Application Information for ACPE Accreditation

Updates in the Management of Sickle Cell Disease

Nkem P. Nonyel, PharmD, MPH, BCPS SNPhA Regions I & II Conference, UPMC February 22, 2020

Job Title

Assistant Professor of Pharmacy Practice School of Pharmacy and Health Professions University of Maryland Eastern Shore Princess Anne, Maryland, 21853 Ambulatory Care Clinical Pharmacist Peninsula Regional Family Practice Peninsula Regional Medical Group Salisbury, Maryland, 21801

Description of Expertise to Present on the Topic

I am a pharmacy practice faculty at the University of Maryland Eastern Shore School of Pharmacy. I am a Board Certified Pharmacotherapy Specialist and I teach sickle cell disease (SCD) within our Pharmacotherapy and Medication Management: Hematology/Oncology course. My clinical pharmacy practice is a part of an underserved, rural community health system, (Peninsula Regional Health System) located on the Eastern Shore of Maryland. I also work at another hospital in the Maryland area, and we have a lot of SCD patients. I dedicate my time to interacting with the SCD patients, providing disease-specific and medication education to them. I currently have a scholarship activity on SCD. I have also presented Continuing Medical Education/Continuing Pharmacy Education/ Continuing Education on Sickle Cell Disease. I believe that I possess the knowledge, skills, and expertise to present on the topic:

Learning Objectives

- Given a patient case, determine the risk for developing sickle cell disease (SCD).
- 2. Explain at least two of the several complications of SCD.
- 3. Given SCD patient case, recommend an appropriate medication therapy for the patient.

Attachments

- COI Disclosure Form
- 2. Biography
- 3. CV
- 4. Course Materials
 - a. PowerPoint Slides
 - b. Self-Assessment Questions
 - c. KEY: Self-Assessment Questions

UPMC Center for Continuing Education in the Health Sciences

COI Disclosure Form

All individuals who have the ability to control or influence the content of an educational activity must disclose all relevant relationships with any commercial interest, including but not limited to members of the planning committee, speakers, presenters, authors, and/or content reviewers.

Activity Title: U	pdates in the Management of Sickle Cell Disease
	February 22, 2020
nave nad, a relevant finan	es of commercial interests (defined in the "Glossary of Terms" below) with which you or your spouse/partner have, o ncial relationship within the past 12 months. For this purpose we consider the relevant financial relationships of your u are aware of to be yours.
Check One:	I have/had no relevant financial relationships with any commercial interests.
	I have, or have had, a relevant financial relationship within the past 12 months.
Nature of Rela	tionship Name of Commercial Interest
Grant/Research	Support:
Consultant:	
CE Speakers' B	ureau:
Stockholder:	
Other:	
commercial en Pittsburgh Med responsible wil	f Understanding I attest that the information above is accurate and confirm that I am not receiving direct payment from a tity for honorarium, travel or other expenses. I also agree to abide by all policies of the University of Pittsburgh and University of dical Center, including those related to patient privacy. I agree that all elements of the educational activity for which I am I be balanced, based upon the best available scientific evidence, and free of commercial influence. An "X" in the box serves as signature of the individual completing this Conflict of Interest Form and attests to the accuracy of the information given above.
Completed By (First	st Name, Last Name): Nkem P. Nonyel, PharmD, MPH, BCPS

Glossary of Terms

Date Completed: 12/01/2019

<u>Commercial Interest:</u> The ACCME defines a "commercial interest" as any entity producing, marketing, re-selling, or distributing health care goods or services, used on, or consumed by, patients. The ACCME does not consider providers of clinical service directly to patients to be commercial interests. For more information, visit www.accme.org.

Financial relationships: Financial relationships are those relationships in which the individual benefits by receiving a salary, royalty, intellectual property rights, consulting fee, honoraria, ownership interest (e.g., stocks, stock options or other ownership interest, excluding diversified mutual funds), or other financial benefit. Financial benefits are usually associated with roles such as employment, management position, independent contractor (including contracted research), consulting, speaking and teaching, membership on advisory committees or review panels, board membership, and other activities from which remuneration is received, or expected. ACCME considers relationships of the person involved in the CME activity to include financial relationships of a spouse or partner.

Relevant financial relationships: ACCME focuses on financial relationships with commercial interests in the 12-month period preceding the time that the individual is being asked to assume a role controlling content of the CME activity. ACCME has not set a minimal dollar amount for relationships to be significant. Inherent in any amount is the incentive to maintain or increase the value of the relationship. The ACCME defines "relevant' financial relationships" as financial relationships in any amount occurring within the past 12 months that create a conflict of interest.

Conflict of Interest: Circumstances create a conflict of interest when an individual has an opportunity to affect CME content about products or services of a commercial interest with which he/she has a financial relationship.

