



**Global Thrombosis Forum**  
**Virtual High School Scholars' Day**  
**Saturday, July 14, 2023**  
1:00pm - 3:00pm CST  
Loyola University Health Science Division  
<https://luc.zoom.us/j/84826293153>

Consistent with The North American Thrombosis Forum objectives, training, and educational initiatives the Global Thrombosis Forum, under the leadership of Dr. Atul Laddu, has continued to make a major impact in inspiring public sectors, in particular younger students to promote awareness of thrombosis and its management at various levels. Such programs have recruited talented young scholars who have participated in educational and translational research programs in an exemplary fashion. Since its foundation in 2011, the Global Thrombosis Forum has worked with Loyola University and other academic institutions on various initiatives in promoting these activities. The summer research scholar's program at various institutions including Loyola University, NorthShore University Systems, Albany College of Pharmacy, PACO Foundation, and Harvard University have provided major platforms for the young students to carry out translational research projects which have resulted in the participation at national and international meetings and publications. This program is now expanded to include international institutions including in countries such as Brazil, China, India, and Turkey.

Loyola University is committed to its primary mission in continuing our academic programs. The students and faculty contributed with several innovative approaches to carry out assigned projects in an effective manner. This involved periodic group sessions, individual faculty / student interactions and scheduled didactic presentations relevant to assigned biomedical research in an integrated fashion. The concept and implementation of the virtual program was supported by the Vice Provost, Dr. Mehrvan Singh who has provided guidance and support. With this advanced communication and the utilization of various platforms such as Zoom students were continually in touch with the faculty and mentors. With this platform this program will continually evolve and will offer

students who are not able to physically participate on site the ability to participate.

Dr. Margaret Callahan, Provost, Loyola University Chicago, has been extremely supportive of the GTF / Loyola initiatives and has provided guidance and leadership to carry out these missions. Under the strong leadership of Dr. Sam Goldhaber, the ex-President of the NATF, Dr. Alfonso Tafur, and Dr. Joseph Caprini from the PACO Foundation, Dr. Atul Laddu, President, and CEO of GTF and the faculty participation at various institutions, these programs will continue to expand in various formats. Summer research programs along with other programs which were scheduled at various institutions will also provide flexibility for students to participate in short term research projects. Such programs will be offered to individuals with dedicated time periods pending their availability. This will provide opportunities for young students which will be helpful in their career planning and education to become physicians and scientists to serve healthcare and biomedical research programs.

This year's program has covered diverse topics such as cancer associated thrombosis, history of COVID-19, DOACs in elderly patients, predictive value of cellular indices for DVT, and the influence of pharmaceutical industry in the role of drug development. The presenters have worked independently under the direction of Dr. Atul Laddu. We are happy to congratulate these GTF scholars and appreciate their interest in thrombosis related diverse topics. This year has also seen the transition of leadership and Dr. Sam Goldhaber has retired after 10 years of excellent leadership. Dr. Christian Ruff is the new president of NATF, and GTF will work with him on leading the new program. The Loyola faculty is happy to welcome 2024 scholars with a virtual and in-person training program. We will develop innovative programs in thrombosis with their interest.

## AGENDA

**1:00 pm– 1:30 pm Welcome Addresses**  
**Provost Dr. Margaret Callahan**  
**Dr. Atul Laddu**  
**Dr. Jawed Fareed**

### Student Presentations

**1:30 pm *DOAC use in the elderly.***  
Presenters: Divyanka Kavdikar,  
Krish Raina, Rohit Dandavate  
Mentor: V. Pai, MD

**1:40 pm *Influence of Pharmaceutical industry on development of drugs.***  
Presenters: Harith Dinakaran, Krish Punyarthi  
Mentor: Atul Laddu, MD

**1:50 pm *Cellular Indices for DVT***  
Presenters: Abhinav Paknikar, Anvit Divekar  
Mentor: Neha Thomas, MSc

**2:00 pm *Pharmacy Benefit Managers***  
Presenters: Sonal Kapuria and Aneesh Natakala  
Mentor: Rashmi Kulkarni, MD

### Poster Presentations

**2:10 pm *History of COVID-19 and VTE***  
Presenters: Arushi Garud, Nethra Pai  
Mentor: Priya Lokasundaram

**2:20 pm *DVT Walk-in Clinic***  
Presenters: Ragini Mohan, Arav Raghunathan  
Mentor: Sagar Garud, MD

**2:30 pm *Thrombosis in pediatric cancer patients***  
Presenters: Anish Joshi, Avaneesh Jadhav, and Arav Raghunathan  
Mentor: Aditya Sathe, MD

