



# The results of ECAT HIT surveys

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## 2 Surveys

- **Pilot study (autumn 2007)** - **n = 89**
- **Survey 2008-2** - **n = 119**

### Both surveys:

- **HIT positive sample (pool of citrated HIT positive samples)**
- **HIT negative control**



## Laboratory tests:

	<u>Pilot study</u>	<u>2008-2</u>	
<b>Immunological</b>	<b>96</b>	<b>144</b>	<b>(80-85%)</b>
<b>Functional</b>	<b>22</b>	<b>34</b>	<b>(15-20%)</b>



## Laboratory tests:

### Immunological

PAGIA

### Pilot study

32

### 2008-2

61

(33-42%)

Elisa

64

83

(58-67%)

### Functional

Platelet Aggregation

### Pilot study

17

### 2008-2

26

(77%)

Serotonin Release Assay

3

5

(14%)

Platelet Activation

1

2

(4-5%)

Flow cytometry

1

1

(2-3%)



## Results:

## POSITIVE SAMPLE

### Immunological

### Pilot study

### 2008-2

PAGIA

75%

90%

(7-16% B)

Elisa

97%

98%

### Functional

### Pilot study

### 2008-2

Platelet Aggregation

41%

8%

Serotonin Release Assay

33%

100%

Platelet Activation

100%

50%

Flow cytometry

0%

0%



## Results:

## NEGATIVE SAMPLE

### Immunological

### Pilot study

### 2008-2

PAGIA

94%

98%

Elisa

95%

100%

### Functional

### Pilot study

### 2008-2

Platelet Aggregation

83%

100%

Serotonin Release Assay

100%

100%

Platelet Activation

100%

100%

Flow cytometry

100%

100%



## Measured OD

## Positive sample 2008-2

<b>ELISA-based assays</b>	<b>N</b>	<b>Mean</b>	<b>CV</b>	<b>Range</b>
Aesku Dignostics Aeskulisa HIT II	-	-	-	-
GTI PF4 Elisa	28	2.628	17.2%	1.410 – 3.300
Haemachrom HIA IgG	1	2.318	-	-
Hyphen-Biomed Zymutest IgGAM	3	1.621	-	1.240 – 1.820
Hyphen-Biomed Zymutest IgG	4	1.125	-	0.452 – 1.410
Hyphen-Biomed Zymutest IgM	1	0.142	-	-
Stago Asserachrom HPIA	32	2.533	16.0%	1.230 – 3.240
Unknown	4	1.833	-	0.920 – 2.400



## Ratio Measured OD / Cut-off

## Positive sample 2008-2

<b>ELISA-based assays</b>	<b>N</b>	<b>Mean</b>	<b>CV</b>	<b>Range</b>
Aesku Diagnostics Aeskulisa HIT II	-	-	-	-
GTI PF4 Elisa	28	6.45	17.2%	3.52 – 8.26
Haemachrom HIA IgG	-	-	-	-
Hyphen-Biomed Zymutest IgGAM	3	2.95	-	2.48 – 3.64
Hyphen-Biomed Zymutest IgG	4	5.05	-	1.33 – 9.66
Hyphen-Biomed Zymutest IgM	1	0.18	-	-
Stago Asserachrom HPIA	32	5.14	23.7%	1.50 – 7.84
Unknown	4	3.88	-	2.31 – 5.33





## Measured OD

## Negative sample 2008-2

<b>ELISA-based assays</b>	<b>N</b>	<b>Mean</b>	<b>CV</b>	<b>Range</b>
<b>Aesku Diagnostics Aeskulisa HIT II</b>	-	-	-	-
<b>GTI PF4 Elisa</b>	<b>29</b>	<b>0.252</b>	<b>25.0%</b>	<b>0.100 – 0.380</b>
<b>Haemachrom HIA IgG</b>	<b>1</b>	<b>0.079</b>	-	-
<b>Hyphen-Biomed Zymutest IgGAM</b>	<b>3</b>	<b>0.109</b>	-	<b>0.070 – 0.160</b>
<b>Hyphen-Biomed Zymutest IgG</b>	<b>4</b>	<b>0.152</b>	-	<b>0.010 – 0.430</b>
<b>Hyphen-Biomed Zymutest IgM</b>	<b>1</b>	<b>0.136</b>	-	-
<b>Stago Asserachrom HPIA</b>	<b>31</b>	<b>0.116</b>	<b>50.9%</b>	<b>0.050 – 0.390</b>
<b>Unknown</b>	<b>4</b>	<b>0.151</b>	-	<b>0.110 – 0.170</b>



