Prevalence and Factors Associated with Thrombocytopenia in Pregnancy: Cross-Sectional Study in University Hospital of Marrakech

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DOI: https://dx.doi.org/10.51244/IJRSI.2025.12120032

Received: 04 December 2025; Accepted: 12 December 2025; Published: 03 January 2026

ABSTRACT

Background: Thrombocytopenia is a prevalent hematologic disease affecting 5-10% of pregnancies globally. This study aimed to investigate the prevalence and prognostic factors of thrombocytopenia in pregnancy. Methods: A cross sectional study was conducted at the university hospital Mohamed VI Marrakech, covering 1162 pregnant patients over one month (January 2022). Statistical analyses were performed using SPSS software, and associations between thrombocytopenic status and independent factors were assessed. Blood samples were analyzed for complete blood count and platelet count.

Results: Of the included pregnant patients, 7%(n=81) exhibited thrombocytopenia, with a mean age of 27.9±6.9 years. History of diabetes was reported among 11.36% (n=132). Anemia affects 20.40% (n=237) of participants. Regarding hypertension, the majority of cases are gestational hypertension (82.14%, n=23), with a few cases of chronic hypertension and preeclampsia. Anemia and history of thrombocytopenia were significantly associated with thrombocytopenia (P= 0.003), whereas maternal age, gestation, history of abortions, and diabetes did not exhibit significant associations. Gestational thrombocytopenia was the predominant etiology (70.4%, n=57), followed by preeclampsia and HELLP syndrome.

Conclusion: This study offers a look at the diverse landscapes of pregnancy-associated thrombocytopenia, highlighting the prevalence of gestational thrombocytopenia and its management challenges. Tailored strategies for postpartum investigation are emphasized for severe cases, contributing to a better understanding of the condition's clinical nuances, and informing more effective clinical approaches.

Keywords: Thrombocytopenia – prevalence – pregnancy – Morocco

INTRODUCTION

Thrombocytopenia in pregnancy refers to a condition characterized by a decreased platelet count in pregnant individuals [1]. Platelets are blood cells involved in clot formation, and their reduction can lead to an increased risk of bleeding and other complications during pregnancy and childbirth. Thrombocytopenia during pregnancy is a common hematological disorder, affecting approximately 5-10% of pregnancies globally [2]. There are various causes of thrombocytopenia during pregnancy, with gestational thrombocytopenia (GT) being the most prevalent. GT is considered a benign condition and typically manifests during the third trimester, resolving spontaneously postpartum. It is thought to result from increased platelet consumption due to enhanced blood flow in the placenta and subsequent sequestration in the spleen [2]. While GT does not usually pose significant risks to the mother or fetus, careful monitoring is necessary to detect any complications.

However, not all cases of thrombocytopenia in pregnancy are benign. Obstetricians often encounter other pregnancy-specific causes with more serious prognostic implications, such as pre-eclampsia, HELLP syndrome (hemolysis, elevated liver enzymes, low platelet count), and acute fatty liver of pregnancy [3]. These conditions are associated with significant maternal and fetal morbidity and mortality and require prompt recognition and management. In addition to pregnancy-specific causes, thrombocytopenia during pregnancy can also be due to non-pregnancy-related conditions, including immune thrombocytopenia, von Willebrand disease type 2B, Evans syndrome, thrombotic thrombocytopenic purpura, atypical hemolytic-uremic syndrome, and antiphospholipid antibody syndrome [4]. These conditions may present unique challenges in diagnosis and management, often necessitating multidisciplinary care involving obstetricians, hematologists, and other specialists.

Managing thrombocytopenia during pregnancy involves identifying the underlying cause, assessing the severity of thrombocytopenia, and implementing appropriate monitoring and interventions to minimize the risk of complications for both the mother and fetus. Treatment strategies may vary depending on the specific etiology and clinical presentation, ranging from close observation and supportive care to pharmacological interventions such as corticosteroids, intravenous immunoglobulin, or platelet transfusions [5]. Overall, thrombocytopenia in pregnancy represents a significant clinical challenge, requiring careful evaluation and management to optimize maternal and fetal outcomes. A comprehensive understanding of the various causes, risk factors, and management strategies is essential for healthcare providers involved in the care of pregnant individuals with thrombocytopenia. Further research is needed to improve diagnostic approaches, refine treatment algorithms, and enhance outcomes for this vulnerable population.

Given the prevalence and complexity of thrombocytopenia during pregnancy, there is a need to comprehensively evaluate its occurrence and associated factors. Understanding the epidemiology and determinants of thrombocytopenia in pregnant individuals is crucial for improving clinical management and outcomes. By conducting this study we aimed to evaluate the occurrence of thrombocytopenia during pregnancy and investigate any related factors.

