

بنام حشر و نند جان و



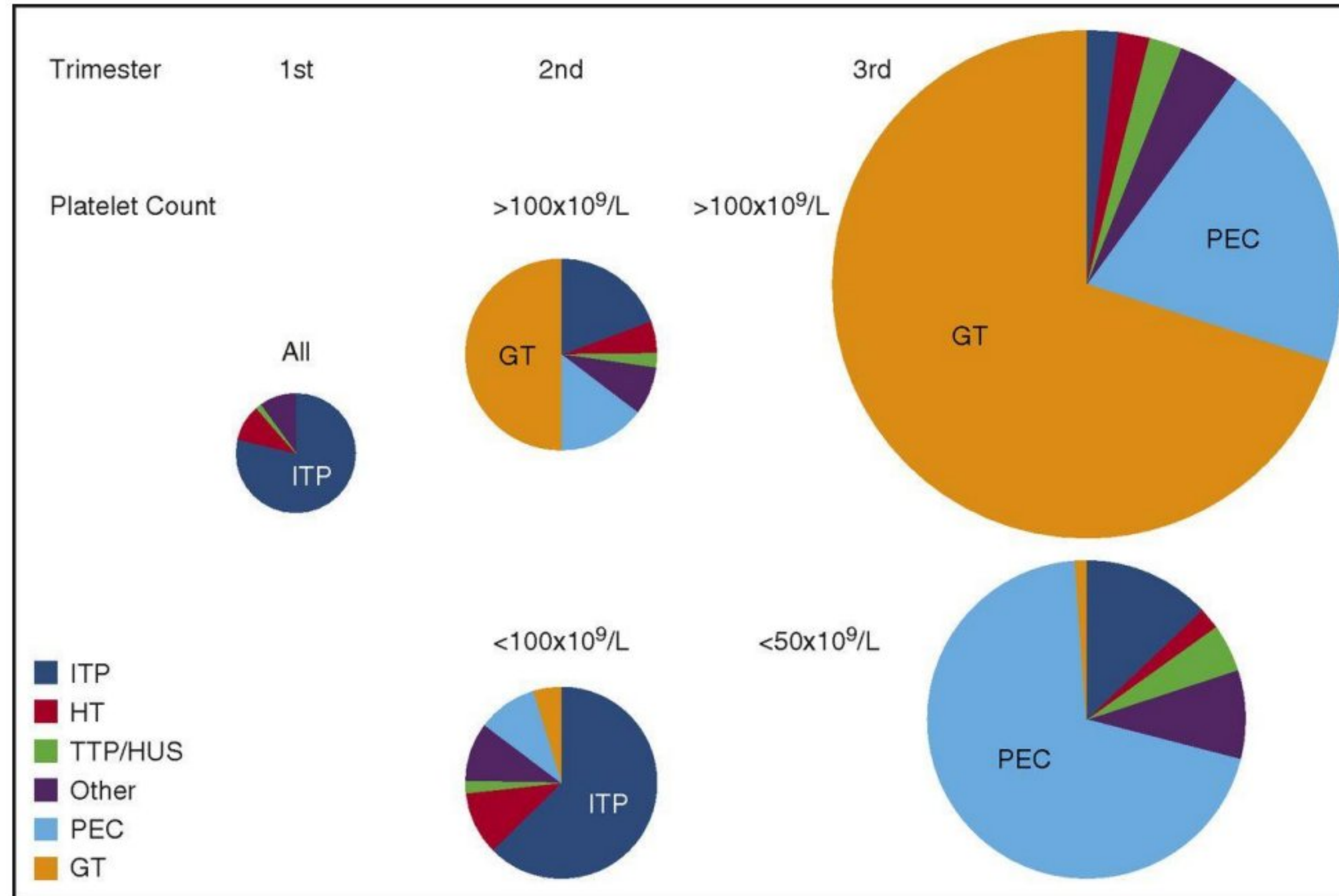
# Laboratory Diagnosis of Thrombocytopenia in obstetrics

M. Ahmadinejad MD. Pathologist

Associate Professor of Blood Transfusion Research Center, High Institute for Research and Education in Transfusion Medicine,  
Head of Reference Coagulation Lab of IBTO

Mashhad 2<sup>nd</sup> Thrombosis Hemostasis seminar 1403

## Thrombocytopenia in pregnancy



Douglas B. Cines, Lisa D. Levine, Thrombocytopenia in pregnancy, Blood, 2017, Figure 1.



