Fourth Annual World Health Continuing Medical Education Conference

Health Disparities Impacting Global and Local Caribbean Populations

Virtual Conference

June 3–5, 2021

Provided by Healthfirst, Howard University College of Medicine, and MediNova

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HOWARD UNIVERSITY
College of Medicine

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International Medicine Innovation & Educational Development

FOURTH ANNUAL WORLD HEALTH CONTINUING MEDICAL EDUCATION CONFERENCE: "HEALTH DISPARITIES IMPACTING GLOBAL AND LOCAL CARIBBEAN POPULATIONS"

PROGRAM OVERVIEW

This Continuing Medical Education activity is designed to update primary care and specialty practices on the evolving strategies for implementing evidence-based medicine to meet the needs of local, regional, and global communities. The intent is to inform the attendees on innovations in treating special patient populations, with a focus on Caribbean communities. Using evidence-based prevention, chronic-disease management, pharmacotherapy, and cutting-edge treatment options, participants will be able to integrate approaches to improve patient care outcomes.

PROGRAM OBJECTIVES

At the conclusion of this activity, participants will be cognizant of:

Objective 1

New models of healthcare delivery system reform and how they can be employed

Objective 2

Current solutions to address healthcare fragmentation and health outcomes

Objective 3

Using data to define standards of care

Objective 4

Using quality measures to define value

Objective 5

Addressing health disparities of Caribbean populations both locally and abroad

TARGET AUDIENCE

Medical directors, physicians, physician assistants, nurse practitioners, nurses, health professionals, and practice leaders that serve high-risk populations.

SPONSOR ACCREDITATION

Howard University College of Medicine is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

CREDITS

Howard University College of Medicine Office of Continuing Medical Education designates this educational activity for a maximum of 10.25 AMA PRA Category 1 Credits™. Physicians should claim only credit commensurate with the extent of their participation in the activity.

CME CERTIFICATION

Howard University College of Medicine is in full compliance with provisions of the Americans with Disabilities Act (ADA) and is accessible to individuals with special needs. If you would like to attend this conference and require any special needs or accommodations, please contact Elizabeth Jean-Jacques, Healthfirst, at ejean-jacques@healthfirst.org or call 1-212-497-4382.

Day 1 | Thursday June 3, 2021 - 4.0 Credits

Day 2 | Friday June 4, 2021 - 4.25 Credits

Day 3 | Saturday June 5, 2021 - 2.0 Credits

REGISTRATION

If you need additional information or to register for the conference, please email Elizabeth Jean-Jacques, Healthfirst, at ejean-jacques@healthfirst.org or call 1-212-497-4382.

FACULTY DISCLOSURE

It is the policy of Howard University College of Medicine to ensure objectivity, balance, independence, transparency, and scientific rigor in all CME-sponsored educational activities. All faculty participating in the planning or implementation of a sponsored activity are expected to disclose to the audience any relevant financial relationships and to assist in resolving any conflict of interest that may arise from the relationship. Presenters must also make a meaningful disclosure to the audience of their discussions of unlabeled or unapproved drugs or devices. This information will be available as part of the course materials.

SPECIAL NEEDS

Howard University College of Medicine is in full compliance with provisions of the Americans with Disabilities Act (ADA) and is accessible to individuals with special needs. If you would like to attend this conference and require any special needs or accommodations, please contact Chance Manley, Howard University Hospital, at 1-202-865-6696.

AGENDA

Day 1	June 3, 2021
8:30am–8:45am	**Welcome and Introduction** Shelly McDonald-Pinkett, M.D., F.A.C.P., C.P.H.Q. *Chief Medical Officer, Howard University Hospital* Roxanne Smith-White, M.D., F.A.C.P. *Chief Executive Officer, Lemurian Healthcare PC* Henry R. Paul, M.D. *President, MediNova* Susan J. Beane, M.D. *Executive Medical Director, Healthfirst*
	Lectures
8:45am–9:45am	Health Disparities - The Bahamian Experience The Hon. Duane E. Sands, M.D. *Government of the Bahamas* Women's Health: Disparities in the Caribbean Population Locally and Globally Ambereen Sleemi, M.D., M.P.H. *Urogynecologist, Fistula Surgeon, Executive Director, International Medical Response*
9:45am–10:15am	Question and Answer Session
10:15am–10:45am	State of the Art: Hand-held Ultrasound and Teleradiology Implementing Point of Care Ultrasound in an Austere Setting Berndt P. Schmit, M.D., M.B.O.E. *Associate Professor, Radiology,* *The University of Arizona Health Sciences* *Founder, Humanitarian Radiology Development Corps, USA*

AGENDA

10:45am–11:00am	Question and Answer Session
11:00am–12:00pm	Changing Paradigms of Pulmonary Tuberculosis: A Radiologist's Perspective Michelle L. Hershman, M.D. *Cardiothoracic Radiologist, Hospital of the University of Pennsylvania*
12:00pm–12:15pm	Break: 15 Minutes
12:15pm–1:15pm	Use of System-Level Improvements for Diabetes Management Gail Nunlee-Bland, M.D., F.A.C.E., F.A.A.P. *Professor, Pediatrics and Medicine, Howard University Hospital* Reducing the Burden of Prostate Cancer in The Bahamas Robin Roberts, M.D. *Director & Senior Lecturer, UWI School of Clinical Medicine and Research, The Bahamas*
1:15pm–1:45pm	Question and Answer Session

Dismiss Session

AGENDA

Day 2	June 4, 2021
8:30am–8:45am	**Welcome and Introduction** Shelly McDonald-Pinkett, M.D., F.A.C.P., C.P.H.Q. *Chief Medical Officer, Howard University Hospital* Roxanne Smith-White, M.D., F.A.C.P. *Chief Executive Officer, Lemurian Healthcare PC* Henry R. Paul, M.D. *President, MediNova* Susan J. Beane, M.D. *Executive Medical Director, Healthfirst*
	Lectures
8:45am–10:15am	**Unraveling the Ancestral Fabric: Exploring the Role of Epigenetics in Type 2 Diabetes Health Disparities** Maurice B. Fluitt, Ph.D. *Assistant Professor, Division of Endocrinology and Metabolism, Department of Medicine, Howard University* **Metabolic Abnormalities in ESRD that Explain CV Risk** Clinton D. Brown, M.D., F.A.S.N., F.A.H.A., F.N.L.A. *Professor of Medicine, Downstate Health Sciences University, Brooklyn, New York* **Improving Colon Health at Home and Abroad** Adeyinka O. Laiyemo, M.D., M.P.H., F.A.C.G., A.G.A.F. *Associate Professor of Medicine, Howard University Hospital*
10:15am–11:00am	Question and Answer Session
11:00am–11:30am	**Emergency Radiology Cases** Berndt P. Schmit, M.D., M.B.O.E. *Associate Professor, Radiology, The University of Arizona Health Sciences* *Founder, Humanitarian Radiology Development Corps, USA*

AGENDA

11:30am–11:45am	Question and Answer Session
11:45am–12:00pm	Break: 15 Minutes
12:00pm–1:00pm	Ethnic Concordance Between the Physician and the Patient and What it Means for the Future of Healthcare Disparities Errol L. Pierre, M.P.A. *Senior Vice President, State Programs, Healthfirst* NHI Bahamas: Transforming Primary Healthcare in The Bahamas on its Journey to Universal Health Coverage Monique Thompson, N.M.D., C.P.H.Q., BSc *Manager, Healthcare Quality and Wellness Development, National Health Insurance Authority*
1:00pm–1:30pm	Question and Answer Session

Dismiss Session

AGENDA

Day 3	June 5, 2021
8:30am–8:45am	Welcome and Introduction Shelly McDonald-Pinkett, M.D., F.A.C.P., C.P.H.Q. *Chief Medical Officer, Howard University Hospital* Roxanne Smith-White, M.D., F.A.C.P. *Chief Executive Officer, Lemurian Healthcare PC* Henry R. Paul, M.D. *President, MediNova* Susan J. Beane, M.D. *Executive Medical Director, Healthfirst*
	Lectures
8:45am–9:45am	Cross Cultural Issues in Behavioral Health Disorders in the Caribbean Population Georges J. Casimir, M.D. *Clinical Assistant Professor, SUNY Downstate Health Sciences University* COVID-19 Vaccine Trial at Howard Siham M. Mahgoub, M.D. *Assistant Professor of Medicine, College of Medicine, Howard University*
9:45am–10:00am	Question and Answer Session
10:00am–10:15am	Break: 15 Minutes
10:15am–10:45am	New Lung Cancer Screening/New Guidelines Amos Charles, M.D. *Clinical Associate Professor of Medicine, Warren Alpert School of Medicine, Brown University*
10:45am–11:00am	Question and Answer Session
	Closing Remarks/Adjourn Henry R. Paul, M.D., President, MediNova

Duane E. Sands, M.D.

Cardiothoracic and Vascular Surgeon

Duane Sands, MD, former Minister of Health (Bahamas), is a cardiothoracic and vascular surgeon. Dr. Sands obtained his Doctor of Medicine degree from Johns Hopkins University School of Medicine in Maryland, and completed his residency in General Surgery and Cardiothoracic and Vascular Surgery at Wayne State University in Michigan.

Dr. Sands served as a consultant physician at the Princess Margaret Hospital (PMH) before serving as Director of Accident and Emergency, and then as the Hospital's Chief of Surgery. He also practices at Doctors Hospital and the Cardiothoracic and Vascular Institute of the Bahamas Ltd.