METHODS

Study Design and Setting:

This cross-sectional study was conducted at the Gynecology and Obstetrics Department in the University Hospital Mohamed VI Marrakech. It encompasses all patients admitted from January 2022.

Study Population:

The target population included all pregnant women admitted to the emergency department of gynecology and obstetrics. Participants were hospitalized following admission to the obstetric emergency department, given the hospital's level C designation.

Data Collection:

Data collection was conducted using a questionnaire developed based on a literature review. The questionnaire encompassed various aspects, including sociodemographic characteristics (age, origin, etc.), medical and obstetric history, clinical assessments, and therapeutic follow-up. Specifically, the questionnaire gathered information on sociodemographic characteristics, such as age and origin, as well as medical and obstetric history, including past pathological and obstetric antecedents. Clinical assessments and therapeutic follow-up data were also collected to comprehensively understand the patients' conditions and treatment trajectories.

Blood samples were obtained from the study population following strict pre-analytical phase conditions to ensure result reliability. This included using a frank venipuncture technique, limiting tourniquet use to one minute, and utilizing EDTA and citrated tubes for sample homogenization. Samples were transported to the hematology laboratory of the University Hospital Mohamed VI Marrakech for analysis of complete blood count and platelet rate.

Definitions:

Key variables, including thrombocytopenia, were clearly defined. Thrombocytopenia was defined as a platelet

count of less than 150 x 10^9 /L.

Statistical Analysis:

Statistical analyses were performed using SPSS software version 16.0 (SPSS Inc., Chicago). Descriptive statistics were used to present counts and proportions for categorical variables and means and standard deviations for continuous variables. Associations between thrombocytopenic status and independent factors were assessed using the chi-square test for categorical variables and the t-test for continuous variables. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations:

Informed consent was obtained from all patients willing to participate in the study. The study adhered to ethical guidelines. Confidentiality and anonymity of patient data were strictly maintained throughout the study.

RESULTS

Participant characteristics:

A total of 1162 pregnant patients were included (Figure 1) in this study, of which 7% [95% CI: 5.53%, 8.47%] had thrombocytopenia.

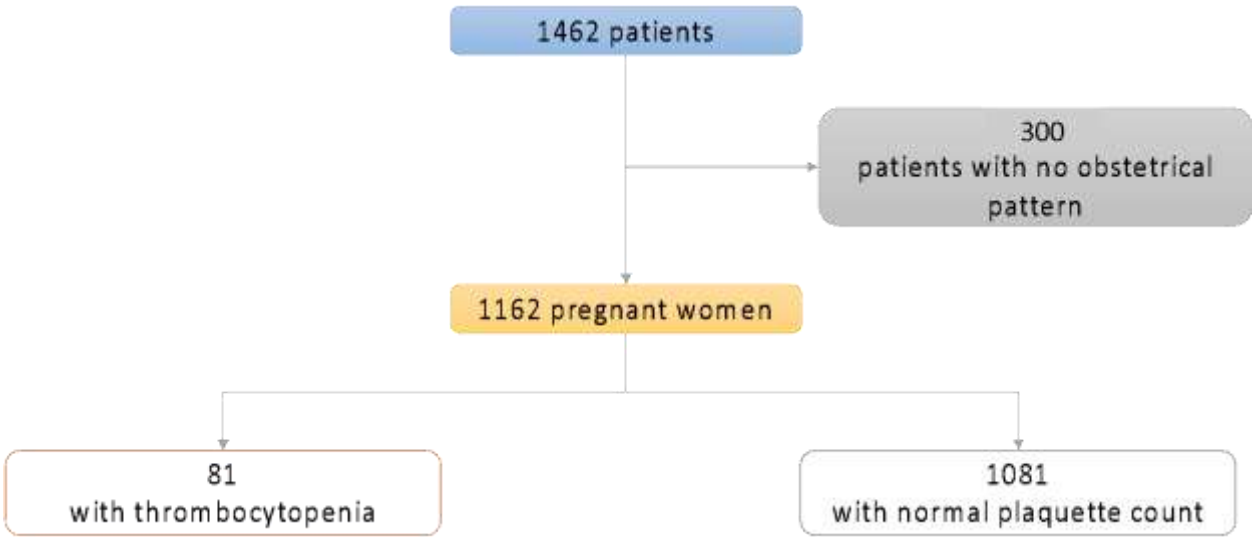

Figure 1: patient's selection

Table 1 compares various variables between individuals with thrombocytopenia (n=81) and those with normal platelet counts (n=1081). The mean age of the thrombocytopenic patients was 27 years with extremes from 16 to 48. Primary causes of admission include vaginal births (73.4%) and cesarean sections (19.6%). The mean gestational age is 38.6 weeks with a standard deviation of 3.7 weeks. Approximately 11.36% of participants were diagnosed with diabetes, predominantly gestational diabetes (87.12%). Anemia affects 20.40% of participants. Regarding hypertension, the majority of cases are gestational hypertension (82.14%). (table1)

