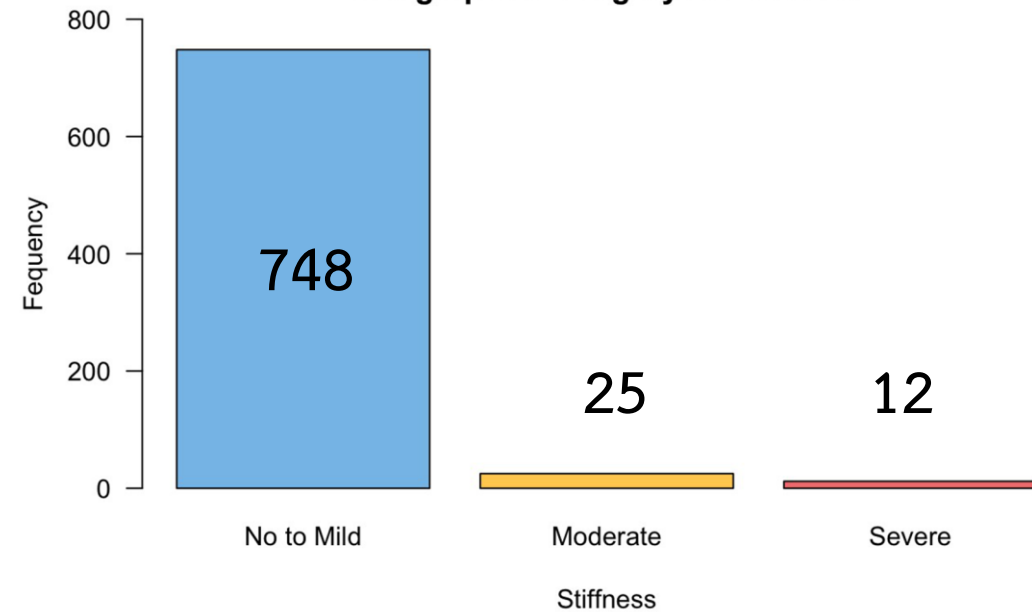
Stiffness



Histogram of Stiffness (log())transform

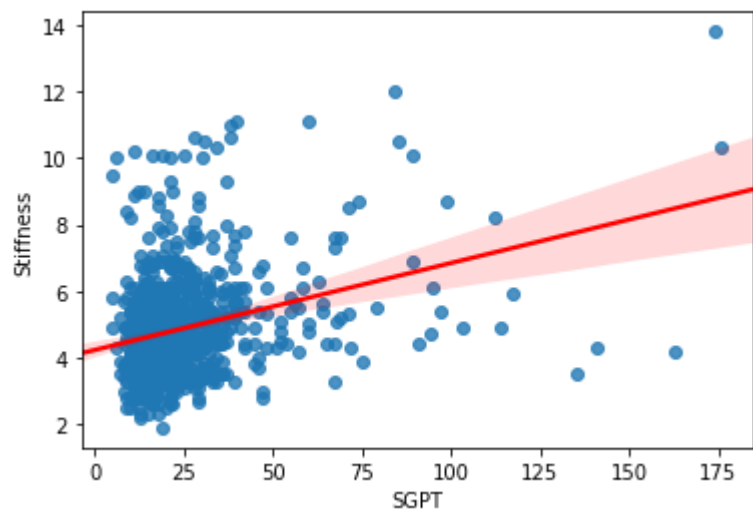


Bar graph of category of Stiffness

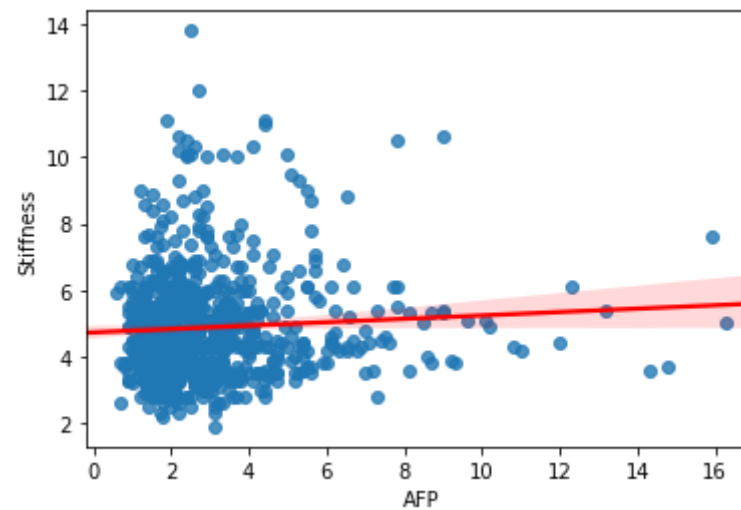


Relationships

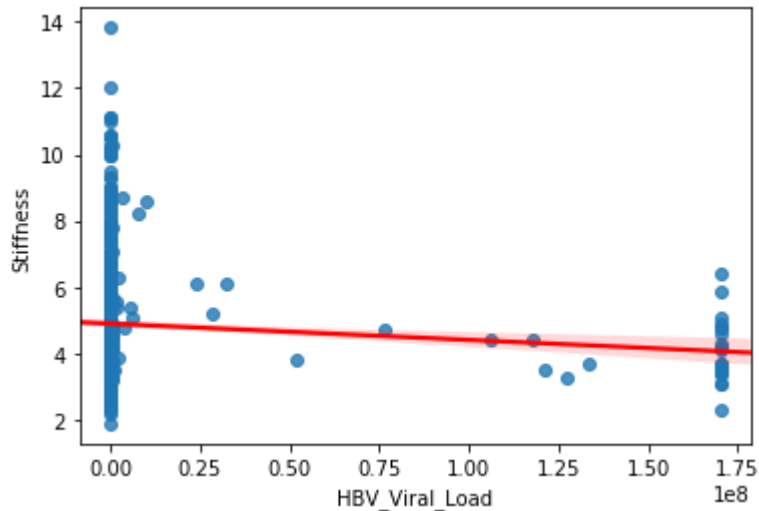
Relation between Stiffness and SGPT



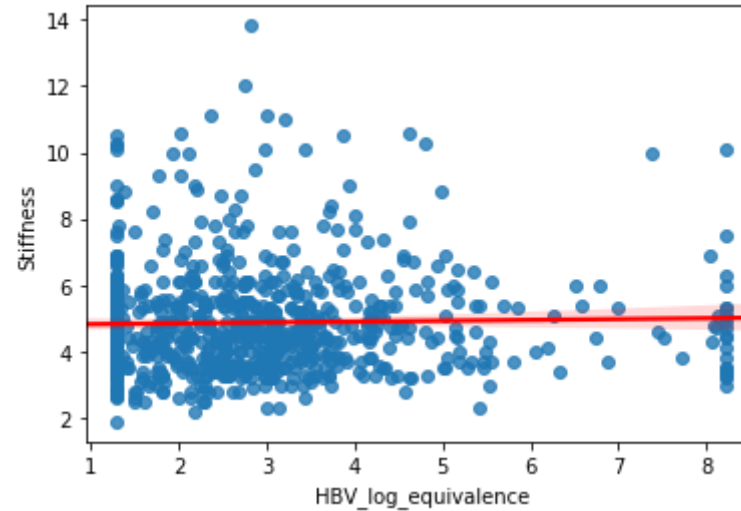
Relation between Stiffness and AFP



Relation between Stiffness and HBV_Viral_Load



Relation between Stiffness and HBV_log_equivalence



Relationships

Correlation Coefficient :

| | SGPT | AFP | HBV_Viral_Load | HBV_log_equivalence | Stiffness |
|---------------------|-------------|------------|-----------------------|----------------------------|------------------|
| SGPT | 1.000000 | 0.006256 | 0.121775 | 0.026046 | 0.306615 |
| AFP | | 1.000000 | -0.006593 | -0.034011 | -0.010238 |
| HBV_Viral_Load | | | 1.000000 | 0.004305 | -0.089146 |
| HBV_log_equivalence | | | | 1.000000 | 0.025280 |
| Stiffness | | | | | 1.000000 |

Relationships

Correlation Coefficient :

| | SGPT | AFP | HBV_Viral_Load | HBV_log_equivalence | Stiffness | Stiffness_Cat |
|------|------|-----|----------------|---------------------|-----------|---------------|
| SGPT | | | | | 0.356853 | 0.449667 |