Nkem P. Nonyel, PharmD, MPH, BCPS

Updates in the Management of Sickle Cell Disease
Nkem P. Nonyel, PharmD, MPH, BCPS
SNPhA Regions I & II Conference, UPMC
February 22, 2020



Dr. Nonyel is an Assistant Professor in the Department of Pharmacy Practice and Administration at the University of Maryland Eastern Shore School of Pharmacy (UMES SOP) & Health Professions. Her clinical practice focuses on Ambulatory Care at Peninsula Regional Medical Group, in Salisbury, Maryland. Prior to joining the UMES workforce, she worked as a full-time clinical pharmacist at Holy Cross Hospital, Silver Spring, Maryland where she completed an ASHP-accredited PGY1 pharmacy residency. Before entering the pharmacy profession, Dr. Nonyel practiced as a Licensed Practical Nurse in both acute and sub-acute care settings, and in pediatric home care.

Dr. Nonyel earned a Doctor of Pharmacy degree from the University of Maryland School of Pharmacy, and a Master of Public Health from the University of Maryland School of Medicine. She is a Board Certified Pharmacotherapy Specialist, and she teaches Sickle Cell Disease. Her scholarship interests include Medication Safety, Health Disparities, Cultural Competency, Public & Global Health, and Leadership/Professional development.

She is very passionate about the pharmacy profession, and mentoring current and prospective PharmD students. She serves as the Student Organization Director for UMES SOP and the faculty advisor for the UMES chapters of the Student National Pharmaceutical Association (SNPhA).

Dr. Nonyel holds several professional pharmacy leadership positions at the local, regional, state, and national levels including:

- 1. American Association of Colleges of Pharmacy (AACP)
- 2. Maryland Pharmacy Coalition (MPC)
- 3. Maryland Pharmaceutical Society (MPhS)
- 4. National Pharmaceutical Association (NPhA)
- 5. Nigerian Association of Pharmacists and Pharmaceutical Scientists in the Americas (NAPPSA)

Nkem P. Nonyel, PharmD, MPH, BCPS

EDUCATION

Master of Public Health (MPH) May 2017 Concentration: Global Health Department of Epidemiology and Public Health University of Maryland School of Medicine Baltimore, MD MPH Capstone Project: Strengthening capacity for sustainability of international medical missions to Haiti: global health collaborative opportunities among healthcare professionals, students, and volunteers Preceptor: Hoai-An Truong, PharmD, MPH, FNAP, FAPhA Post Graduate Year-1 Pharmacy Residency Program (ASHP-Accredited) Jul 2015 Holy Cross Hospital Silver Spring, MD Residency Program Director: Kikelola Gbadamosi, MS, MBA, PharmD, BCPS Doctor of Pharmacy (PharmD) May 2014 University of Maryland School of Pharmacy Baltimore, MD Associate of Arts in Biology and Chemistry (High Honors) May 2009 Prince George's Community College Largo, MD Licensed Practical Nursing (LPN) Feb 1999 University of District of Columbia NW Washington, DC Bachelor of Science in Physics and Education May 1991 University of Nigeria Nsukka, Enugu

PROFESSIONAL LICENSURE AND CERTIFICATION

100	
<u>Licensure</u>	
Pharmacist License: State of Maryland	2014 - Present
Nursing License (Licensed Practical Nursing): State of Maryland	1999 – 2018
Certification: Professional Pharmacy	
Board Certified Pharmacotherapy Specialist (BCPS)	2016 - Present
Pharmacy Residency Teaching Certification	2014 - 2015
Pediatric Advanced Life Support (PALS)	2015 - Present

Advanced Cardiac Life Support (ACLS)	2014 - Present
Pharmacy-Based Immunization Delivery Certification	2012
Basic Life Support for Providers (BLS) Certification	1998 – Present
Certification: Clinical Research	
NIDA Clinical Trials Network certification	May 2019 - Present
The National Institute of Health (NIH) Office of Extramural Research certification	May 2019 - Present
Association of Clinical Research Professionals (ACRP) certification	May 2019 - Present
Collaborative Institutional Training Initiative (CITI) Program Certificate	Jan 2019 - Present
Research and Scholarship Certificate Program	2018 - 2020
American College of Clinical Pharmacy Research & Scholarship Academy	[in progress]
PROFESSIONAL EMPLOYMENT EXPERIENCE	
Pharmacy Practice	
Peninsula Regional Medical Center	Aug 2017 - Present
Ambulatory Care Clinical Pharmacist	
Holy Cross Hospital	Jul 2014 - Present
Clinical Pharmacist	
Clinical Pharmacist (Resident)	
 Clinical Pharmacist (Resident) Aspen Hill Clinic 	
Rite Aid Pharmacy (Student Intern)	Jul 2012 – Jun 2013
Nursing Practice	
Licensed Practical Nurse	Apr 1999 - 2018
	7,012333 2010
<u>Teaching Experience</u>	
Teaching Appointment (PharmD)	
Assistant Professor, University of Maryland Eastern Shore School of Pharmacy	Jul 2017 - Present
 Assistant Professor of Pharmacy Practice 	
 Ambulatory Care Clinical Specialist, Peninsula Regional Medical Center 	
 Preceptor, Advanced Pharmacy Practice Experience Required Rotation 	
 Preceptor, Post-Graduate Year 1 (PGY1) Pharmacy Residency: 	
 Ambulatory Care Elective Rotation 	
 Student Organization Director (Desk title) 	
Clinical Assistant Professor, University of Maryland School of Pharmacy	Aug 2015 - 2018
 Preceptor, Advanced Pharmacy Practice Experience 	
Course Coordinator: University of Maryland Eastern Shore School of I	Pharmacy
PHAR 681: Coordinator and Developer, Medication Safety Elective	Fal 2019