## Ratio Measured OD / Cut-off

## Negative sample 2008-2

<b>ELISA-based assays</b>	<b>N</b>	<b>Mean</b>	<b>CV</b>	<b>Range</b>
Aesku Diagnostics Aeskulisa HIT II	-	-	-	-
GTI PF4 Elisa	29	0.63	25.4%	0.24 – 0.95
Haemachrom HIA IgG	-	-	-	-
Hyphen-Biomed Zymutest IgGAM	1	0.21	-	-
Hyphen-Biomed Zymutest IgG	4	0.51	-	0.04 – 1.43
Hyphen-Biomed Zymutest IgM	1	0.16	-	-
Stago Asserachrom HPIA	31	0.21	28.6%	0.07 – 0.38
Unknown	4	0.33	-	0.21 – 0.41



# Thrombosis and ELISA optical density values in hospitalized patients with heparin-induced thrombocytopenia

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$0.79 \pm 0.46$ ,  $P < 0.001$ ). Patients with isolated HIT and an OD measurement of  $\geq 1.0$  demonstrated nearly a 6-fold increased risk of thrombosis compared with those with OD values between 0.4 and 0.99 (odds ratio 5.74, 95% confidence interval 1.73, 19.0; absolute rate of thrombosis, 36% vs. 9%, respectively,  $P = 0.07$ ). We conclude that in hospitalized patients with isolated HIT, the presence of heparin–PF4 antibodies detected by ELISA was associated with a significant risk of subsequent thrombosis and higher ELISA values were observed among patients suffering thrombotic events.

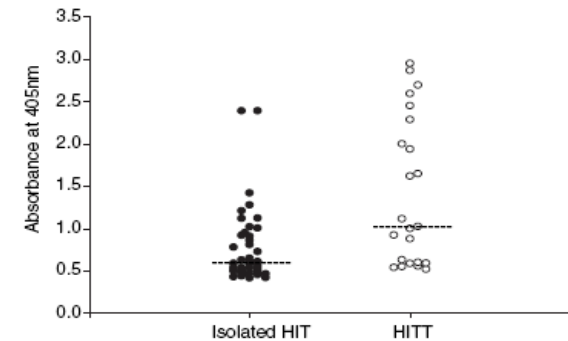


Fig. 1. Optical density (OD) scattergram for all 63 patients identified as heparin-induced thrombocytopenia (HIT) antibody positive by ELISA with an optical density (OD)  $> 0.4$ . Median values represented by (- - -).

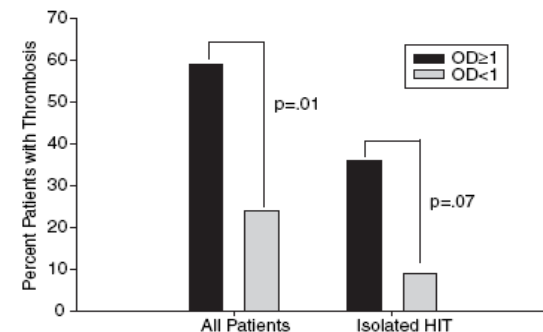


Fig. 2. Thrombosis in hospitalized patients with heparin-induced thrombocytopenia (HIT) ELISA optical density values above or below 1.0 within 30 days following testing.



## Conclusions

- 1) To our knowledge the surveys performed by the ECAT Foundation were the first large-scale international HIT EQA surveys.
- 2) The majority of participants have used immunological assays
- 3) The classification of ELISA-based assays is mostly satisfactory
- 4) There is a considerable variation in the measured OD and OD/Cut-off ratios both within and between methods

**In 2009 two surveys for HIT: 2009-2 and 2009-4**