Table 1: Demographic data of 1162 pregnant women.				
Variable	**Thrombocytopenia (n=81) n(%)**	**Normal platelets (n=1081) n(%)**	**p-value**	**odds ratio and 95% CI**
Maternal age, mean (SD)	28.4 (6.8)	27.9 (7.0)	0.500	0.99(0.96-1.02)
Gestational age. mean (SD)	38.1 (3.9)	38.7 (3.5)	0.201	0.98(0.89-1.09)
History of :				
Anemia	10.0 (12.3)	227.0 (21.0)	0.062	0.28(0.13-0.59)

High blood pressure	3.0 (3.7)	25.0 (2.3)	0.431	1.31(0.38-4.57)
Preeclampsia	2.0 (2.5)	9.0 (0.8)	0.142	2.46(0.51-11.8)
Stays in maternal intensive care unit	0.0 (0.0)	1.0 (0.1)	0.784	3.53(0.14-88.1)
Medication intake	11.0 (13.6)	226.0 (20.9)	0.114	0.29(0.02-7.22)
Iron therapy	8.0 (9.9)	196.0 (18.1)	< 0.001	0.28(0.12-0.62)
Gestation				
Nulliparous	32.0 (39.5)	441.0 (40.8)	0.820	0.94(0.59-1.49)
1 gestation	27.0 (33.3)	388.0 (35.9)	0.64	0.89 (0.55-1.43)
>=2 gestations	54.0 (66.7)	693.0 (64.1)		
Prior abortion	13.0 (16.0)	166.0 (15.4)	0.884	0.96(0.52-1.77)

Clinical and paraclinical data

Examining the history of medical conditions, individuals with thrombocytopenia show higher rates of anemia (p=0.062) and thrombocytopenia itself (p<0.001) compared to those with normal platelets. Regarding gestational history, a statistically significant association is observed between thrombocytopenia and a history of prior neonatal death (p=0.067) and anemia (p=0.003). In terms of diabetes type, there is no significant difference between the two groups. (Table2)

Table 2: clinical data of our patients				
	Thrombocytopenian (%)	**Normal rate of platelets N (%)**	**p value**	**odds ratio and 95% CI**
Blood Pressure			0.0041	0.37(0.2-0.68)
Normal rates	66.0 (82.5%)	1002.0 (92.7%)		
High	14.0 (17.5%)	78.0 (7.2%)		
Paleness			0.1161	0.7 (0.43-1.13)
present	26.0 (32.1%)	443.0 (41.0%)		
absent	55.0 (67.9%)	638.0 (59.0%)		
Urine strip			< 0.0011	0.17(0.09-0.32)
Negative	54.0 (80.1%)	845.0 (94.7%)		
Positive to proteins	17.0 (23.9%)	47.0 (5.3%)		
Limb edema			< 0.0011	4.61(2.18-9.76)
Present	10.0 (12.3%)	32.0 (3.0%)		
Absent	71.0 (87.7%)	1048.0 (97.0%)		
Osteo tendinous reflexes			< 0.0011	0.14(0.06-0.031)
Present	72.0 (88.9%)	1061.0 (98.3%)		
Absent	9.0 (11.1%)	18.0 (1.7%)		
Hemorrhagic signs			0.0171	40 (1.62-992)
Present	1.0 (1.2%)	1.0 (0.1%)		
Absent	80.0 (98.8%)	1073.0 (99.9%)		
Signs of preeclampsia			< 0.0011	6.07(2.27-16.2)
Present	6.0 (7.4%)	14.0 (1.3%)		
Absent	75.0 (92.6%)	1062.0 (98.7%)		
Anemia	12.0 (14.8)	326.0 (30.2)	0.003	2.48(1.33-4.65)
Diabetes type			0.722	NA
Gestational diabetes	13.0 (92.9)	102.0 (86.4)		
Type 1 diabetes	0.0 (0.0)	4.0 (3.4)		
Type 2 diabetes	1.0 (7.1)	12.0 (10.2)		
Fetal well-being				
Satisfying	7.0 (9.2%)	94(8.7)		1.07(0.48-2.38)
Non satisfying	69.0 (90.8%)	987(91.3)		