PHAR 681: Coordinator and Developer, Medication Safety Elective Fal 2019
PHAR 613: Pharmacotherapy and Medication Management: Immunology & Spr 2018 – 19

Rheumatology

- Coordinator (Spring 2020)
- Co-Coordinator (Spring 2019)

PHAR 614: Pharmacotherapy and Medication Management: Pulmonology and	Fal 2019
Ophthalmology	
PHAR 622: Pharmacotherapy and Medication Management: Endocrinology &	Fal 2019
Urology	Fal 2018
PHAR 615: Pharmacotherapy and Medication Management: Gastroenterology	Spr 2019
PHAR 613: Pharmacotherapy and Medication Management: Immunology &	Spr 2018, 2019
Rheumatology	
PHAR 620: Pharmacotherapy and Medication Management:	Spr 2018, 2019
Hematology/Oncology	
PHAR 624/625: Integrated Pharmacy Practice (IPP) I/II	Spr 2018, 2019
PHAR 799: Advanced Seminar	Spr 2018, 2019
PHAR 703: Ambulatory Care Required Advanced Pharmacy Practice Experience	Jan 2018 - Present
PHAR 561: Professional Development I	Fal 2018

Elective Course Instructor/Lecturer: University of Maryland Eastern Shore School of Pharmacy

PHAR 681: Medication Safety Elective	Fal 2019
PHAR 680: Independent Study	Sum 2019

Didactic Course Instructor/Lecturer: University of Maryland School of Pharmacy

PHAR 5002: (Resident) AST 2	Spr 2015
APPE 499/APPC/APEX: Lecturer (Resident), Clinical Track: Orientation,	Spr 2015
Feedback, Professionalism	
PHAR 538: (Resident), Abilities Lab 2	Spr 2015
PHAR 518: (Resident), Abilities Lab 2	Fal 2015

Advisor/Mentor (PharmD)

Faculty Advisor, American Society of Health Systems Pharmacist (ASHP-SSHP)	Jul 2019 - Dec 2019
Faculty Co-Advisor, Pharmacy Student Government Association (PSGA)	Oct 2018 - Present
Faculty Advisor, Student National Pharmaceutical Association (SNPhA)	Jul 2017 - Present
Academic Advisor, Class of 2020	2017 - 2020
National Pharmaceutical Association-Student National Pharmaceutical	2017 - 2018
Association Pharmacy Student Mentoring Program	

PHAR 543: Public Health for Pharmacists

SCHOLARSHIP

Refereed Publication

Nonyel NP and Gogineni HP. Rheumatoid Arthritis Module. APhA	Apr 2019
PharmacotherapyFirst: A Multimedia Learning Resource (Book Chapter)	

Non-Refereed Article

Nonyel NP. Quality Improvement Initiative: Insulin Best Practices and Strategies	May 2015
for Ensuring the Safe Use of Insulin in the Hospital	
Holy Cross Hospital Monthly Newsletter, Inside the Pill Box. Volume 4, Issue 3,	
pages 6-8, May 2015	

Spr 2017, 2018, 2019

Aug 2012
Mar 2009
Oct 2019
Jul 2019
Jul 2019
Apr 2019
7,15, 2025
Nov 2018 – Present
Oct 2018
Apr 2018
, ,,,
Sep 2019
Jul 2019
Jul 2019
Jul 2018
Aug 2015
May 2015
Dec 2014
Dec 2014
2019-2020
2013-2020
(In progress)