## Differential diagnosis of thrombocytopenia in pregnancy

	Pregnancy specific	Not pregnancy-specific
<b>Isolated thrombocytopenia</b>	<ul style="list-style-type: none"> <li>Gestational thrombocytopenia</li> </ul>	<ul style="list-style-type: none"> <li>ITP</li> <li>Secondary ITP</li> <li>Medication therapy/drugs</li> <li>Type 2B von Willebrand disease</li> <li>Congenital thrombocytopenia</li> </ul>
<b>Thrombocytopenia associated with systemic disorders</b>	<ul style="list-style-type: none"> <li>Pre-eclampsia</li> <li>HELLP* syndrome</li> <li>Acute fatty liver of pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>TTP/HUS<sup>†</sup></li> <li>Systemic lupus erythematosus (SLE)</li> <li>APLS<sup>‡</sup></li> <li>Viral infections (HIV, HBV etc)</li> <li>Bone marrow disorders</li> <li>Nutritional deficiency</li> <li>Splenic sequestration</li> </ul>

## Gestational Thrombocytopenia

	Pregnancy specific
Isolated thrombocytopenia	<ul style="list-style-type: none"><li>• Gestational thrombocytopenia</li></ul>

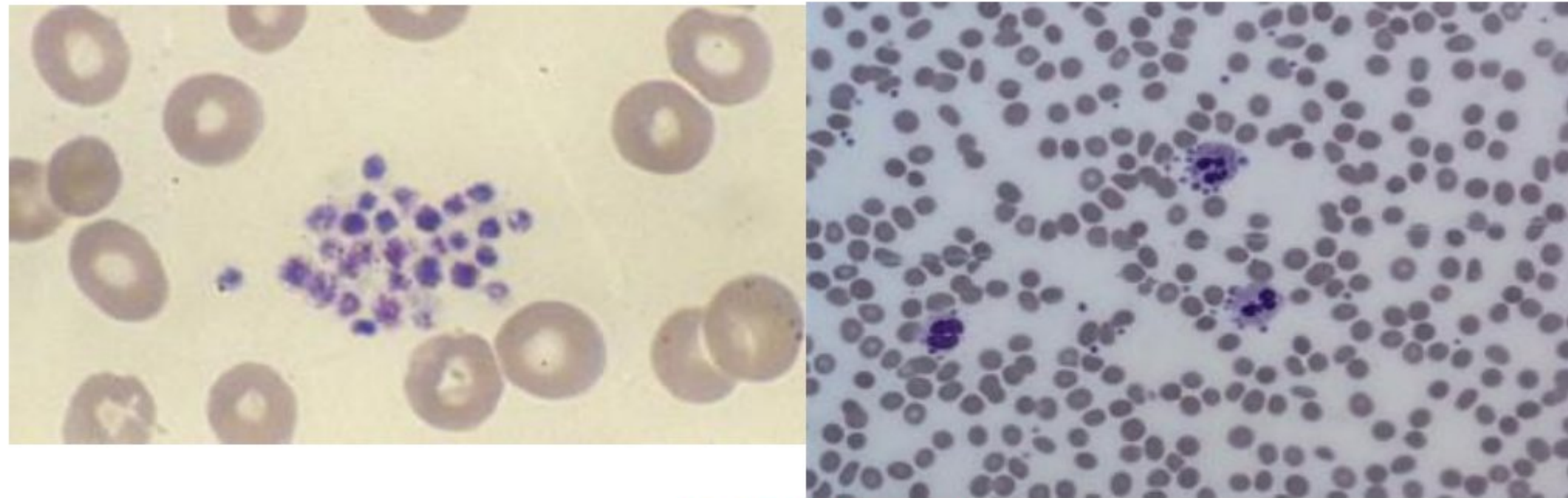
- There is **no specific laboratory test** to confirm the diagnosis
- Gestational thrombocytopenia is a **diagnosis of exclusion**