**2:40 pm Closing Remarks by Dr. Atul Laddu**

## ABSTRACTS

### Powerpoint presentations

- ***DOAC use in the elderly.***

**Presenters:** Divyanka Kavdikar, Krish Raina, Rohit Dandavate  
**Mentor:** V. Pai, MD

DOACs are needed in the elderly to manage several conditions such as non-valvular atrial fibrillation and stroke prophylaxis. DOACs have been reported to significantly reduce the risk of stroke and systemic thromboembolism in older patients, without increasing the risk of major bleeding (even more than in younger patients) and have a more favorable risk. Although DOACs are the antithrombotic treatment of choice, irrespective of age, certain factors may limit their use. Prescribing and maintaining FDA-

recommended doses of DOAC agents in the elderly is very challenging due to multiple factors. Fluctuations in renal function, comorbidities, and concomitant antiplatelet use may necessitate more individualized dosing strategies with these agents. We have reviewed the use of DOACs especially as they relate to the use in the elderly and have tried to comment on the various challenges during the use of DOACs in the elderly.

- ***Influence of Pharmaceutical industry on development of drugs.***

**Presenters:** Harith Dinakaran, Krish Punyarthi  
**Mentor:** Atul Laddu, MD

Drugs are typically developed by the members of a Pharmaceutical Industry, such

as chemists, pharmacologists, toxicologists, pharmacokinetic division (ADME) and clinical research. After the chemical is created, and patents have been issued, the drug goes into various animal testing such as acute and chronic toxicity, and studies in ADME. Of the thousands of chemicals that are screened, only a few may make it to be labeled for human use. The chemical selected for humans is then subject to a protocol that needs to be sent to the FDA for approval. The process is called an IND (Investigational New Drug) application. The next step is to test the drug in humans, for which we need an investigator, and an approval from the Institutional Review Board (IRB). It is here that the Clinical Research Studies (Phases I, II, and III) get initiated and finally a New Drug application (NDA) is submitted to the FDA for approval of marketing of the drug. Finally, each segment development gets published in peer reviewed scientific journals such as the ACS, Journal of Pharmacology & Experimental Therapeutics, Toxicology and Applied Pharmacology, American Journal of Clinical Pharmacology, and so on. Most of the drug developments go without a hitch and eventually the drug happens to help millions of patients to manage their health conditions. There have been a few occasions when the process of drug development was not a smooth one, and there were issues in the smooth process. We have researched some such instances where the members of the pharmaceutical industry were less than honest with the development and thus creating a major risk to human life. In addition, we also looked at the shady post marketing practices.

- ***Cellular Indices for DVT***

**Presenters:** Abhinav Paknikar, Anvit Divekar

**Mentor:** Neha Thomas, MSc

DVT is a very serious condition that affects about 900,000 people yearly in the US and results in about 100,000 deaths. DVT can be explained by Virchow's Triad that identifies three key factors involved in the formation of thrombosis: venous stasis, vascular injury, and hypercoagulability. DVT can be diagnosed using various methods, such as D-dimer levels, which provide initial indications of clot formation, Doppler ultrasound, CT scans, and MRI imaging. A series of cellular indices such as platelet-neutrophil ratio (PNR) and the lymphocyte-monocyte ratio (LMR) have been used for the diagnosis and prognosis of DVT. An elevated PNR, like NLR, indicates increased inflammation and has been associated with poor outcomes in various conditions. Complete Blood Count (CBC) is a commonly performed and cost-effective laboratory test that is conducted in Hematology laboratories. CBC is a fundamental laboratory test that provides important information about the cellular components of blood. The results of the CBC assist healthcare professionals in making accurate diagnoses and developing appropriate treatment plans for patients. Neutrophils and lymphocytes are critical components of the immune system's defense against infections and have been implicated in thrombosis. The neutrophil-lymphocyte ratio (NLR) has shown potential as a prognostic indicator for deep vein thrombosis (DVT).