Duane served as Chairman of The Bahamas Mortgage Corporation between 2011 and 2012 and is a former Chairman of the Bahamas Medical Council and Director of the Central Bank of the Bahamas. He previously served as Director of the Public Hospitals Authority, Vice President of Medical Affairs, and Member of the Board of Directors of Doctors Hospital and Director of Physicians Alliance Ltd.

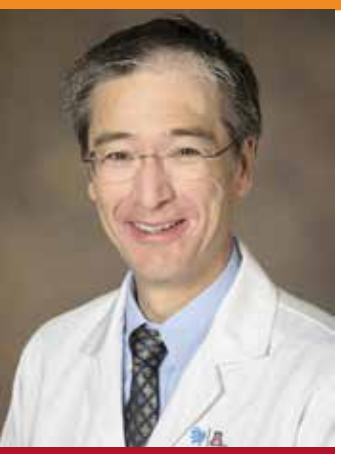
Ambereen Sleemi, M.D., M.P.H.

Urogynecologist, Fistula Surgeon,
Executive Director, International Medical Response

Ambereen is a female pelvic medicine reconstructive surgeon (urogynecologist) and trained obstetric fistula surgeon. She has served as an obstetric fistula surgeon for the Eritrean Women's Project in Mendefera, Eritrea, since 2007, and as a surgical team co-leader for Medicine In Action's spring trip to Kingston, Jamaica, as well as on the medical board. She spent six years on the executive committee of the International Society for Obstetric Fistula Surgeons (ISOFS) and is still an active member. In January 2013, she developed the Haitian Women's Heath Collaborative in partnership with the Department of Ob/Gyn at the National Hospital in Port-au-Prince, Haiti. This project has expanded to a partnership with St. Boniface Hospital in the southern part of the country, continuing our pledge to increase safe surgical capacity in Haiti.

She holds an MD/MPH from George Washington University School of Medicine and is currently pursuing her M.S. in Epidemiology at Columbia University's Mailman School of Public Health. She trained in Ob/Gyn at Louisiana State University in New Orleans, LA, in Female Pelvic Medicine and Reconstructive Surgery at Maimonides Medical Center, and in obstetric fistula surgery in northern Nigeria.

Berndt P. Schmit, M.D., M.B.O.E.



Associate Professor, Radiology,
The University of Arizona Health Sciences
Founder, Humanitarian Radiology Development Corps, USA

Berndt Schmit, MD, MBOE, is a Clinical Associate Professor in the Department of Medical Imaging. Originally a faculty member in the Cardiothoracic Division, Dr. Schmit was promoted to Service Chief of Emergency Radiology and tasked with creating the Medical Imaging's Emergency Radiology Section in 2019.

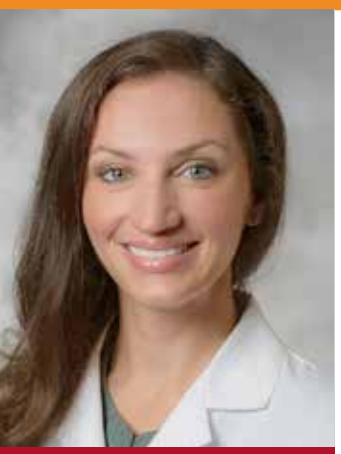
Dr. Schmit has been a practicing radiologist for more than 20 years. He received his medical degree from Tufts University School of Medicine in 1991, and then trained for two years in the Emergency Medicine residency program at the University of Arizona. He then completed his diagnostic radiology residency at Mount Auburn Hospital in Cambridge, Massachusetts, followed by his Fellowship in Musculoskeletal Imaging at the Brigham and Women's Hospital in Boston in 1998. Dr. Schmit co-authored the textbook *Bone and Soft Tissue Tumors; a Multidisciplinary Review with Case Presentations*, published in 2014.

Dr. Schmit believes in cultures that create engagement and empowerment, and thus pursued the unique business degree at Ohio State University which focuses on the principles of Lean Management in the Healthcare setting. He earned his Master of Business Operational Excellence degree in 2014. Dr. Schmit is a consultant with Radiology Business Solutions, which works with radiology private practices across the country. Dr. Schmit loves to teach and has been honored with teaching awards from medical students and radiology residents.

Dr. Schmit has a lifelong commitment to global health development. He first became involved in international charitable medicine as a third-year medical student when he worked for a summer in a public hospital in rural Guatemala. After several years of leadership experience in a radiology non-profit organization, Dr. Schmit founded Humanitarian Radiology Development Corporation (HRD Corps) in 2017.

Dr. Schmit is an invited lecturer on global health and radiology capacity development. In 2018, Dr. Schmit created a Global Health Radiology curriculum for the University of Arizona Radiology Residency Program.

Michelle L. Hershman, M.D.



Cardiothoracic Radiologist,
Hospital of the University of Pennsylvania

Dr. Michelle Hershman is a cardiothoracic radiologist at the Hospital of the University of Pennsylvania. Originally from Miami, FL, she graduated from Jefferson Medical College in Philadelphia, PA, and completed an internship at Yale University Medical Center. She did her radiology residency at the University of Arizona Medical Center, followed by a cardiothoracic radiology fellowship at the Hospital of the University of Pennsylvania. She is a member of a 501c3 nonprofit organization called Humanitarian Radiology Development Corps (HRD Corps), which aims to increase radiology capacity in low- and middle-income countries.

Gail Nunlee-Bland, M.D., F.A.C.E., F.A.A.P.

Professor, Pediatrics and Medicine, Howard University Hospital

Dr. Gail Nunlee-Bland is the Chief of Endocrinology and Director of the Diabetes Treatment Center at Howard University Hospital. She is a Professor of Pediatrics and Medicine. Dr. Nunlee-Bland is a graduate of Howard University College of Medicine, Class of 1980. She completed her internship and residency in pediatrics at Howard University Hospital and her pediatric endocrine fellowship at Johns Hopkins Hospital.

Dr. Nunlee-Bland has professional memberships in the American Diabetes Association, Lawson Wilkins Pediatric Endocrine Society, Endocrine Society and American Association of Clinical Endocrinologists. She has served on several advisory committees and has presented at national and local scientific meetings on diabetes and obesity. She has numerous publications related to diabetes in the African-American population and is currently conducting research in the areas of diabetes and obesity.

Dr. Nunlee-Bland is passionate about improving access to quality diabetes care. This passion has translated into the American Diabetes Association recognized Diabetes Treatment Center. The Diabetes Treatment Center is a resource for patients and practitioners to have access to the expertise of nutritionists, diabetes educators, podiatrists, and diabetes specialists. Dr. Bland is the principal investigator for the W.E.I.G.H.T. project, which is funded by NIMHD under the DC-Baltimore Research Center on Child Health Disparities.

Robin Roberts, M.D.

Director & Senior Lecturer, UWI School of Clinical Medicine and Research, The Bahamas

Over the past 25 years, I have delivered urological care to the peoples of The Bahamas, a population of 400,000, of which 85% are of African ancestry. As the first urologist in the Government health care service, I introduced and advanced the practice of urology with a major focus on male health and in particular prostate cancer. With my initial experience of discovering that more than 80% of our males present with advanced and metastatic prostate cancer on initial presentation, I initiated an annual island-wide prostate cancer screening program, on a volunteer basis, with the Cancer Society of The Bahamas. The screening clinics span 15 years on the main island, New Providence, and seven years on the island of Grand Bahama, documenting 7,268 clinic visits in 2,846 men and 4,063 visits in 1,940 men, respectively. In my quest to empower men to take charge of their prostate health, I have delivered over 200 public lectures, appeared on over 50 radio programs, published 10 pamphlets and booklets for the Cancer Society on prostate cancer, and produced three TV documentaries on prostate cancer (30 min. each). Being able to recruit men for the proposed study is without question. More than 30% of my 130 urological presentations at national, regional, and international academic conferences have been on prostate cancer. For my contributions in health care and in particular male health, the Government of The Bahamas has recognized me for National Honors at The Queen's Diamond Jubilee Birthday Honors for June 2012 and awarded an Order of the British Empire in 2017.

It is of note that my interest and initiatives in prostate cancer are in addition to the realities of being (1) a general urologist delivering the full spectrum of pediatric and adult urology for both males and females in both a private and public medical practice; (2) prior Chief of Department of Surgery with over 60 physicians at the 450-bed Princess Margaret Hospital; (3) currently a Director of the University of the West Indies Faculty of Medical Sciences in The Bahamas, with the responsibility of managing 80 undergraduate medical students in the final two years of their degree program and 80 postgraduate medical students in their residency training program. These added responsibilities limit my ability to publish regularly and be more involved in prostate cancer research on Bahamian males. All my research has been my personal efforts without the benefits of any research assistant or funding – this grant will provide a formal research assistant for the first time and will go a long way to advancing care and research in prostate cancer in The Bahamas as well as allot the time for publications. I will be most remiss in not adding that I am the President and a Managing Director of a physician-owned company engaged in a Public-Private Partnership with the Bahamas government that generates revenues in excess of two million dollars annually; my abilities to be fiscally and academically accountable are not in question.

Maurice B. Fluitt, Ph.D.

Assistant Professor, Division of Endocrinology and Metabolism, Department of Medicine, Howard University

Maurice B. Fluitt, PhD, is an Assistant Professor at the Howard University College of Medicine in the Division of Endocrinology and Metabolism and a research collaborator of the Immunoregulation section.

He earned his Bachelor of Science degree in Biology and Allied Health from Chowan University (2009) (Murfreesboro, NC) and his PhD in Genetics and Human Genetics from Howard University (2016). After completing his doctoral studies, he was awarded the highly competitive NIH-TL1 post-doctoral fellowship through the Georgetown Howard Universities Center for Clinical and Translational Sciences to investigate the role of microRNAs in diabetic nephropathy at Georgetown University Medical Center. He was later awarded post-doctoral fellowship from the American Diabetes Association to continue his post-doctoral studies at Georgetown University to investigate the role of microRNAs in diabetic nephropathy.

