

Free Continuing Education Credits

Only at the Day and Time Indicated learn.unclcn.org

Webinar Title	Dates	Time	Credits
PATIENT-CENTERED CARE	2nd Wednesday (Jan-Oct) 1st Wednesday (Nov-Dec)	12 pm - 1 pm	CME NCPD/CNE ASPE ASST CTR
ADVANCED PRACTICE PROVIDER	3rd Wednesday (Jan-Oct) 2nd Wednesday (Nov-Dec)	4 pm - 5 pm	CME NCPD/CNE
RESEARCH TO PRACTICE	4th Wednesday (Jan-Oct) 3rd Wednesday (Nov-Dec)	12 pm - 1 pm	CME NCPD/CNE ASPE ASST CTR
AMERICAN SOCIETY OF CLINICAL ONCOLOGY PROVIDER PARTNERSHIP	1st Wednesday (Feb, May, Nov)	12 pm - 1 pm	CME NCPD/CNE

Self-Paced, Online Courses
Available any Day and Time learn.unclcn.org/spoc

Spread the Word!

Do you enjoy our webinars and feel others may benefit, too?
Help us spread the word!

Become a promoter:
Receive special emails to share within your organization!
unclcn.org/promoter

Follow our social channels:

 facebook.com/unclcn
 unclcn.org/instagram
 linkedin.com/in/unclcn

Send questions to unclcn@unc.edu or (919) 445-1000.
Thank you for spreading the word!



Our Presenter



Nancy Vogler, APRN, BC

Nancy is from North Carolina. She graduated from UNC Wilmington and worked in advertising before going to nursing school at UNC Chapel Hill and to get her MSN at Duke. She has worked as a bedside nurse in medical oncology and as a nurse practitioner in primary brain tumors and malignant hematology. She currently works as a nurse practitioner at UNC Eastowne in the benign hematology clinic. She lives in Durham with her husband, two sons, and cat.

Our Presenter

Our Presenter

5. Nancy Vogler, AGPCNP-BC, graduated from UNC Wilmington and worked in advertising before going to nursing school.

Our Presenter

5. Nancy Vogler, AGPCNP-BC, graduated from UNC Wilmington and worked in advertising before going to nursing school.

4. She attended nursing school at UNC Chapel Hill and is getting her MSN at Duke.

Our Presenter

5. Nancy Vogler, AGPCNP-BC, graduated from UNC Wilmington and worked in advertising before going to nursing school.

4. She attended nursing school at UNC Chapel Hill and is getting her MSN at Duke.

3. Nancy has worked as a bedside nurse in medical oncology and as a nurse practitioner in primary brain tumors and malignant hematology.

Our Presenter

5. Nancy Vogler, AGPCNP-BC, graduated from UNC Wilmington and worked in advertising before going to nursing school.
4. She attended nursing school at UNC Chapel Hill and is getting her MSN at Duke.
3. Nancy has worked as a bedside nurse in medical oncology and as a nurse practitioner in primary brain tumors and malignant hematology.
2. She currently works as a nurse practitioner at UNC Eastowne in the Benign Hematology clinic.

Our Presenter

5. Nancy Vogler, AGPCNP-BC, graduated from UNC Wilmington and worked in advertising before going to nursing school.
4. She attended nursing school at UNC Chapel Hill and is getting her MSN at Duke.
3. Nancy has worked as a bedside nurse in medical oncology and as a nurse practitioner in primary brain tumors and malignant hematology.
2. She currently works as a nurse practitioner at UNC Eastowne in the Benign Hematology clinic.
1. She lives in Durham with her husband, two sons, and cat.

Sample Poll Everywhere Question

Anemia is a problem of not having enough healthy red blood cells or hemoglobin to carry oxygen to the body's tissues while Thrombocytopenia is a condition that occurs when the platelet count in your blood is too low.