ORAL/PODIUM PRESENTATION

Invited Continuing Professional Development & Continuing Pharmacy Education (A	CPE-Accredited)
Nonyel NP. Strategies for Optimizing Medication Safety Among Culturally Diverse	Jan 2020
Patient Population (Live CPE Credit: 1.0) (accepted to be completed)	
Nonyel NP. "The Grass is Greener Where You Water It": The Purposeful	Dec 2019
Leadership (Live CPE/CE Credit: 1.0) (accepted to be completed)	
Nonyel NP. Strategies to Alleviate Patient-Related Barriers to Safe Medication	Dec 2019
Use (Live CPE Credit: 1.0) (accepted to be completed)	
ACPE #0215-0000-19-020-L05-P; ACPE #0215-0000-19-020-L05-T	
Nonyel NP. One Size Does Not Fit All: Ensuring Medication Safety Among	Nov 2019
Culturally and Linguistically Diverse Patient Population (Live CPE Credit: 1.0)	
ACPE #0217-9999-19-227-L05-P	
Nonyel NP. Environment of Care: Ensuring Medication Safety and Enhancing	Nov 2019
Clinical and Humanistic Outcomes in Sickle Cell Disease (Live CPE/CME/CE Credit:	1401 2013
1.0)	
ACPE #JA4008181-000-19-188-L04-P	
Nonyel NP. Nutraceuticals in Chronic Disease Management: Key Interactions with	Jul 2019
Therapeutic Drugs (Live CPE Credit: 1.0)	3412013
ACPE #0215-0000-19-016-L01-P	
Nonyel NP and Wade L. "I Don't Understand You! Cultural and Linguistic	Jun 2019
Competency Considerations for College/University Faculty" (Live presentation)	3411 2013
Nonyel NP. Refining Your Preceptorship Brand (Live CPE/CME/CE Credit: 1.0)	Jan 2019
ACPE #JA4008181-0000-19-004-L04-P	3411 2013
Nonyel NP. Optimizing the Management of Gout Across the Continuum of Care:	Sep 2018
An Interprofessional Approach (Live CPE/CME/CE Credit: 1.0)	3cp 2010
ACPE #0798-9999-18-193-L01-P; UAN: 0798-9999-18-193-L01-T	
Nonyel NP. Nutraceuticals: "What Every Pharmacist Needs to Know" (Live	Jul 2018
CPE/CE Credit: 1.0)	3412010
ACPE #0798-9999-18-135-L04-P; UAN: 0798-9999-18-135-L04-T	
Nonyel NP. ICU Delirium (Live CPE/CME/CE Credit: 1.0)	Jun 2015
ACPE #0025-9999-15-102-L01-P	3411 2013
Nonyel NP. Impact of pharmacist led medication education on pharmacy care	Apr 2015
experience of high-risk hospitalized patients (Webinar CPE Credit: 1.0)	7 pr 2015
Invited Professional Presentation	
Nonyel NP. "To Infinity and Beyond": Career Choices in Pharmacy Profession	Oct 2019
Nonyel NP. "The Grass is Greener Where You Water It": The Purposeful	Oct 2019
Leadership	
Nonyel NP. Medication Safety Alerts on Vaccines	May 2019
Nonyel NP. Diabetes Self-Management Education Support Group	May 2019
Nonyel NP. Formulary Review: Menveo & Bexsero (Meningococcal Vaccine)	Jan 2018
Nonyel NP. Introduction to PRMC Vaccine Education Initiative	Nov 2018
Nonyel NP. Strategies to Alleviate Patient-Related Barriers to Successful Chronic	Oct 2018
Medication Management	
Nonyel NP. Building Strong Relationship with Your Student Organization Faculty Advisor	Jul 2018
Nonyel NP. New Formulary Vaccine: Shingrix (Shingles/herpes vaccine)	May 2018
Nonyel NP. A Slice of Policy: "All Hands on Deck"	May 2018

Nonyel NP. Formulary Review: Shingrix (Shingles/herpes vaccine)	Mar 2018
Nonyel NP. Legislative Day Student Preparation	Feb 2018
Nonyel NP. Pharmacy Update: Drug-Induced QTc Interval Prolongation	Jan 2018
Nonyel NP. Industrial Pharmacist Association (IPhO) Round Table	Apr 2017
Nonyel NP and Gbadamosi K. Utilizing Quality Compass to Strengthen	Jul 2015
Antimicrobial Stewardship Program	

PROFESSIONAL AFFILIATIONS/SERVICE ACTIVITY

	Professional Pharmacy Organizations	
•	Nigerian Association of Pharmacists and Pharmaceutical Scientists in	Mar 2019 - Present
	the Americas (NAPPSA), Inc.	
•	American Association of Colleges of Pharmacy (AACP)	2017 - Present
•	American College of Clinical Pharmacy (ACCP)	2017 - Present
•	Maryland Pharmacy Coalition (MPC)	2015 - Present
•	National Pharmaceutical Association (NPhA)	2014 - Present
•	Maryland Pharmaceutical Society (MPhS)	2014 - Present
•	Lambda Kappa Sigma International Pharmaceutical Fraternity (LKS)	2010 - Present
•	American Society of Health-System Pharmacists (ASHP)	2010 - 2017
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•	Students National Pharmacy Association (SNPhA)	2010 - 2014
	Service to Pharmacy Profession	
Nigeria	an Association of Pharmacists and Pharmaceutical Scientists in the	Mar 2019-Present
Ameri	cas (NAPPSA), Inc.	08.000.000.000.000.000.000.000.000.000.
•	Mentorship Committee, Co-Chair (2019-2020)	
•	Education Committee, Member (2019-2020)	
•	Scholarship Committee, Member (2019-2020)	
Ameri	can College of Clinical Pharmacy (ACCP)	2018 - Present
•	Research Process Committee, Member – Ambulatory Care PRN	
	(Pharmacy Research Network) (2018-2019)	
•	Ambulatory Care Judge: Poster Walk Rounds	
Americ	can Association of Colleges of Pharmacy (AACP)	2017 - Present
•	Health Disparities Cultural Competency (HDCC) SIG	
	 Secretary of Information Management, HDCC (2019-2021) 	
	 Chair, Resolutions Ad Hoc Committee (2019-2021) 	
	 Executive Planning Committee (2019-2020) 	
	o Nominations Committee (2019-2020)	
	o Programs Committee Member (2019-2020)	
	Practice Section	