His current research aims to investigate the role vof non-coding RNAs as early markers, mediators, and therapeutic interventions for type 2 diabetes mellitus and its cardio-renal complications. This work promises to provide necessary insight into the molecular complexity of this disease.

Clinton D. Brown, M.D., F.A.S.N., F.A.H.A., F.N.L.A.

Professor of Medicine, SUNY Downstate Health Sciences University

Dr. Clinton D. Brown is the former Director of the Brooklyn Health Disparities Center, and the Contact PI on that Center's first federally funded P20 grant. Dr. Brown is currently Chair of the Institutional Review Board at SUNY Downstate, was previously the Presiding Officer for the Executive Committee (College of Medicine), and is Deputy Chief, Renal Division, Department of Medicine, and Professor of Medicine at Downstate. He received his B.S. degree from Queens College and degree in medicine from Tufts University School of Medicine. His training is in nephrology and clinical lipidology. He is a fellow in The American Society of Nephrology, The American Heart Association, and The National Lipid Association. He has authored more than 100 articles, book chapters, and abstracts. His research interest is atherosclerosis.

For more than thirty years Dr. Brown has trained and mentored students from SUNY Downstate Medical School, nearby high schools, and colleges, as well as students from and graduates of medical schools abroad. For his distinguished work and dedication, Dr. Brown has received awards from SUNY Downstate, the National Institutes of Health, and the Brooklyn community.

Adeyinka O. Laiyemo, M.D., M.P.H., F.A.C.G., A.G.A.F.

Associate Professor of Medicine, Howard University Hospital

Dr. Laiyemo is currently an Associate Professor of Medicine in Howard University College of Medicine in Washington, DC. He received his medical degree from the University of Lagos in Nigeria in 1990 and obtained a Master of Public Health (MPH) degree from Johns Hopkins School of Public Health in 2006. After completing his medical residency and clinical gastroenterology fellowship at Howard University, he underwent a four-year postdoctoral fellowship in Cancer Prevention in the Office of Preventive Oncology, National Cancer Institute, National Institutes of Health, from 2005 to 2009.

Dr. Laiyemo is a clinical and health services researcher. He is a board-certified gastroenterologist with research interest in cancer epidemiology and prevention. As a researcher, Dr. Laiyemo has been studying the risk factors that are associated with colorectal adenoma and cancer, including screening and surveillance issues. His research interests also involve evaluating factors that are associated with higher incidence and mortality from colorectal cancer among blacks as compared with other race-ethnicities in the United States and studying interventions to eliminate these disparities.

Errol L. Pierre, M.P.A.

Senior Vice President, State Programs, Healthfirst

Errol L. Pierre is the Senior Vice President of State Programs at Healthfirst, Inc., the largest not-for-profit health plan in New York State serving more than 1.6 million members. He is accountable for revenue growth, profit and loss, and sales and retention for the Medicaid, Commercial, and Long-Term Care product portfolios representing in excess of $9 billion annually. Additionally, he leads the strategic and operational direction of the Healthfirst Foundation and serves as the Co-Chair for Healthfirst's overall Diversity, Equity, and Inclusion efforts.

Prior to Healthfirst, Errol spent more than ten years at Empire BlueCross BlueShield, the largest for-profit health plan in New York State serving close to five million members. Errol started his career in healthcare in 2003 as an intern at Empire. Throughout his tenure, he held various leadership roles in Sales and Strategy, leaving the company as the Chief Operating Officer in 2019.

A Bronx, New York resident, Errol graduated from Fordham University with a bachelor's degree in Business Administration with a concentration in Finance. He later obtained a master's degree in Health Policy and Financial Management from New York University. He will complete his doctoral degree focused in Health Equity by June 2021. Lastly, he is an adjunct professor at New York University, teaching various courses in Healthcare and Business.

In his spare time, Errol volunteers for numerous non-profit organizations. He serves as a board member of the Arthur Ashe Institute of Urban Health and is a member of the national 100 Black Men's Health & Wellness Committee. Lastly, he mentors both high school students and Fordham undergraduates in the Bronx. In 2020, he was acknowledged as one of the Caribbean-American "Power 100" by Carib News and was awarded for "Outstanding Community Service" by the Aesclepius Medical Society.

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Monique Thompson, N.M.D., C.P.H.Q., BSc

Manager, Healthcare Quality and Wellness Development, National Health Insurance Authority

Driven by her passion for helping others, Dr. Thompson has spent her life working and volunteering in service to others through the medical field and civil society organizations. After graduating from St. Andrews High School as a leading student, she received a full academic scholarship to Albright College and obtained her Bachelor of Science in the dual degree program PsychoBiology with Pre-Medical studies.

Dr. Thompson has spent her medical career learning life-saving therapies from some of the best and brightest minds in the alternative and traditional medical fields. After a rigorous four-year medical program, she graduated as a Naturopathic Medical Doctor in December of 2013 from Southwest College of Naturopathic Medicine in Tempe, Arizona.

As the Manager of Healthcare Quality and Wellness Development with the National Health Insurance Authority (NHIA) since June 2018, Dr. Thompson has been tasked with improving the quality of healthcare services of providers participating in the delivery of NHI Bahamas – a Universal Health Coverage program that offers Primary Healthcare Services.

Dr. Thompson is a member of the American Health Information Management Association (AHIMA), and the National Association for Healthcare Quality (NAHQ), and gained certification as a Certified Professional of Healthcare Quality. In her role at the National Health Insurance Authority, Dr. Thompson impacts various healthcare settings to enhance care delivery, optimize value, and improve outcomes. This is done by leading and coordinating activities in Patient Safety; Regulatory and Accreditation, Quality Review and Accountability, Performance and Process Improvement, Health Data Analytics and Population Health and Care Transitions.

In 2014 Dr. Thompson founded Cornerstone Healing Institute, an integrative medical practice. She has also served as an Adjunct Professor, and worked in the community to reach the underserved by acting as the Chair of the Bahamas Urban Youth Development Center, and serving on the Board of Directors for the Youth Empowerment Program. Dr. Thompson is certified in Biological Medicine, Project Management, is a Certified Intravenous Administrator, and a Drug Prevention Specialist.

Georges J. Casimir, M.D.

Clinical Assistant Professor,
SUNY Downstate Health Sciences University

Dr. Casimir is currently Clinical Assistant Professor of Psychiatry, and formerly the Associate Director of the Geriatric Psychiatry Division and the Geriatric Psychiatry Fellowship Training Program at SUNY Downstate Medical Center. In 2002, he was appointed Vice-President of Medical Affairs and Medical Director of Kingsbrook Jewish Medical Center, a position he held until 2004.

Dr. Casimir is a Diplomate of the American Board of Psychiatry and Neurology with added certifications in Geriatric Psychiatry, Addiction Psychiatry, and Forensic Psychiatry. He is also board certified by the American Society of Addiction Medicine and the American Society of Clinical Psychopharmacology.

Dr. Casimir has received research and training funding of more than $8 million from many national agencies, such as the National Institute of Mental Health (NIMH), the National Institute of Aging (NIA), etc. He has co-authored several book chapters and published more than fifty peer-reviewed articles. His clinical presentations and professional activities have received wide publicity in many local and national news organizations, including the New York Daily News, the New York Post, Amsterdam News, Clinical Psychiatry News, the Miami Herald, and the Boston Globe.

Siham Mahghoub, M.D.

Assistant Professor of Medicine, College of Medicine, Howard University

Dr. Siham Mahgoub is an infectious diseases specialist attending in the Department of Medicine, Infectious Diseases Division, Howard University Hospital and Howard College of Medicine.

She is currently the Medical Director for the Center for Infectious Disease Management and Research (CIDMAR); she is the Principal Investigator on several grants: Ryan White part A, Sexually transmitted Infections grant, she was the Howard Principal investigator for the convalescent plasma previously an expanded access through Mayo Clinic, Coinvestigator for the NIH – Howard University Genetic Study and now the Principal Investigator for the Novavax vaccine trial at Howard.

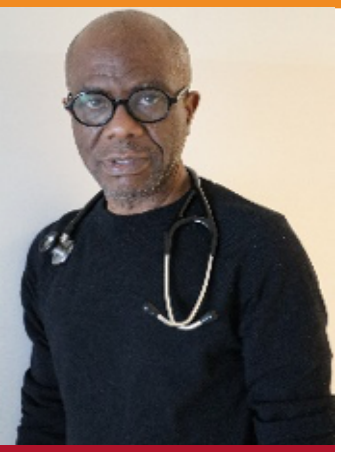
Dr. Mahgoub has played and continues to play an instrumental, phenomenal role during the COVID-19 pandemic: she has been the lead physician for the COVID-19 treatment task force and contributed to the Howard University treatment guidelines.

Dr. Mahgoub has served as the Infectious Diseases /Infection Control advisor for the faculty Private Practice COVID-19 task force. She was the Infectious Diseases advisor for President Frederick's task force for reopening Howard University.

Dr. Mahgoub was recently nominated for and awarded the 2020 Attending Leadership Award and 2021 Howard University International Women's Day Honoree for excellence in leadership.

Dr. Mahgoub believes that the best care can be provided to patients in a multidisciplinary approach. Dr. Mahgoub's passion is teaching the future generation of doctors and includes evidence-based medicine in her teaching. She is a great advocate for addressing disparities in health and healthcare.