Outcome			< 0.0011	NA
Delivery Vaginal C-section	 50.0 (61.7%) 20.0 (24.7%)	 803.0 (74.3%) 208.0 (19.2%)		
High risk pregnancy	9.0 (11.1%)	70.0 (6.5%)		
Post-partum	2.0 (2.5%)	0.0 (0.0%)		

Associated Factors

Blood pressure levels show a significant association with thrombocytopenia (p=0.0041), with a higher proportion of elevated blood pressure in the thrombocytopenia group. Urine analysis by urine strips reveals a highly significant association (p<0.0011), indicating a higher prevalence of positive findings in individuals with thrombocytopenia. Similarly, the presence of limb edema and osteo-tendinous reflexes both show highly significant associations (p<0.0011), emphasizing the link between these factors and thrombocytopenia. The occurrence of clinical signs of thrombocytopenia and signs of preeclampsia are also significantly associated with thrombocytopenia (p=0.0171 and p<0.0011, respectively). (Table 2)

Thrombopenia etiologies and management

The majority of cases (70.4%) are attributed to gestational thrombocytopenia, highlighting its prevalence in the studied population. In the category of pregnancy-induced hypertension conditions, cases constitute 16.0% of the total. Eclampsia and HELLP syndrome each contribute 2.5%, while retro-placental hematoma contribute 1.2% (table 3). The management was nonspecific for most of them because of the admission for delivery, but the research of etiology in postpartum was necessary for those who had rates under 50G/L.

Table 3 : Etiologies of thrombocytopenia in our study

	Counts	**Percent (%)**
Related to the pregnancy		
Gestational	57	70.4 %
Pregnancy-induced hypertension	13	16.0 %
Eclampsia	2	2.5 %
HELLP syndrome	2	2.5 %
Retro-placental hematoma	1	1.2 %
Constitutional		
PTI	1	1.2 %
Toxic / drugs intake	1	1.2 %
Others (idiopathic bicytopenia ; cirrhosis …)	4	4.9 %

HELLP: Hemolysis, Elevated Liver enzymes and Low Platelets; PTI: Immune (idiopathic) thrombocytopenic purpura

DISCUSSION

Thrombocytopenia in pregnancy is a prevalent hematological issue, with a global incidence estimated at 7–8% of all pregnancies [6]. Our study aimed to assess the prevalence, etiologies, and clinical implications of thrombocytopenia among pregnant women admitted for delivery. We observed a prevalence of 7%, which is consistent with international data and supports the robustness of our findings. In line with previous studies, mild thrombocytopenia was the most frequent presentation (59%), followed by moderate (26%) and severe forms (15%) [7], reinforcing the predominance of benign conditions such as gestational thrombocytopenia.

From a clinical management perspective, our findings emphasize the importance of a structured diagnostic and management pathway. In most cases, thrombocytopenia was discovered incidentally during routine antenatal or

peripartum laboratory testing, and management was largely nonspecific due to admission for delivery. However, our data support the need for targeted postpartum investigations, particularly in patients with platelet counts below 50 G/L, persistence of thrombocytopenia after delivery, or associated clinical signs such as hypertension, proteinuria, or hemorrhagic manifestations. In such cases, postpartum evaluation should include repeat platelet counts, peripheral blood smear, liver function tests, and assessment for immune or secondary causes, in accordance with international recommendations [13]. This approach allows differentiation between transient gestational thrombocytopenia and underlying pathological conditions such as immune thrombocytopenic purpura or HELLP syndrome.

Comparing our results with the literature, the observed prevalence aligns with the reported global range of 7–11% [8]. Nonetheless, significant regional differences have been described. Higher prevalence rates have been reported in low- and middle-income countries, particularly in Africa, likely reflecting differences in access to antenatal care, nutritional status, and the burden of hypertensive and infectious diseases [9]. Our findings are consistent with other African studies, where gestational thrombocytopenia remains the leading etiology but hypertensive disorders of pregnancy represent a substantial proportion of cases. These disparities highlight the importance of adapting diagnostic and management strategies to regional epidemiological contexts.

When compared with larger multicenter studies, our etiological distribution is largely concordant. Multicenter cohorts from Europe and Asia report gestational thrombocytopenia accounting for 65–75% of cases, followed by hypertensive disorders and immune thrombocytopenia [10,14]. The slightly higher proportion of pregnancy-induced hypertension observed in our cohort may reflect referral patterns to our center or regional differences in the prevalence and severity of hypertensive disorders. Such comparisons underline the relevance of our findings while situating them within a broader international framework.