Public Health SIG

o Global Health Committee (2018-2019)

Committee, Member (2018-2019)

O Section Poster Abstract Reviewer (2019)

O NIA Award Application Reviewer (2019)

 Workgroup: Research in the context of international partnerships - GPE SIG and Public Health SIG (2018-2019)

o Research Development Committee/Research & Scholarship

Scholarship Committee (2019-2020)

	AACP Trainee Poster Competition Judge: Poster Walk Rounds - #134,	
	#142, #152 (2019)	
	and Pharmacy Coalition (MPC)	2015 - Present
•	Lead, Governance Committee (2019-2020)	
•	Chair, MPC (2017-2018)	
•	Chair, Public Relations/Public Health Committee (2016-2017)	
	The state of the s	
Nation	al Pharmaceutical Association (NPhA)	2014 - Present
•	Zone 1 Director (2018-2020)	
	 Membership Committee (2018-2020) 	
•	Public Relations Committee, LinkedIn Administrator (2017-2018)	
•	Clinical Skills Competition Judge SNPhA (2019)	
Maryla	and Pharmaceutical Society (MPhS)	2012 - Present
•	Immediate Past President (2019-2021)	
•	MPhS Representative to MPC (2018-19, 201920)	
•	President (2017-2019)	
•	President-Elect/Vice President (2015-2017)	
Lamba	a Kappa Sigma International Pharmaceutical Fraternity (LKS)	2012 - Present
Univer	sity of Maryland School of Pharmacy, Baltimore (Epsilon chapter)	
	Professionalism Chair (2012-2013)	
•	Professionalism Co-chair (2011-2012)	
Studen	t National Pharmaceutical Association (SNPhA)	2010 - 2014
Univer	sity of Maryland School of Pharmacy, Baltimore chapter	
	President (2012-2013)	
•	President-Elect (2011-2012)	
Pharm:	Service to the UMES School of Pharmacy and Health Profession acy Practice and Administration Community Events Workgroup	7.8
	Faculty Liaison	Sep 2019 – Present
•	District of Columbia-College of Clinical Pharmacy (DC-CCP)	I. 12010 D.
	Co-Liaison, American College of Clinical Pharmacy (ACCP) College of	Jul 2019 – Present
	Pharmacy Faculty Liaison	Jan 2019 – Present
	Maryland Pharmaceutical Society	
	t Organization Director	Jul 2018 – Present
	ions Committee	Oct 2018 – Present
	t Conduct Committee	Jul 2018 – Present
		Jul 2017 – Present
	Committee for Practice Faculty (Ambulatory/Acute Care)	Oct 2018 – Aug 2019
	Objective Structured Clinical Examination) Sub-Committee	Jul 2017 – Jun 2019
OIVIES/	Wilmington Delaware Interprofessional Education	Oct 2017
	Service to the University of Maryland Eastern Shore	
Senate	Constitution Committee	Sep 2019
UMES C	Community Fall Festival Planning Committee	Oct 2019
	all 3K Fun Walk and Community Festival Planning Committee	Oct 2018
	Complete to the University of Manual and Call and Call	
	Second Hansietta Lacks Bioppial Symposium Planning Committee	
•	Second Henrietta Lacks Biennial Symposium Planning Committee	2013
•	Theme: The Dignity of Difference	<u>1</u> 420-2020
•	University of Maryland Strategic Plan 2011-2016	2011

Service to the Community	Service	to	the	Community
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International Community Initiatives (ICI) Medical Mission Training Coordinator	2016 - Present
JACQUES Initiatives HIV Counseling and Testing Certification	2013

Service to Peninsula Regional Medical Center (PRMC)

Peninsula Regional Medical Group (PRMG) Primary Care Provider Meetings	Sep 2017 - Present
(Only Pharmacist)	160

Service to Holy Cross Hospital/Holy Cross Health (HCH)

Pharmacy and Therapeutics Committee	Jul 2014 – Jun 2017
Antimicrobial Stewardship Subcommittee	Jul 2014 – Jun 2017
Medication Safety Subcommittee	Jul 2014 - Jun 2017
Risk Management and Patient Safety Committee	Jul 2014 - Jul 2015