Amos Charles, M.D.



Clinical Associate Professor of Medicine, Warren Alpert School of Medicine, Brown University

Dr. Charles is a Clinical Associate Professor of Medicine at the Alpert Medical School of Brown University in Providence, RI. He is a Pulmonologist/Critical Care Specialist by training. He is currently the Chief of the Hospitalist Division of the Department of Medicine at the Providence VA Medical Center (PVAMC). Dr. Charles has been at the PVAMC since 1992.

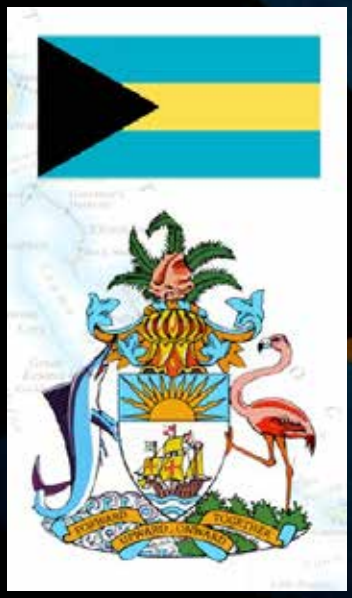
Dr. Charles earned his Bachelor of Science Degree in Biology from the City College of the City University of New York (CUNY). He received his Medical Degree from Ross University School of Medicine (Portsmouth, Dominica). After medical school, Dr. Charles worked for three years as a Pulmonary Research Associate at the Pulmonary Center, Boston University School of Medicine. He completed a Medicine Residency Training at the Robert Wood Johnson Residency Program in Neptune, New Jersey, and a Pulmonary Critical Care training at Brown University Pulmonary/Critical Care Fellowship training program in Providence, RI. He has stayed in Rhode Island and has been working at the Providence, VA since he completed his fellowship training.

Dr. Charles filled a number of roles during his tenure at the PVAMC. He has been the Medicine Clerkship site Director for the past 15 years. He previously served as the Medicine Residency Program Director for several years. For 15 years, he has been the co-leader of the Brown University Residency Global Health Exchange Program with Haiti and the Dominican Republic. Dr. Charles also participated in the Brown University Pulmonary Fellowship training in Addis Ababa, Ethiopia.

Dr. Charles has participated in several mobile clinics that he organized himself and with others providing medical care in underserved areas in Haiti and other places with limited resources.

Dr. Charles expresses joy teaching residents and medical students alike. He has received more than 50 awards/honors for his role as a Medical Educator. His hobbies include traveling and running, trail walking, hiking, and amateur photography.

Dr. Charles is a staunch patient advocate. He believes that delivery of care by healthcare providers should be unbiased and equitable.



Health Disparities – The Bahamian Experience

The Honourable Dr. Duane E.L. Sands, MD
Former Minister of Health
The Commonwealth of The Bahamas
June 3, 2021

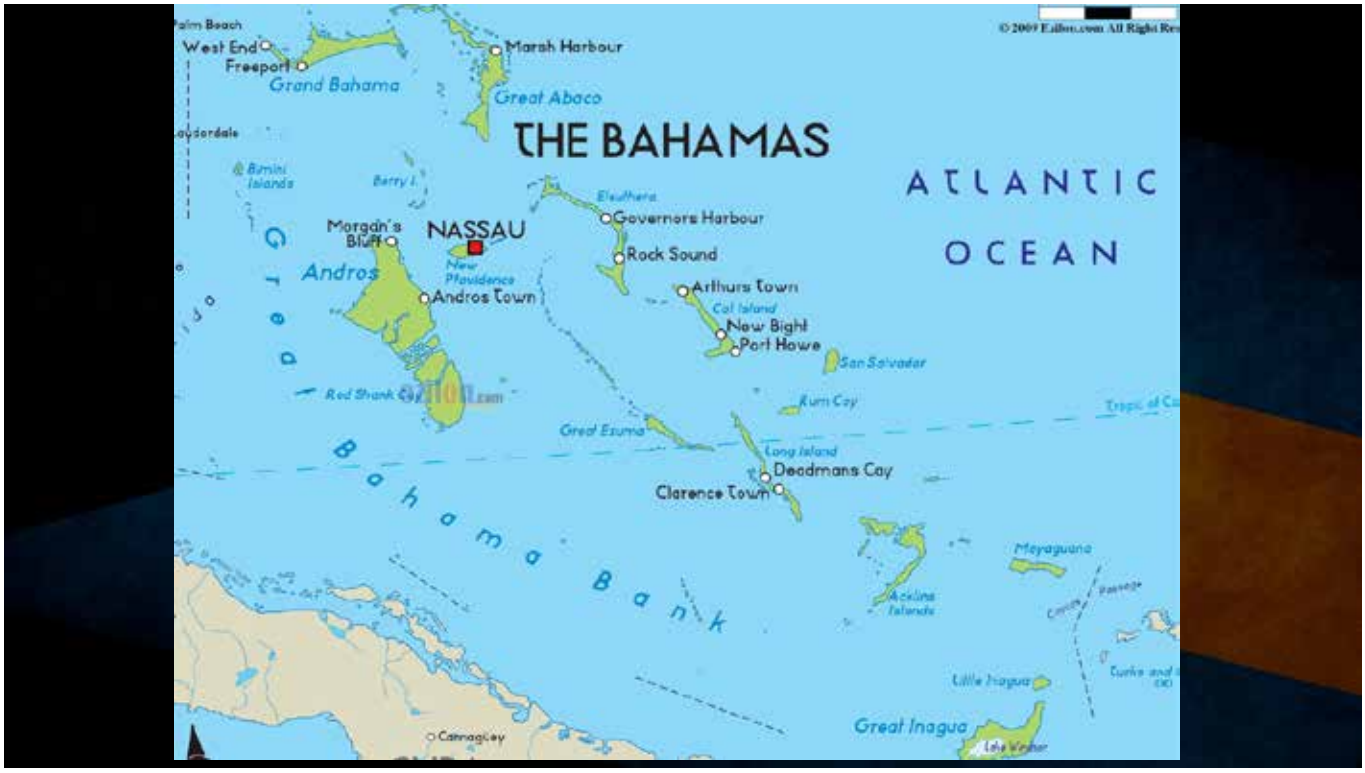
Purpose and Objectives

PURPOSE	*The Impact of Climate Driven Challenges on Access to a Unique Health System*

OBJECTIVES

- All Health Systems face unique issues
- Things can always get worse than you imagined
- Preparedness and Planning for the worst mitigates health inequity

FINANCIAL DISCLOSURE	I have no financial disclosures.


West End
Freeport
Grand Bahama
Marsh Harbour
Great Abaco
THE BAHAMAS
ATLANTIC
OCEAN
Bimini Islands
Berry I.
Eleuthera
Governors Harbour
Morgan's Bluff
NASSAU
New Providence
Rock Sound
Andros
Andros Town
Arthurs Town
Cat Island
New Bight
Port Howe
San Salvador
Rum Cay
Great Exuma
Long Island
Deadmans Cay
Clarence Town
Bahama Bank
Meyaguana
Acklins Islands
Little Inagua
Great Inagua
Cockburn Town


Hurricane Harvey
MAX WIND
130 mph
PRESSURE
941 mb
MOVING
NW at 8 mph
LOCATION
35 MI E OF CORPUS CHRISTI TEXAS


MATTHEW
Through Wednesday A.M.
ATLANTIC OCEAN
WED A.M.
CUBA
TUE A.M.
HISPANIOLA
JAMAICA
MON A.M.
SAT A.M.
SUN A.M.
CARIBBEAN SEA
AccuWeather

MY COUNTRY'S PROFILE AND FISCAL REALITY

BASIC ECONOMIC INDICATORS

Indicators	Statistics	Year
Population (000)	376.3	2017 (DoS)
Main Industries	1. Tourism 2. Financial Services 3. Agriculture	2017 (CB)
GDP (US$)	9B	2016 (IMF)
GDP Growth Rate (%)	0.6	2016 (IMF)
Per Capita GDP (US$)	25.1K	2016 (IMF)
Unemployment Rate (%)	12.7	2016 (HIA)
Youth Unemployment (%)	25.8	2016 (DoS)
Imports of Goods & Services (US$)	657 M	2016 (Trading Economics)
Food Imports	90	2016 (DoS)
Poverty rate (%) Person living below poverty line of $4,247 per person per year	12.8	2014 (DoS)

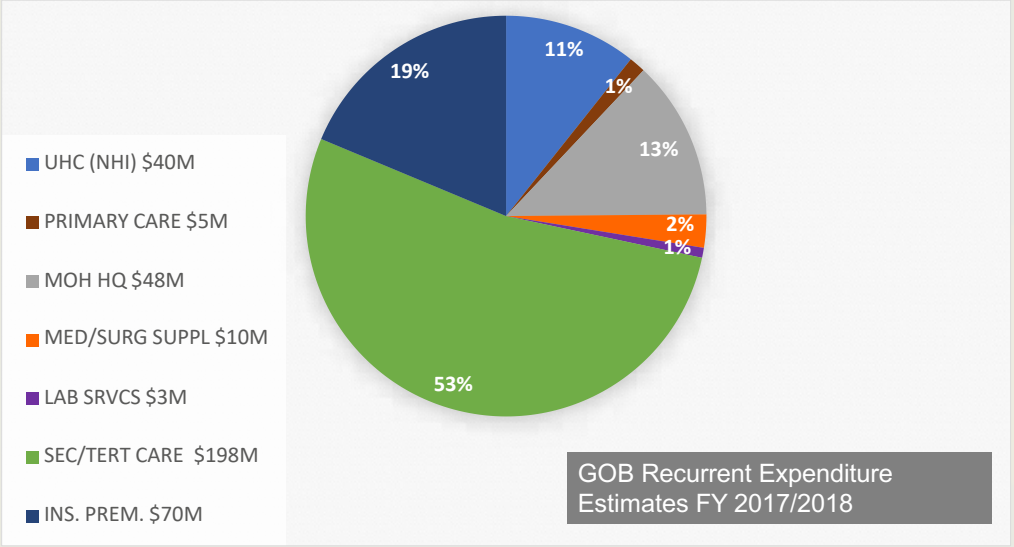
Key:
DoS – Department of Statistics
CB – Central Bank of The Bahamas
IMF – International Monetary Fund
HIA – Health in the Americas 2012 Report

THE GOVERNMENT OF THE BAHAMAS (GOB)

- **Principal Financier**
  - National Budget allocation for health has experienced a linear increase over the past ten years
  - In 2017-2018 direct MOH allocation accounts for 11.5% of the National Budget
  - Government Health Expenditure accounts for 14.1% of the National Budget if the health insurance premium allocation for civil servants is included.