Join by Web

- 1 Go to PollEv.com
- 2 Enter UNCLCN
- 3 Respond to activity

Anemia and Thrombocytopenia Basics

Nancy Vogler, MSN, AGPCNP-BC
nancy.vogler@uncchealth.unc.edu
June 19, 2024

Learning Objectives

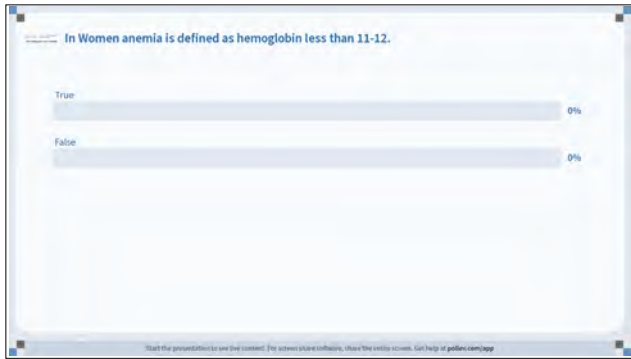
- List the basic types of anemia and thrombocytopenia
- Identify common causes of anemia and thrombocytopenia
- Describe management strategies for patients with anemia and thrombocytopenia

In Men anemia is defined as hemoglobin less than 13.

True 0%

False 0%


Watch the presentation to see the content. Don't spend too much time. Check the white screen. Get help at [palliativecareapp](#)



What is Anemia?

- Anemia is a decrease in the number of healthy red blood cells
- Not enough RBCs = Not enough oxygen rich blood to the body
- In adults this is defined by a decrease in hemoglobin or hematocrit

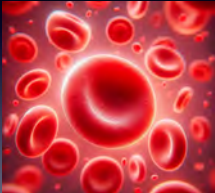
MEN:
Hemoglobin < 13 g/dL



WOMEN:
Hemoglobin < 11-12 g/dL

Classification of Anemias

- **Microcytic Anemia = MCV < 80**
 - Iron deficiency, thalassemias, ACD/ACI
- **Normocytic Anemia = MCV 80-100**
 - Iron, B-12 and/or folate deficiencies, drug induced, liver disease, hemolysis, hypothyroidism, ACD/ACI
- **Macrocytic Anemia = MCV >100**
 - B-12 or folate deficiencies, drug induced, liver disease, hypothyroidism, myelodysplastic syndrome



Anemia Case Study

- 47 yo African American female with PMHx of HTN, DMT2, obesity and vitamin D deficiency
 - Presents for annual physical, last seen in 2019
 - C/o fatigue, hot flashes, cold intolerance, exercise intolerance and RLS. Denies CP, SOB at rest. Weight has increased 3 lbs since 2019. Vitals stable.
 - Surgical Hx: ACL repair in 1994
 - Social Hx: from Wash DC. Moved to NC in 2019 w/ husband and 2 kids. Works in billing at a local company. EtOH socially, denies tobacco, drug use
- Labs from 2019:
 - WBC 11, Hgb 11.6, MCV 80, RDW 17.1, platelets 356
 - CMP unremarkable
 - TSH normal
 - Vitamin D 38
 - A1C 6.0

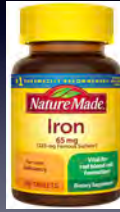


Anemia Case Study

- Today's labs
 - WBC 8.9
 - Hgb 9.7
 - MCV 71
 - RDW 18.1
 - Platelets 467
 - TSH normal
 - Vitamin D 41
 - A1C 6.0
 - Iron 22, iron sat 9%, TIBC 402, ferritin 11
 - B-12 423
- Labs from 2019:
 - WBC 11, Hgb 11.6, MCV 80, RDW 17.1, platelets 356
 - CMP unremarkable
 - TSH normal
 - Vitamin D 38
 - A1C 6.0

IDA Treatment

- Approximate recommended intake of iron:
 - 9 mg, 18 mg or 27 mg daily, depending on life stage
- Oral iron: Ferrous Sulfate 325 mg every other day as tolerated
 - May need to be individualized for each patient
- IV iron infusion(s) - Refer to hematology
- Reserve PRBCs for symptomatic patients with Hgb <7



Comanich, Clara. "Iron Deficiency." Blood, vol. 133, no. 1, Jan. 2016, pp. 30-38. DOI.org/10.1182/blood-2015-04-525461.