# Pseudothrombocytopenia

- Relatively **uncommon** phenomenon
- The number of platelets reported by **automated cell counters** is much lower than the real number of platelets circulating *in vivo*.
- **Erroneous diagnosis of thrombocytopenia**

platelet clumping



*in vitro*, may be induced either by

- (a) antibody-mediated agglutination, the most important causes of which are **(EDTA)-dependent** agglutination<sup>1</sup> and platelet satellitism,<sup>2</sup> or
- (b) aggregation secondary to platelet activation resulting from improper blood sampling techniques or delayed mixing with anticoagulant in the test tubes



# Immune Thrombocytopenia

Immune thrombocytopenia (ITP), previously called idiopathic thrombocytopenic purpura, is an **acquired autoimmune disorder** characterized by the destruction of platelets and megakaryocytes, resulting in thrombocytopenia (**platelet count  $<100 \times 10^9/L$** ).

ITP accounts for approximately **3%** of all cases of thrombocytopenia in pregnancy, but is the **most common cause of a platelet count less than  $50 \times 10^9/L$**  in the **first or second trimesters**

	Pregnancy specific	Not pregnancy-specific
Isolated thrombocytopenia		<ul style="list-style-type: none"><li>• ITP</li></ul>
	<ul style="list-style-type: none"><li>• There is <u>no specific laboratory test</u> to confirm the diagnosis</li><li>• ITP is a <u>diagnosis of exclusion</u> though the diagnosis</li><li>• <u>Supported by one or more of the followings:</u><ol style="list-style-type: none"><li>1. Severe thrombocytopenia (platelets <math>&lt;50 \times 10^9/L</math>) with normal blood film.</li><li>2. Steroid responsiveness</li><li>3. Positive autoimmune serology</li></ol></li></ul>	



Secondary ITP occurs in approximately 20% of patients with ITP

	Pregnancy specific	Not pregnancy-specific
Isolated thrombocytopenia	<ul style="list-style-type: none"><li>Gestational thrombocytopenia</li></ul>	<ul style="list-style-type: none"><li>ITP</li><li>Secondary ITP</li><li>Medication therapy/drugs</li><li>Type 2B von Willebrand disease</li><li>Congenital thrombocytopenia</li></ul>

Definition: Thrombocytopenia associated with other diseases such as chronic infections, lymphoproliferative disorders such as chronic lymphocytic leukemia (CLL), other autoimmune disorders as SLE, rheumatoid arthritis (RA) and APLA syndrome



## Drug-induced thrombocytopenia

	Pregnancy specific	Not pregnancy-specific
Isolated thrombocytopenia	<ul style="list-style-type: none"><li>Gestational thrombocytopenia</li></ul>	<ul style="list-style-type: none"><li>ITP</li><li>Secondary ITP</li><li>Medication therapy/drugs</li><li>Type 2B von Willebrand disease</li><li>Congenital thrombocytopenia</li></ul>