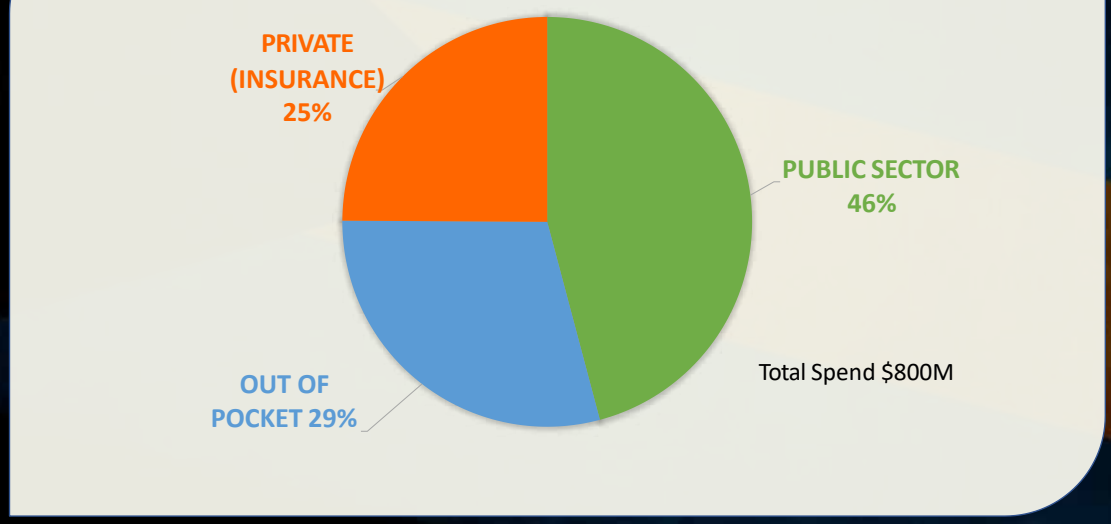
- **Principal Provider of Health Care Services**
  - Data reflect that at least 65% of the Bahamian population accesses health care services through the public health network of hospitals and community clinics.

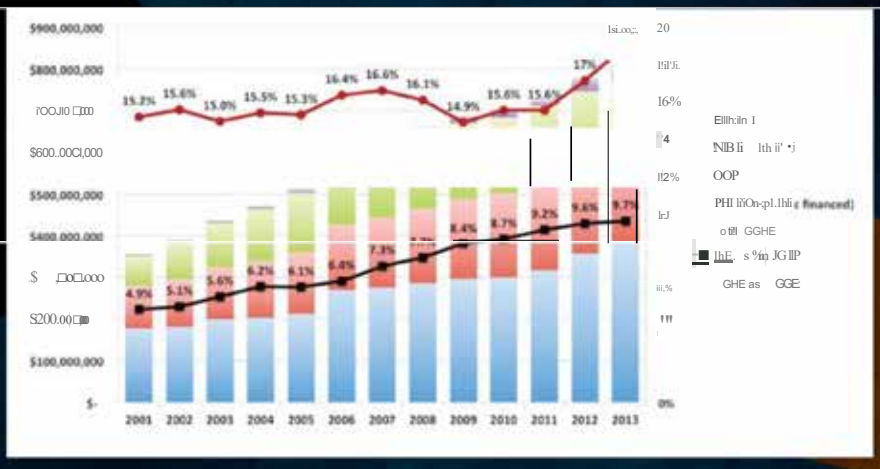
WHERE DO THE PUBLIC HEALTH SECTOR DOLLARS GO?



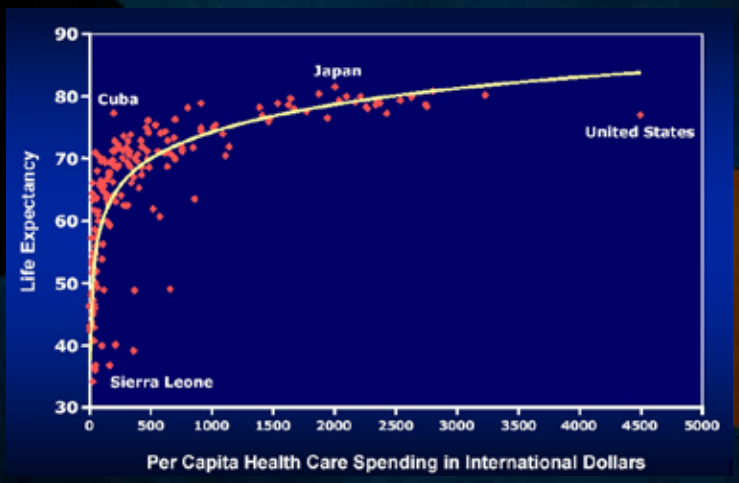
GOB Recurrent Expenditure Estimates FY 2017/2018

HOW ARE TOTAL HEALTH SECTOR DOLLARS SPENT?





Life Expectancy by Health Care Spending



The USA nation spends more on health care than any other country .

s/ppt/0412academyMensah.ppt#22

BASIC HEALTH INDICATORS

Indicators	Statistics	Year
Population (thousands)	377	2013
Population aged under 15 (%)	21	2013
Population aged over 60 (%)	12	2013
Median age (years)	32	2013
Population living in urban areas (%)	83	2013
Total fertility rate (per woman)	1.9	2013
Number of live births (thousands)	5.8	2013
Number of deaths (thousands)	2.3	2013
Birth registration coverage (%)	...	
Cause-of-death registration coverage (%)	93	2008-2010
WHO region	Americas	2013
World Bank income classification	High	2013

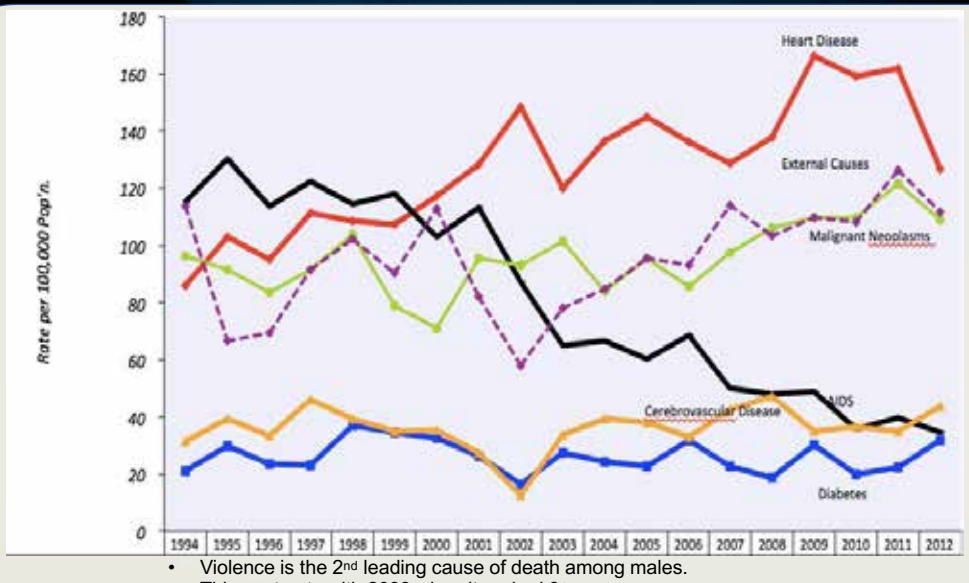

OUR PRIORITY SETTING AND
BURDEN OF DISEASE


Violence: A Public Health Challenge
Non-Communicable Diseases
Health Systems Strengthening
OUR
PRIORITIES

In light of the foregoing, The process of prioritization for this SIDS demands mental, ethical, social and fiscal gymnastics. There are the demands to answer the health challenges that are threatening to overcome us like a tsunami – Threats like obesity... or the costs associated with complications of non-communicable diseases …
… or the threat to our economy created by travel notices related to disease outbreaks and vector-borne illnesses...