AWARDS/HONORS

	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	
•	ACCP Ambulatory Care PRN 2018 Academy Sponsorship	2018
	Maryland Pharmaceutical Society 2013 Scholarship Award and	
	recognition for dedication to the promotion of pharmacy profession and services to underserved communities in the state of Maryland	May 2014
•	4보이지 지구나는 이 전	Dec 2013
•	Rho Chi Recognition Certificate for recognition of high scholastic achievement for the academic year	Nov 2013
•	Student Government Association Leadership Award University of Maryland School of Pharmacy	Oct 2013
•	SNPhA/Rite Aid Leadership Academy Award	Jul 2013
•	University of Maryland, School of Pharmacy Student Ambassador Honor	
	and Scholarship	2010 - 2013
•	University of Maryland, School of Pharmacy Scholarship Ambassador Honor	2012 – 2013
•	Who's Who Among Students in American Universities and Colleges Award, Prince George's Community College, Largo	2009
•	Prince George's Community College 2009 Science Achievement Award	2009

SKILLS

Clinical Systems and Software: Proficient in the use of Cerner, EPIC, DoseEdge, Pyxis Enterprise, Pyxis MedStation ES, OmniCell, Quality Compass, CRISP, SlicerDicer, FDB AlertSpace

Classroom Technology: ExamSoft (assessment creation, administration and analysis software), TurningPoint Technology ResponseWare, Blackboard Learning Management System

Updates in the Management of Sickle Cell Disease

Nkem P. Nonyel, PharmD, MPH, BCP9 Assistant Professor, DMES School of Pharmacy

> SMPhA Regions Lik III CPE UPMC

February 99, 9020

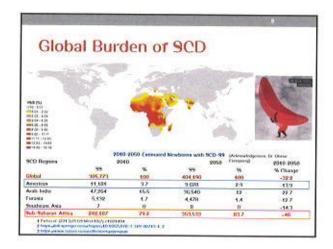
Disclosure/s

I do not have a financial interest arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this activity.

Learning Objectives

- Given a patient case, determine the risk for developing sickle cell disease (SCD).
- Explain at least two of the several complications of SCD.
- Given SCD patient case, recommend an appropriate medication therapy for the patient.

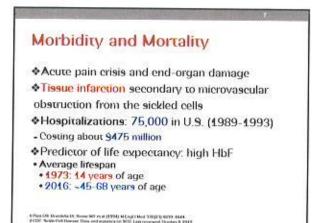
What is Sickle Cell Disease? Autosomal recessive inheritance of homozygous sickle cell gene (HbS/S) Hemoglobin polymerization Erythrocyte rigidity Hemolysis Vaso-occlusion

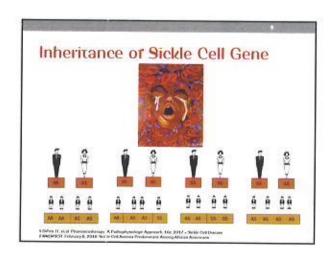


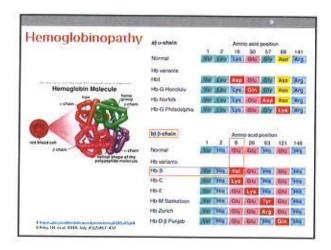
Epidemiology

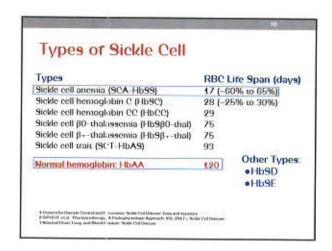
- ♦9CD Globally: prevalent in tropical countries
- -Affects about 300,000 of neonates
- ♦9CD in Americans: 100,000 individuals
- African-Americans: 1 in 365 births
- · Hispanic: 1 in 16,300 births
- ♦ 9ickle cell trait: 1 in 13 African-American
- Prevalence for sickle cell trait ranges from 2-27%

LPaCHL House RE, Pool APot at L003; PCHC Solds Cyli Decisio Data and elaborate on SCH Land invasional House R, 9915.







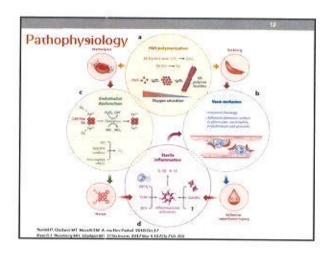


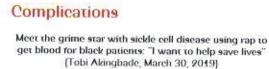
Audience Participation

NR, a 19-year-old woman with 9CD presents to the emergency department with vaso-occlusive pain crisis. Her oral medication regimen includes hydroxyurea, folic acid, oxycontin, oxycodone PRN for severe pain, acetaminophen PRN for mild-to-moderate pain, and multivitamin. She reveals she and her boyfriend are planning to have a baby, and that her boyfriend has the sickle cell trait.

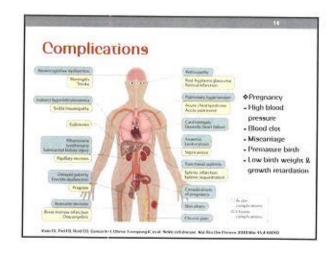
What is NR's risk for having a baby with sickle cell disease?