Regarding associated factors, anemia and hypertensive disorders were significantly more frequent in patients with thrombocytopenia, corroborating previous reports [7]. The coexistence of anemia and thrombocytopenia may suggest underlying inflammatory, nutritional, or autoimmune mechanisms, warranting closer surveillance. Although diabetes was not significantly associated with thrombocytopenia in our cohort, the interaction between metabolic disorders and platelet dynamics remains incompletely understood and deserves further investigation.

Our results also have implications for obstetric management. Consistent with existing evidence, we did not observe an increased risk of hemorrhagic complications based solely on the mode of delivery, provided platelet counts were above accepted safety thresholds [11,12]. This finding supports individualized delivery planning rather than systematic preference for cesarean section in thrombocytopenic patients.

Several limitations should be acknowledged. The cross-sectional design and retrospective data collection limit causal inference. Moreover, data were collected over a single month, which may introduce temporal bias and limit representativeness. Extending the data collection period over several months or a full year would likely improve the robustness of prevalence estimates, capture seasonal variations, and allow more accurate assessment of rare etiologies. Future prospective, multicenter studies with longer inclusion periods would be valuable to validate and extend our findings [14].

Despite these limitations, the strengths of our study include a well-defined obstetric population and a comprehensive assessment of clinical, biological, and etiological aspects of thrombocytopenia. Our findings reinforce the importance of systematic screening, context-adapted management pathways, and appropriate postpartum follow-up to optimize maternal and fetal outcomes.

CONCLUSION

Our study provides valuable insights into the epidemiology, clinical associations, and etiological spectrum of thrombocytopenia in pregnancy. With a prevalence of 7%, our findings underscore the importance of thorough antenatal evaluation and monitoring for associated comorbidities. We identified gestational thrombocytopenia as the predominant contributor (70.4%), highlighting the need for clinicians to navigate diverse etiological pathways effectively. Our study elucidates profound clinical and paraclinical associations, emphasizing the necessity for precision in thrombocytopenia dynamics during pregnancy. These findings contribute to a nuanced

understanding of thrombocytopenia in pregnancy, equipping healthcare providers with a comprehensive roadmap for patient management and care.

What is already know on this topic

1. Thrombocytopenia is a prevalent hematologic disorder during pregnancy, affecting 5-10% of pregnancies globally, with over ten million pregnancies complicated by this condition annually.

2. Gestational thrombocytopenia is identified as the most frequent etiology, accounting for approximately 75% of pregnancy-related thrombocytopenia cases, emphasizing the importance of understanding and managing this benign condition in pregnant individuals.

What this study adds

1. Epidemiological Insights: Thrombocytopenia prevalence of 7% in 1162 pregnant individuals, revealing demographic nuances and prevalent comorbidities.

2. Clinical Associations: Comprehensive examination uncovers profound clinical and paraclinical associations in thrombocytopenia during pregnancy.

3. Etiological Spectrum: Detailed taxonomy delineates gestational thrombocytopenia as primary contributor (70.4%), aiding clinicians in deciphering origins.

Competing interests

The authors declare no competing interest.

Authors' contributions

Conception and study design: BF and MN. Data collection: MN, WQ. Data analysis and interpretation: AM and MN. Manuscript drafting: NM and AM. Manuscript revision: BF, WQ, SI and AS. All authors approved the final version of the manuscript. Guarantor of the study: AS and SS.

Acknowledgements (if any)

Any

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Strobe Statement—Checklist of items that should be included in reports of cross-sectional studies

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	1-2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2-3
Objectives	3	State specific objectives, including any prespecified hypotheses	3
Methods			
Study design	4	Present key elements of study design early in the paper	3
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	3-4
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	3
4Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	3-4
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	*4*
Bias	9	Describe any efforts to address potential sources of bias	4
Study size	10	Explain how the study size was arrived at	4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	4
		(*b*) Describe any methods used to examine subgroups and interactions	4
		(*c*) Explain how missing data were addressed	4
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	5
		(c) Consider use of a flow diagram	

Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	5
		(b) Indicate number of participants with missing data for each variable of interest	
Outcome data	15*	Report numbers of outcome events or summary measures	5
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	5-6
		(*b*) Report category boundaries when continuous variables were categorized	
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	6
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	7
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	6-7
Generalisability	21	Discuss the generalisability (external validity) of the study results	7
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	9

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.