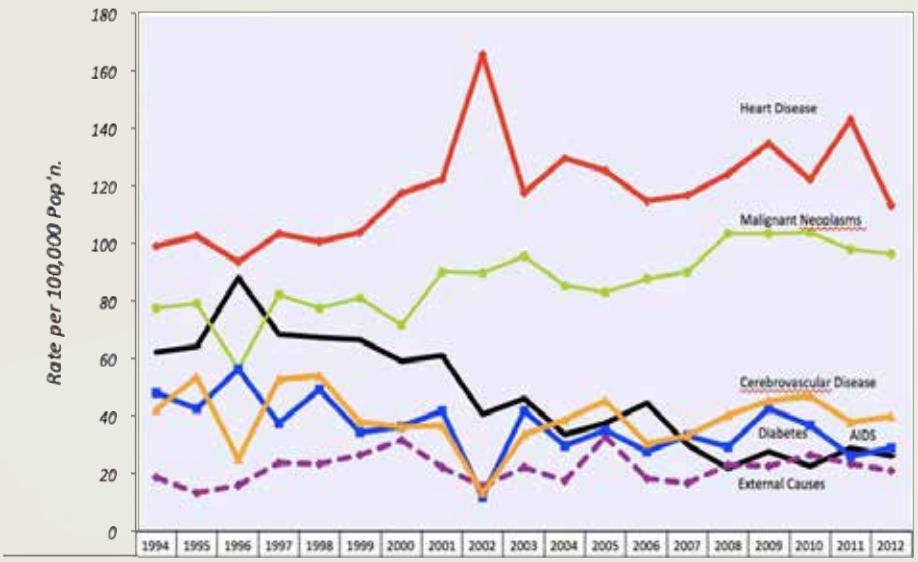
How do we prioritize the recruitment of necessary staff against the investment in reliable procurement chains for pharmaceuticals and therapeutics resulting from the high burden of disease? How do we find efficiencies that would engender confidence in the ability of the Ministry of Health to appropriately manage the health issues in the country while simultaneously requesting funding for technical assistance to develop stronger, and more resilient health systems and human resource capacities.
In brief, I will attempt to bring some perspective to what we in the Ministry of Health are considering – with the caveat that this list is not all inclusive.

LEADING MALE MORTALITY TRENDS (RATE PER 100,000)



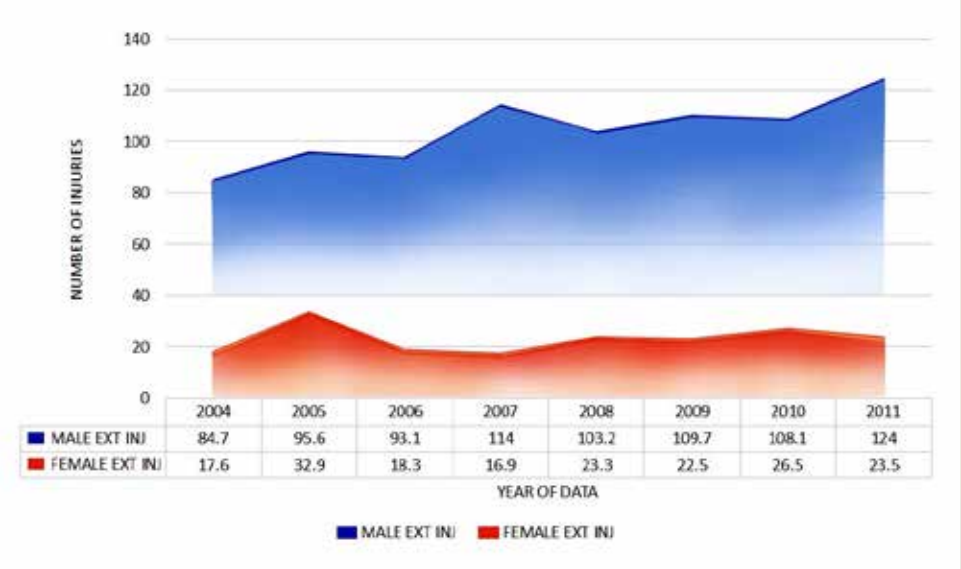
- Violence is the 2nd leading cause of death among males.
- This contrasts with 2009 when it ranked 6th.

LEADING FEMALE MORTALITY TRENDS (RATE PER 100,000)