Vitamin B-12 Deficiency Anemia

- B-12 is crucial to normal hematopoiesis and neurologic function
- Symptoms include the typical anemia symptoms, and weakness, symmetric paresthesias, gait changes, brain fog, glossitis/oral ulcers
- Pernicious Anemia is a disorder in which auto-antibodies interfere with B-12 absorption
 - Most common in White people from northern Europe
 - Elevated methylmalonic acid (MMA), homocysteine levels, intrinsic factor and parietal cell Ab
 - Increased risk for GI cancers, autoimmune diseases



Morris, R., Fakhri, K. (2016). Clinical manifestations and diagnosis of vitamin B12 and folic acid deficiency. UpToDate. Retrieved June 14, 2024 from https://www.uptodate.com/contents/clinical-manifestations-and-diagnosis-of-vitamin-b12-and-folic-acid-deficiency

B-12 Deficiency Causes and Tx



- Due to decreased dietary B-12 intake
 - Livers, meats, fish, dairy products, eggs, fortified cereals
- Due to decreased B-12 absorption
 - Bariatric surgery, gastric/ileum surgeries, Crohn's disease, celiac disease, gastric atrophy a/w aging
 - Medications: Metformin, H2 Blockers, PPIs
- Many routes to replete B-12:
 - Daily oral or sublingual supplements OTC (1000-2000 mcg)
 - IM Injection, 1000 mcg weekly then monthly, in home or in clinic
 - Intranasal and skin patches: Variable, expensive, not preferred

Morris, R., Fakhri, K. (2016). Clinical manifestations and diagnosis of vitamin B12 and folic acid deficiency. UpToDate. Retrieved June 14, 2024 from https://www.uptodate.com/contents/clinical-manifestations-and-diagnosis-of-vitamin-b12-and-folic-acid-deficiency

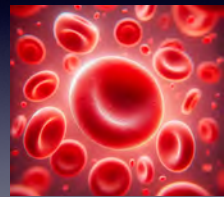


When to be concerned It's Cancer?



- Colon cancer:**
 - Anemia in a post-menopausal woman or a man is evidence of colon cancer until proven otherwise
 - All adults older than 45 should have colon cancer screening
- Myelodysplastic Syndrome (MDS) or Multiple Myeloma (MM):**
 - Adults older than 50
 - Normocytic or Macrocytic anemia
 - Elevated RDW, LOW reticulocyte count, no known bleeding
 - MDS: Other cytopenias, including thrombocytopenia, neutropenia
 - MM: Bone pain, increased serum protein, creatinine and or/calcium

Questions about Anemia?



Causes of Thrombocytopenia

- Normal Variant: 2.5% of people have a "normal" platelet count <150
- Vitamin Deficiencies:
 - **B-12 Deficiency:** Replete with 1-2g daily (PO, IM, SL)
 - **Folate Deficiency:** Replete with 1-2g daily PO
 - **Copper Deficiency:** Replete with 2-8mg daily PO, may need IV
- Liver Disease/Cirrhosis
- **Immune Thrombocytopenia (ITP)**
- **Thrombotic Microangiopathies (TMAs) such as TTP**
- Viral illness (HIV, EBV, HCV); bacterial illness (H.pylori, tick-borne infections); parasites (malaria, babesiosis)
- Cancers (**hematologic** and non-hematologic)
- Acute illness/sepsis

Thrombocytopenia Case Study

- 24 yo Caucasian female with to significant PMHx
- Presents to her PCP c/o 2 weeks of fatigue, LE bruising, prolonged bleeding when she cuts herself shaving, gum bleeds when brushing and flossing her teeth, and blood when she blows her nose in the morning
- Surgical Hx: s/p wisdom teeth extraction at age 18
- Social Hx: Graduate student at UNC. Drinks 2-3 alcoholic beverages/night on the weekends only. Denies tobacco, drug use
- Family Hx: Mom with HTN, hypothyroidism. Dad with HTN and HLD. No siblings

Case Study

- She was last seen in clinic 9 months ago for annual physical, at which time CBC and CMP were normal
- Labs today:
 - WBC 10
 - Hgb 13.9
 - MCV 88
 - MPV 8.7
 - Platelets 11
 - Differential is normal

Thrombocytopenia Causes: Liver Disease

- Thrombocytopenia has been reported in 70% of patients with cirrhosis, and 76% of patients with chronic liver disease