A. 25%
B. 50%
C. 75%

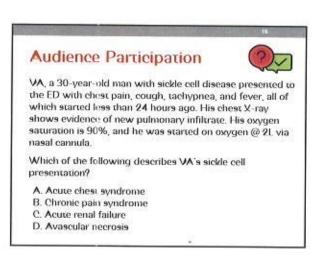


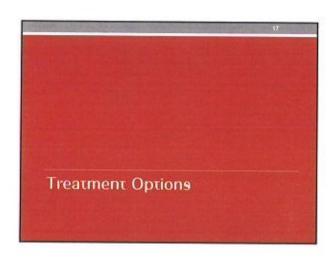


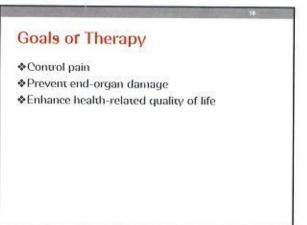
https://outu.be/gPaX0kXj_jQ



Newborn Screening (NBS) Timing of Screening & Communication of Results At birth, regardless of birth setting 1st pediatrician must verify screening result Confirmatory test: no later than 2 months of age ****Communication of newborn carrier status Treatment By 2 months of age: penicillin prophylaxi Pneumococcal vaccine







Non-Pharmacological Therapy

- ♦ Blood transfusion
- ♦ Stem cell transplant
- ♦ Gene therapy
- ♦ Exchange transfusion
- Preventive Lifestyle



Pharmacological Therapy

Disease-Modifying FDA-Approval

♦Hydroxyurea → 1998

♦L-glutamine (Endari) 2017

♦Crizanlizumab-mca (Adakveo) 2019

♦Voxelotor (Oxbryta) 2019

Investigational SCD Drug
Others: Analgesics
Anti-P-Selectin

ediAeu

Asset El Fotte A, Farer I, et al. 5 Log LMod 2017 February 2 370(6) 426-436 ""Morehor Phase J 917) discor - molthyag paymed, MCM 2019

Rivipansel

Opioide

Safety Concerns

- Tolerance versus addiction versus hyperalgesia
- Central nervous system depression
- Respiratory depression
- ◆Gastrointestinal effects (need bowel regimen)
- Neuromuscular and skeletal effects
- Concomitant use with benzodiazepines

Hydroxyurea (Droxia®, 9iklos®)

- ◆FDA-approved: 1998
- ♦ Class: Antimetabolite, fetal hemoglobin inducer
- ♦Indication:
- ♦MOA; via nitrie oxide
- . Induces expression of fetal hemoglobin
- Mediates vasodilation
- Alters the adhesion of RBCs to the endothelium
- Dose: (using IBW or TBW whichever is less)

Hydroxyurea (Droxia®, Siklos®)

Safety

- ◆BBW: myelosuppression, malignancy (leukemia, skin CA)
- ♦ Adverse Effects Monitoring: elevations in LFTs uric acid SCr₂BUN, alopecia, low sperm count in males
- Macrocytosis: folate used to decrease side effects
- Teratogenic: effective contraception during and after treatment:
- Females: at least 6 months
- Males: at least 1 year
- Drug interactions: with pimeerolimus, taerolimus, myelosuppressive therapies, antiretrovirals due to

L-Glutamine Oral Powder Endari®

- ♦FDA-approved: 07,07,2017
- ♦Class: amino acid
- ♦ Indication: to reduce acute complications of SCD in all patients ~5 years of age
- ♦MOA: Unclear
- Decreases oxidative stress damages sickled RBCs
- Increases availability of reduced glurathione thereby improving NAD redox potential of the solded RBCs
- ♦Dose: 5-15 g per twice daily based on body weight
- Adverse Effects: headache, chest pain, flatulence, nausea, constipation, abdominal pain, limb and back pains, coughs

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Crizanlizumab-tmca (Adakveo»)

SUSTAIN TOOL

- ♦FDA-approved: 11,15,2019
- ◆Class: P-selectin inhibitor
- ♦ Indication: to reduce the frequency of VOC crisis in individuals > 16 years old with SCD
- MOA: Humanized IgG2 kappa monoclonal antibody that binds and inhibits P-selectin, a cell adhesion protein involved in multicellular interactions resulting in vaso-occlusion.
- ◆Dose: 5 mg/kg IV infusion over 30 minutes on Week 0.
- Week 2, and every 4 weeks thereafter
- Adverse Effects: nausea, arthralgia, back pain, and pyrexia
 Insufficient human data for use in pregnancy; only use if benefic-risk

Voxelotor (Oxbryta»)

HOPE wiat

- ♦FDA-approved: 11,25,2019
- ◆Class: Hemoglobin 9 polymerization inhibitor.
- ♦ Indication: to increase hemoglobin in individuals >12 years old with 9CD
- MOA: preferential binds to hemoglobin 9 (Hb9) increasing Hb9 affinity for oxygen and inhibits Hb9 polymerization in a dose-dependent manner.
- ♦ Dose: 1500 mg orally once daily (1000 mg for Child Pugh C)
- Adverse Effects: headaches, diarrhea, abdominal pain, nausea, fatigue, rash, and pyrexia
- Insufficient human data for use in pregnancy; only use if benefit-risk

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Audience Participation



NR, a 19-year-old woman with SCD presents to the emergency department with vaso-occlusive pain crisis. She discloses that she has a positive pregnancy test two days ago, and has not moved her bowel since four days ago. Her oral medication regimen includes hydroxyurea, folic acid, oxycontin, oxycodone PRN for severe pain, acetaminophen PRN for mild-to-moderate pain, and multivitamin.