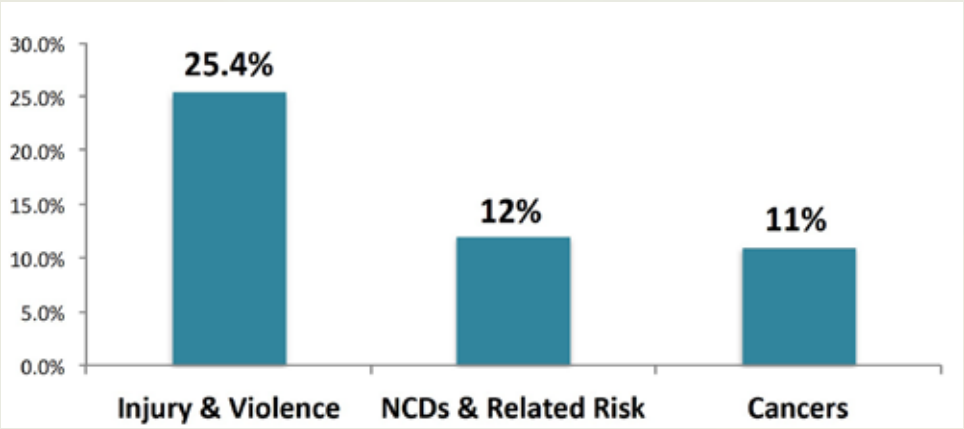


Source: HIRU, MoH

COMPARISON OF MALE & FEMALE EXTERNAL INJURIES



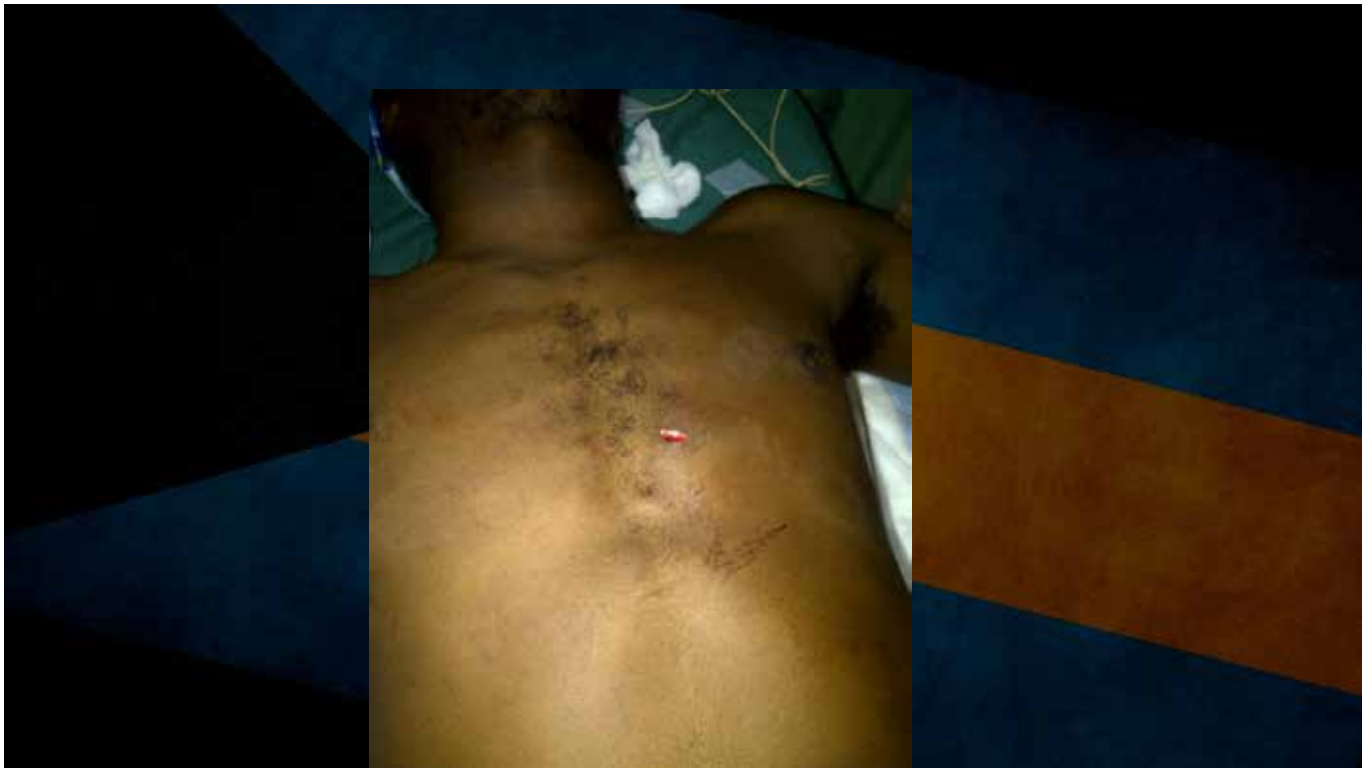
PERCENT CONTRIBUTION TO TOTAL PYLL

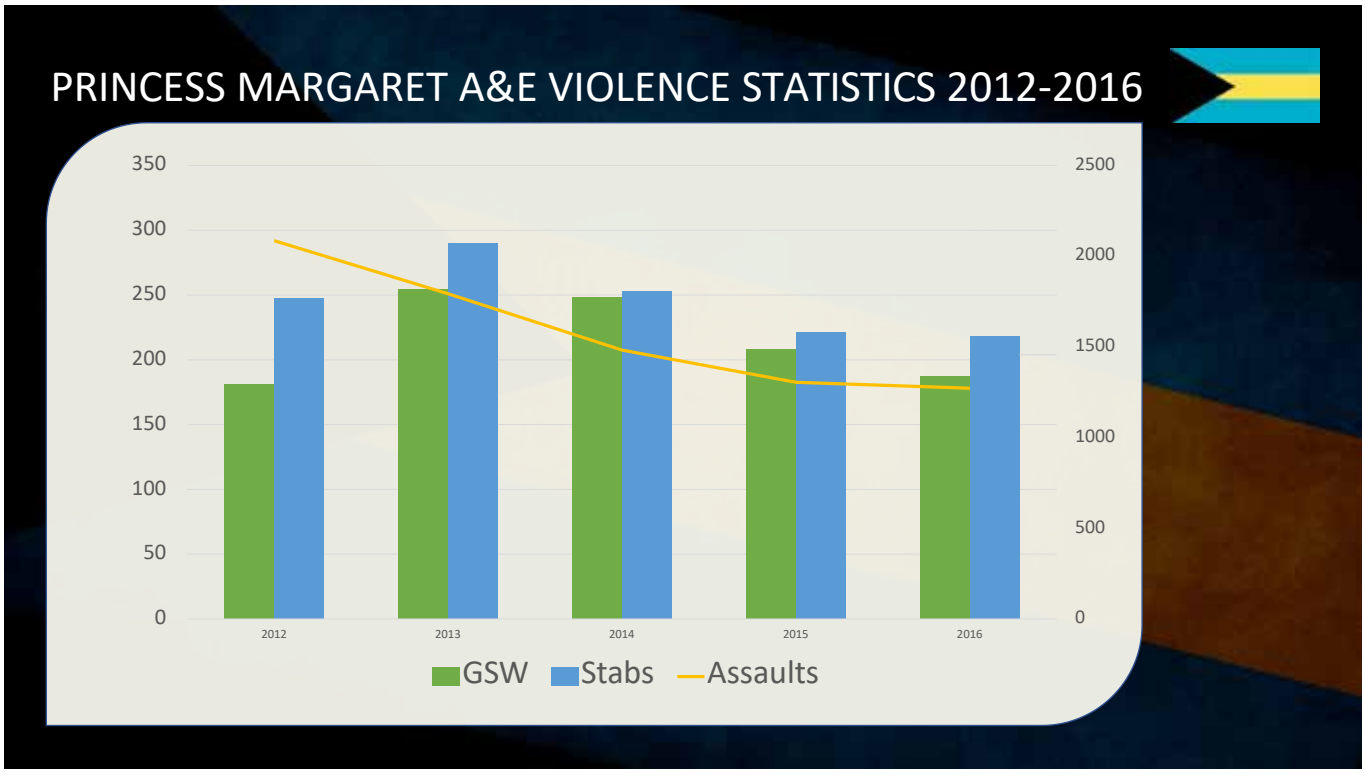


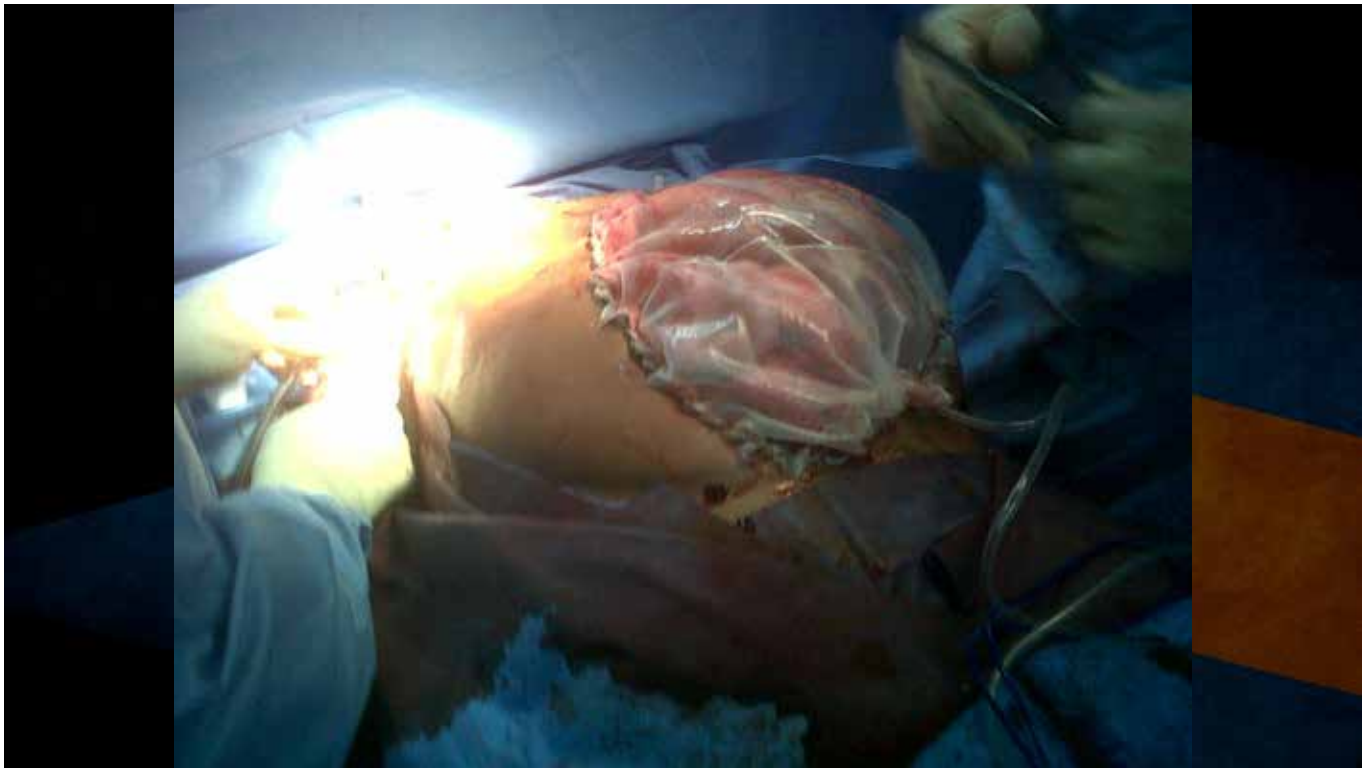
- We are losing our citizens in what should be their most productive years
- PYLL carries significant economic implications
- A nation's health is its wealth
- Injury and violence leads.