Source: American Urology Association

Management of Thrombocytopenia in Liver Disease

- Greatest bleeding risk is platelet count <60k
- Complete Abdominal Ultrasound to evaluate liver and spleen
- LFTs, Hepatitis testing
- Referral to hepatology for further work up and management

Source: Address 11. Thrombocytopenia in Cirrhosis: A Review of Pathophysiology and Management Options. Clinical Liver Disease, vol. 14, no. 3, Nov 2018, pp. 100-106. DOI.org (Crossref), https://doi.org/10.1002/clm.1066

Thrombocytopenia Causes: Thrombotic Microangiopathy (TMA)

- TMA is a pathological state where vessels are occluded by platelet rich thrombi leading to thrombocytopenia, microangiopathic hemolytic anemia (MAHA)
- This can be systemic or intrarenal, both leading to end organ damage
- TMA types include TTP, atypical hemolytic uremic syndrome (aHUS), Shiga toxin-producing bacteria leading to HUS (most common TMA, largely occurring in children under 5)

Thompson, G. L., & Kavanagh, C. (2022). Diagnosis and treatment of thrombotic microangiopathy. International journal of laboratory hematology, 44(Suppl 1), 101-113. https://doi.org/10.1111/ijlh.12484

Thrombotic Thrombocytopenia Purpura (TTP)

- Systemic TMA that leads to end organ damage due to a severe deficiency in **ADAMTS13**, an enzyme that cleaves von Willebrand factor (VWF)
- Large VWF leads to platelet adhesion, aggregation and **formation of microvascular thrombi**
- Symptoms: headache, confusion, stroke, seizures, cardiac ischemia, mesenteric ischemia, AKI (less common)
- Medical emergency - mortality rate of 90% without treatment
- Treatment includes: plasma exchange to remove autoantibodies and replace ADAMTS13, steroids, Rituximab, and +/- Caplacizumab

Thompson, G. L., & Kavanagh, D. (2022). Diagnosis and treatment of thrombotic microangiopathy. International journal of laboratory hematology, 44 Suppl 1(Suppl 1), 101-113. <https://doi.org/10.1111/ijlh.13824>

Thrombocytopenia Causes: Infections

- Viral illnesses: Hepatitis B/C, HIV, COVID, EBV, Influenza
 - Enteroviruses, rotaviruses in children
 - CMV and VZV in immunocompromised
- Bacterial illnesses
 - Tick-borne diseases, H.pylori
- Mild thrombocytopenia often accompanies lymphopenia.
- Bleeding is rare
- Treatment of the underlying infection is key



Reisman, M., Du Toit, J., Langenak, T., van Bussel, B., van Gorsp, E., & Gaejelerba, M. (2021). Thrombocytopenia in Virus Infections. Journal of clinical medicine, 10(6), 877. <https://doi.org/10.3390/jcm10060877>

References

Camaschella, Clara. "Iron Deficiency." Blood, vol. 133, no. 1, Jan. 2019, pp. 30-39. DOI.org (Crossref). <https://doi.org/10.1182/blood-2018-05-815844>.

Cosper, Nichola, and Rajesh Chandra. "TTP/TMA Thrombocytopenia." New England Journal of Medicine, edited by Carol G. Solomon, vol. 381, no. 10, Sept. 2019, pp. 945-55. DOI.org (Crossref). <https://doi.org/10.1056/NEJMp1907474>.

GBD 2021 Anemia Collaborators (2023). Prevalence, years lived with disability, and trends in anemia burden by severity and cause, 1990-2021: Findings from the Global Burden of Disease Study 2021. The Lancet Haematology, 10(9), e713-724. <https://doi.org/10.1016/j.hlt.2023.07.001>.