**Immune** Drug-induced **immune** thrombocytopenia



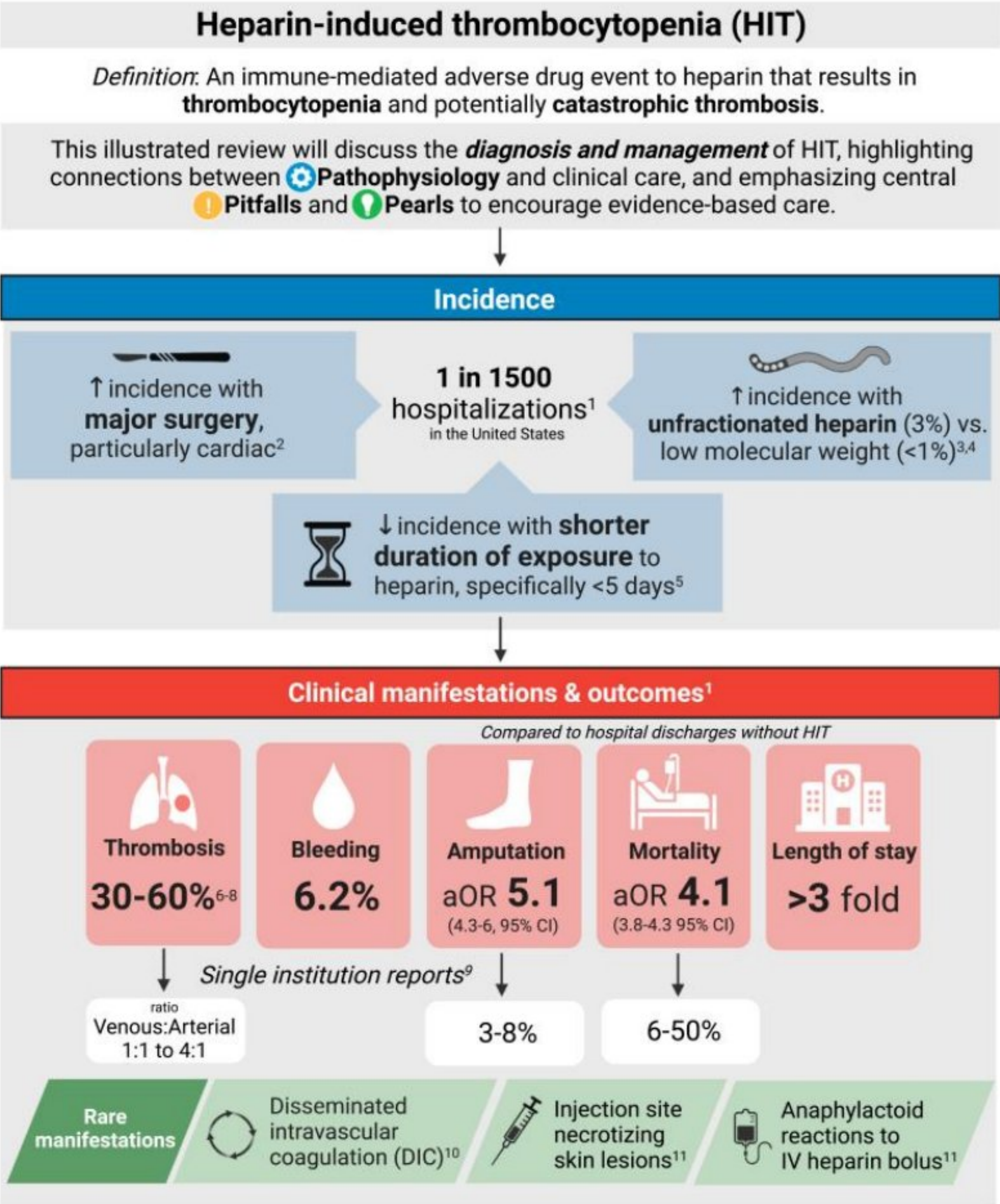
**Heparin-induced  
thrombocytopenia**

### **Non-immune**

- Chemotherapy
- Furosemide
- Gold, used to treat arthritis
- Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Penicillin
- Quinidine
- Quinine
- Ranitidine
- Sulfonamides
- Linezolid and other antibiotics
- Statins



# Heparin-induced thrombocytopenia



aOR, adjusted odds ratio; CI, confidence interval



# Five platelet-activating anti-PF4 disorders