Probability

Probability of SGPT – Stiffness level

| Level of Stiffness | SGPT | |
|--------------------|----------------------------------|--------------------------------|
| | Normal | Abnormal |
| No to mild | $\frac{685}{712} \approx 0.9621$ | $\frac{63}{73} \approx 0.8630$ |
| Moderate | $\frac{20}{712} \approx 0.0281$ | $\frac{5}{73} \approx 0.0685$ |
| Severe | $\frac{7}{712} \approx 0.0098$ | $\frac{5}{73} \approx 0.0685$ |

THANK YOU



จัดทำโดย

| | | |
|---------|----------------|-----------------|
| 6105008 | นางสาวอสมมา | ตั้งปรมัตถ์สกุล |
| 6105011 | นางสาวพรวนัช | กิจอุดม |
| 6105015 | นางสาวกรรณวิญา | ภิลัยวัลย์ |
| 6105024 | นางสาวอิสริย์ | สุวรรณสมบัติ |
| 6105025 | นายทศพร | บุญชู |

| สมาชิก | หน้าที่ |
|-------------------------------------|--|
| 6105008 นางสาวอสมมา ตั้งปรมัตถ์สกุล | Data pre-processing / Probability |
| 6105011 นางสาวพรวนซ์ กิจอุดม | Data pre-processing / Relation Scatter plot / Presentation |
| 6105015 นางสาวกรรณวิญา ภิลัยวัลย์ | Data pre-processing / Correlation coefficient / Probability / Presentation |
| 6105024 นางสาวอิสริย์ สุวรรณสมบัติ | Data pre-processing / Data Exploration (Plot Graphs) |
| 6105025 นายทศพร บุญชู | Data pre-processing / Descriptive Statistics |