Which of the medications pose(s) the most safety concerns for NR? (select all that apply)

- A. Acetaminophen
- B. Folic acid
- C. Hydroxyurea

Audience Participation



12 months later, NR presents to the emergency department with her baby boy for uncontrollable cries. The doctor suspects that the baby has vaso-occlusive pain crisis. The baby's pain was managed with appropriate analgesics.

Which of the following medications is disease-modifying and should be initiated for NR's baby?

- A. Penicillin
- B. Voxelotor
- C. Hydroxyurea
- D. Crizanlizumab-tmea

Preventive Health Maintenance

- Penicillin prophylaxis
- Timely administration of necessary vaccines:
- -Annual influenza
- -Pneumococcal (PCV13, PP9V23)
- -Meningococcal (ACWY-Menveo, Menactra)
- -9almonella (where available)

https://CDC.govvocrieswichedulesulngumv.chid.edulesem.html. Updazed Frünzey 6, 2019

Role of Pharmacists

Acute care setting

- Proper antibiotics
- Empiric 3rd generation cephalosporin for pediatrics
- Supportive care measure
- Timely administration of analgesia

Chronic care setting

- Advocate for adequate chronic pain control and pain management clinic
- Make referrals to psychosocial services
- Guide appropriate use of chelating agents
- ♦Patient education

Resources for 9CD Patients

- Sickle Cell Disease National Resource Directory: https://www.cdc.gov/ncbdd/sicklecell/map/map-nationalresourcedirectory.html OR 4-800-CDC-INFO (232-4636), TTV: 1-888-232-6348 or e-mail: cdcinfo@cdc.gov (Last updated 10,08,2019)
- World Sickle Cell Awareness Day: June 19



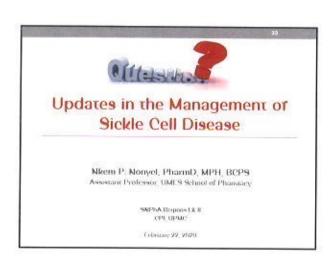


Key Takeaways

- Hemoglobin polymerization and occlusion of the microvasculature lead to complications of 9CD.
- Genetic counseling is important for decreasing the incidence and prevalence of SCD.
- Voxelotor, crizanlizumab-tmca, hydroxyurea, and L-glutamine are the FDA-approved diseasemodifying therapies for SCD.







6

Updates in the Management of Sickle Cell Disease

Nkem P. Nonyel, PharmD, MPH, BCPS SNPhA Regions I & II Conference, UPMC February 22, 2020

Self-Assessment Questions

- 1. NR, a 19-year-old woman with SCD presents to the emergency department with vaso-occlusive pain crisis. Her oral medication regimen includes hydroxyurea, folic acid, oxycontin, oxycodone PRN for severe pain, acetaminophen PRN for mild-to-moderate pain, and multivitamin. She reveals she and her boyfriend are planning to have a baby, and he has the sickle cell trait. What is NR's risk for having a baby with sickle cell disease?
 - a. 25%
 - b. 50%
 - c. 75%
 - d. 100%
- VA, a 30-year-old man with sickle cell disease presented to the ED with chest pain, cough, tachypnea, and fever, all of which started less than 24 hours ago. His chest X-ray shows evidence of new pulmonary infiltrate. His oxygen saturation is 90%, and he was started on oxygen @ 2L via nasal cannula.

Which of the following describes VA's sickle cell presentation?

- a. Acute chest syndrome
- b. Chronic pain syndrome
- c. Avascular necrosis
- d. Acute renal failure
- 3. NR, a 19-year-old woman with SCD presents to the emergency department with vaso-occlusive pain crisis. She discloses that she has a positive pregnancy test two days ago, and has not moved her bowel since four days ago. Her oral medication regimen includes hydroxyurea, folic acid, oxycontin, oxycodone PRN for severe pain, acetaminophen PRN for mild-to-moderate pain, and multivitamin.

Which of NR's medications pose(s) the most medication safety concerns? (Select all that apply)

- a. Acetaminophen
- b. Folic acid
- c. Hydroxyurea
- d. Oxycontin
- 4. 12 months later, NR presents to the emergency department with her baby boy for uncontrollable cries. The doctor suspects that the baby has vaso-occlusive pain crisis. The baby's pain was managed with appropriate analgesics.

Which of the following medications is disease-modifying and should be initiated for NR's baby?

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