Guidelines on haemoptysis: update for adults in hospital and population. Geneva: World Health Organization, 2004. Licence: CC BY-NC-SA 3.0 IGO

Masera, R., D'Avella, R. (2024). Diagnostic Approach to Anemia in adults. UpToDate. Retrieved June 16, 2024 from https://www.uptodate.com/consult/topic/diagnostic-approach-to-anemia-in-adults?source=search_result&resultRank=11

Masera, R., Farfald, K. (2024). Clinical manifestations and diagnosis of vitamin B12 and folate deficiency. UpToDate. Retrieved June 16, 2024 from https://www.uptodate.com/consult/topic/clinical-manifestations-and-diagnosis-of-vitamin-b12-and-folate-deficiency?source=search_result&resultRank=11

Moore, Andrew H. "Thrombocytopenia in Cirrhosis: A Review of Pathophysiology and Management Options." Clinical Liver Disease, vol. 14, no. 5, Nov. 2018, pp. 183-86. DOI.org (Crossref). <https://doi.org/10.3390/jcm10040877>

Thompson, G. L., & Kavanagh, D. (2022). Diagnosis and treatment of thrombotic microangiopathy. International journal of laboratory hematology, 44 Suppl 1(Suppl 1), 101-113. <https://doi.org/10.1111/ijlh.13824>

UpToDate, Mechanisms of Drug-Associated Anemia Chart. <https://go.uptodate.com/lookuptodate/131773>

ChatGPT, images

Questions/Comments?

Nobody has responded yet.
Hang tight! Responses are coming in.



Thank You . . .

University Cancer Research Fund

UNC LINEBERGER COMPREHENSIVE CANCER CENTER

UNC Lineberger Cancer Network

The Telehealth Team

Tim Pee - Director

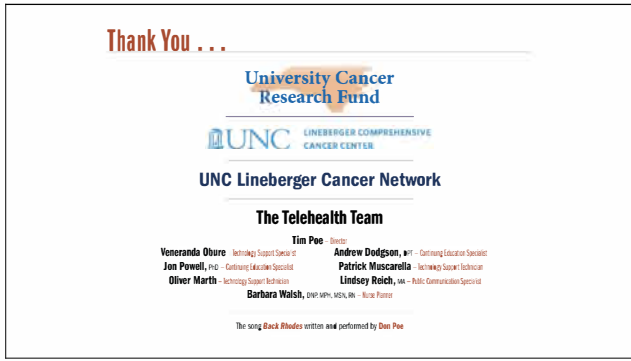
Veneranda Obure - Technology Support Specialist | **Andrew Dodgson, MD** - Outpatient Education Specialist

Jon Powell, PhD - Continuing Education Specialist | **Patrick Muscarella** - Technology Support Technician

Oliver Marth - Technology Support Technician | **Lindsey Reich, MD** - Public Communication Specialist

Barbara Walsh, PhD MPH, MEd, RN - Nurse Planner

The song *Back Rhodes* written and performed by **Don Pee**



Your Feedback

Fill out our short survey:



uncicn.org/survey

Your feedback helps us #evolvegreat
Professional Telehealth oncology webinars

Please respond by **June 16**



Upcoming Live Webinars learn.unclcn.org

ONLINE TO PRACTICE **MONTH DD**
12:00 PM

Updates in Surgical Management for Breast Cancer
Kristalyn Gallagher, DO, FACS, FACS

PATIENT-CENTERED CARE **July 10**
12:00 PM

Colorectal Cancer: Epidemiology, Risk Factors, and Screening Strategies
Lisa M. Gangarosa, MD

ADVANCED PRACTICE PROVIDER **MONTH DD**
4:00 PM

Strategies for Managing Toxicities of Oral Oncolytics
Kevin Chen, PharmD, MS Blanka Patel, PharmD, CPP
Aimee Faso, PharmD, BCOP, CPP

Self-Paced, Online Courses learn.unclcn.org/spoc

ONLINE TO PRACTICE

Obesity and Cancer Prevention: The Efficacy and Timing of Bariatric Surgery
Maggie M. Hodges, MD, MPH

PATIENT-CENTERED CARE

Oncologic Emergencies
Jacob Stein, MD, MPH

ADVANCED PRACTICE PROVIDER

Physical Therapy Approaches to Oncology Care: Beyond Lymphedema
Sarah Richardson, PT, DPT, CLT, WCS

We Thank You for Participating Today!

UNC Lineberger Cancer Network

Sign up for our monthly e-newsletter

Email: unclcn@unc.edu

Call: (919) 445-1000

Check us out at

unclcn.org and learn.unclcn.org

Look for us on these social media platforms

 facebook.com/unclcn  unclcn.org

 linkedin.com/in/unclcn