- ***Pharmacy Benefit Managers***

**Presenters:** Sonal Kapuria and Aneesh Natakala

**Mentor:** Rashmi Kulkarni, MD

Over the last decade, launch prices for prescription drugs have increased by 20%. The US spending on drugs was over \$500 billion in just 2020, and in 2023, drug costs increased by approximately 5%. Pharmacy

Benefit Managers (PBMs) play a big role in negotiating these drug costs and their price increases. PBMs are third party companies that function as intermediaries between insurance providers and pharmaceutical manufacturers. PBMs create and maintain formularies, negotiate rebates (discounts paid by a drug manufacturer to a PBM) with manufacturers, process claims, create pharmacy networks, review drug utilization, and occasionally manage mail-order specialty pharmacies. By negotiating with drug manufacturers and pharmacies to control drug spending, PBMs have a significant behind-the-scenes impact in determining total drug costs for insurers, shaping patients' access to medications, and determining how much pharmacies are paid. We researched behind the scenes activities that have caused such large increases in prescription prices.

### **Poster presentations**

- ***History of COVID-19 and VTE***

**Presenters:** Arushi Garud, Nethra Pai  
**Mentor:** Priya Lokasundaram

Coronavirus, or COVID-19, has created a worldwide pandemic caused by an airborne virus, causing several deaths in various parts of the World, the effects of which can still be seen in our society. It was first reported on Dec 1, 2019. While it was first thought that SARS-CoV-2 infected humans at one of Wuhan, China's open-air "wet markets", later theories show that it may have originated as a biological weapon in a lab in China. Speculation remains as to where this virus originated. As COVID-19 spread both inside and outside China, it infected people who have had no direct contact with animals. Symptoms of COVID-19 can range from mild to severe with multiple risks to life. Worldwide COVID-19 has created deaths in significant people across the world

in all 5 continents. The purpose of our research was to go deep into the history of COVID-19 and to indicate where we stand as of today.

- ***DVT Walk-in Clinic***

**Presenters:** Ragini Mohan, Arav Raghunathan  
**Mentor:** Sagar Garud, MD

DVT is a very serious condition that occurs when a blood clot forms in the deep veins and may cause pulmonary embolism. DVT and PE can cause illness, disability and death. DVT is estimated to affect 900,000 people yearly in the US and result in about 100,000 deaths. An issue that is constantly identified is that after diagnosis of DVT is that the patient may not get immediate help to get proper treatment and may be at risk of developing complications from DVT. A group of physicians at the University of North Carolina have come up with a novel idea of initiating a DVT walk-in-clinic to be a more efficient solution to counteract this problem. We studied details of the DVT walk-in clinic, diagnosis, treatment and follow up of patients with DVT.

- ***Thrombosis in pediatric cancer patients***

**Presenters:** Anish Joshi, Avaneesh Jadhav, and Arav Raghunathan  
**Mentor:** Aditya Sathe, MD

Thrombosis is a life-threatening complication that can occur in pediatric cancer patients. Cancer treatment, such as chemotherapy and radiation therapy, increases the risk of thrombosis in pediatric patients with cancer. Early diagnosis and management of thrombosis in these patients is crucial to minimize the associated morbidity and mortality. Pediatric cancer patients are at an increased risk of developing thrombosis due to the cancer

itself and its treatment modalities. The pathophysiology of thrombosis in pediatric cancer patients is multifactorial. Cancer cells release procoagulant factors, which promote clot formation. Additionally, cancer treatment modalities, such as chemotherapy and radiation therapy, damage the endothelium and increase the risk of thrombosis. The diagnosis of thrombosis in pediatric cancer patients can be challenging due to their underlying medical conditions. Imaging studies such as ultrasound, CT

scan, and MRI are used to confirm the diagnosis of thrombosis. Blood tests, such as D-dimer levels and coagulation profiles, can also aid in the diagnosis. The management of thrombosis in pediatric cancer patients involves a multidisciplinary approach. Anticoagulation therapy is the primary treatment modality, and its duration is based on the risk of recurrence and bleeding. Interventional procedures such as catheter-directed thrombolysis may be used in select cases.

## **Acknowledgements**

The planning committee for the virtual High School Scholar's Day gratefully acknowledges the support and encouragement of Dr. Sam Goldhaber, ex-President of NATF and Kathryn Mikkelsen, Executive Director of NATF. We are also thankful to Provost Dr. Margaret Callahan, Dr. Meharvan Singh and Dr. Eva Wojcik, for their patronage and support for this program. Special thanks are extended to the parents and the GTF board for their efforts and help in making this program possible. The expert coordination of this program by Dr. Bulent Kantarcioglu, Dr. Fakiha Siddiqui and Ms. Erin Healy-Erickson is gratefully acknowledged.