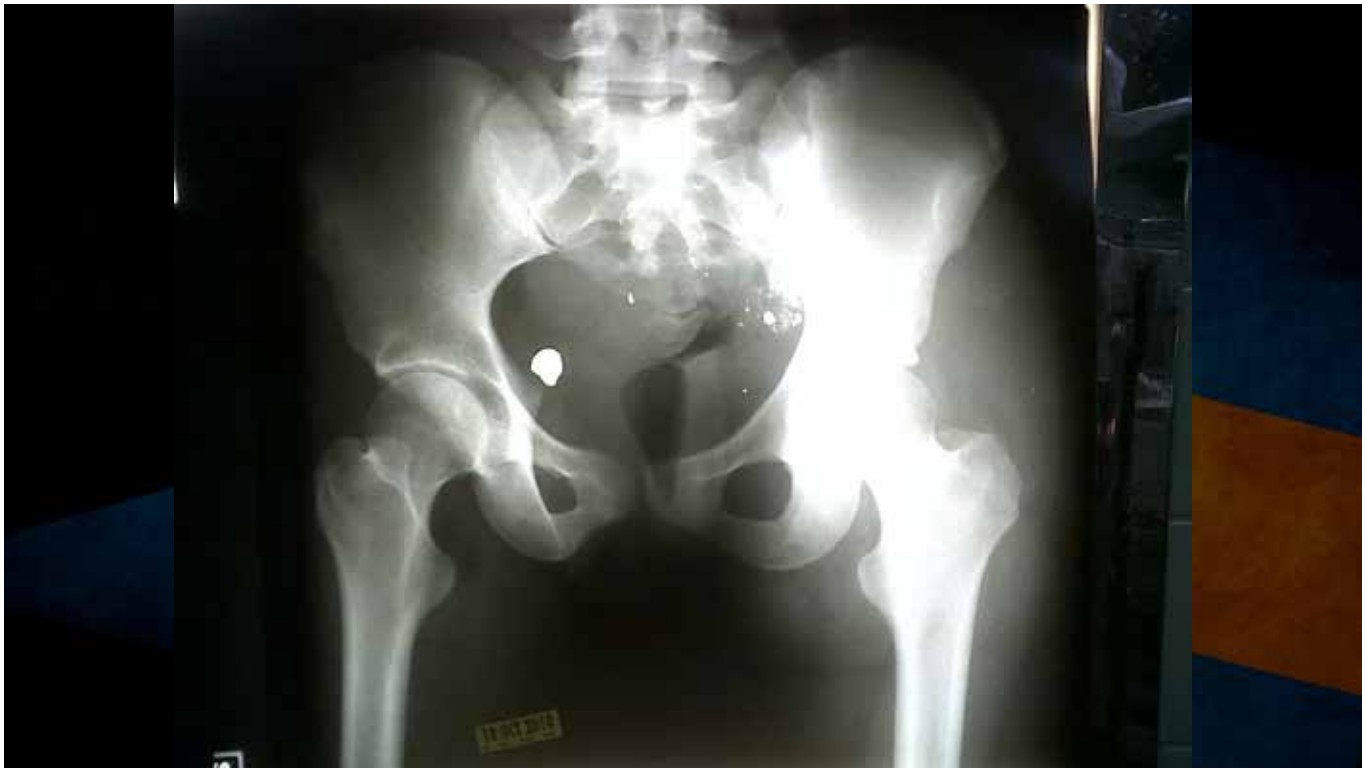
VIOLENCE

PRIORITY #1

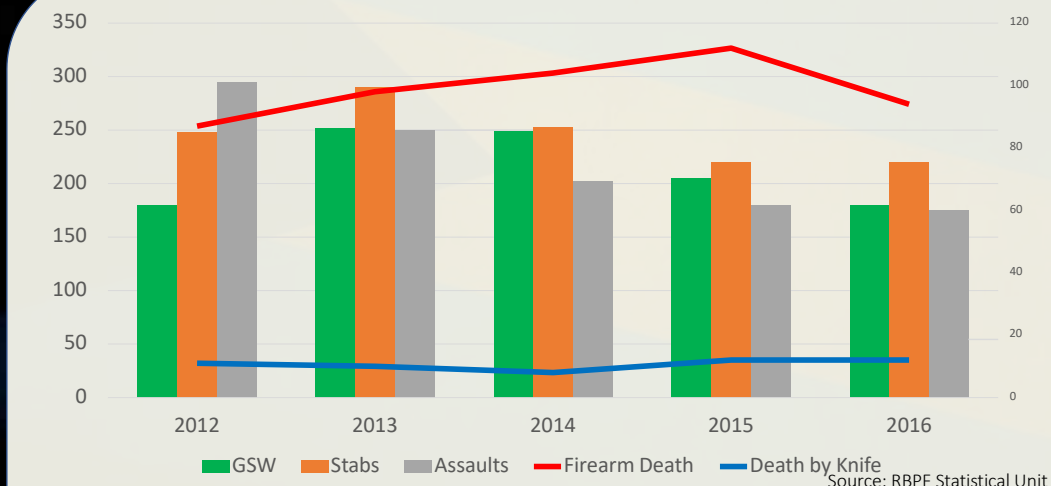



PRINCESS MARGARET A&E VIOLENCE STATISTICS 2012-2016
350
300
250
200
150
100
50
0
2500
2000
1500
1000
500
0
2012
2013
2014
2015
2016
GSW
Stabs
Assaults





WEAPONS USED IN MURDER CASES WITH MALE VS FEMALE VICTIMS



Source: RBPF Statistical Unit
Graph: Planning Unit

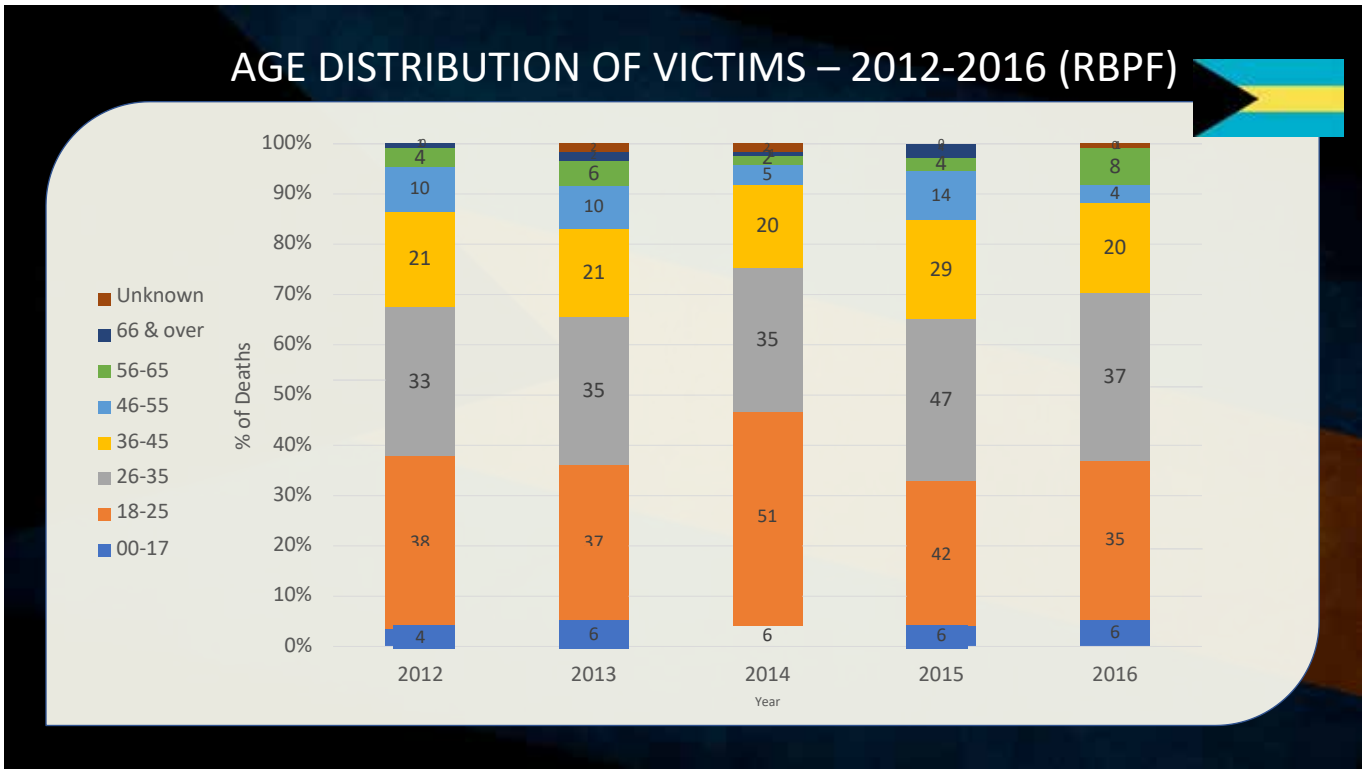
PROFILE OF HOMICIDE VICTIMS - THE BAHAMAS

	1991 - 2003	2005 - 2009
Male	84.2%	88.0%
Single	76.4%	83.0%
Under 25 years	43.0%	28.1%
Bahamian	82.4%	85.0%
Unemployed	60.0%	46.0%
Criminal Record	27.4%	56.0%

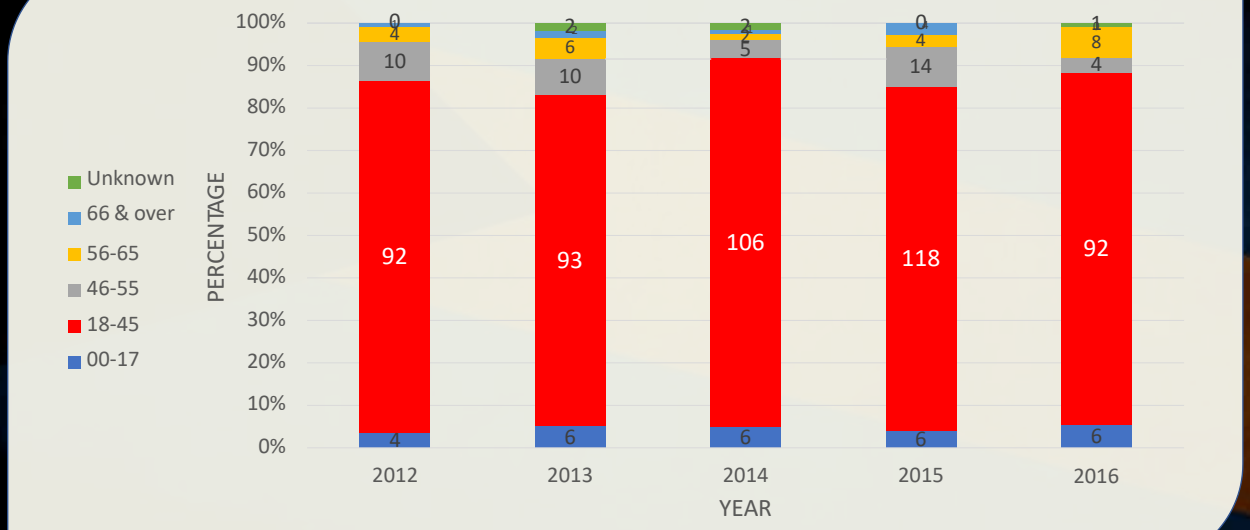
Homicide victims are predominantly:

- **Single**
- **Male**
- **Unemployed**
- **Possess a criminal record**

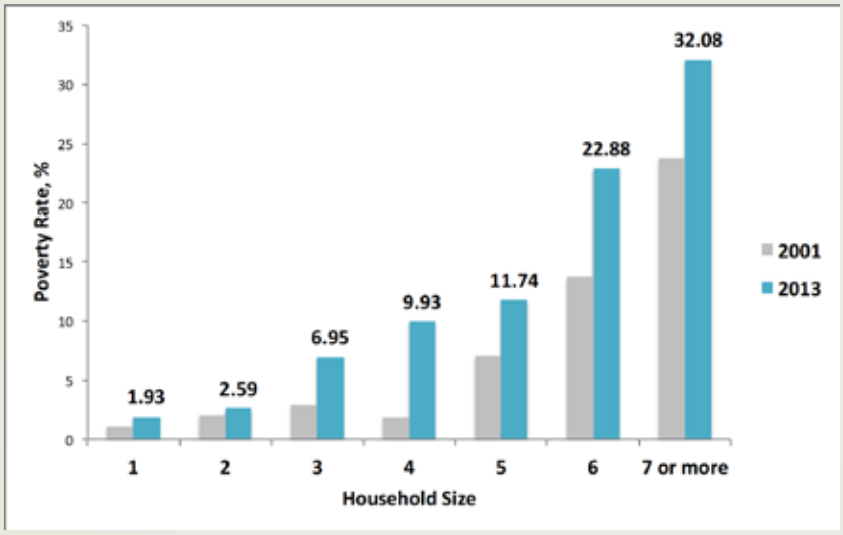
Source: Violence in The Bahamas


AGE DISTRIBUTION OF VICTIMS – 2012-2016 (RBPF)
Unknown
66 & over
56-65
46-55
36-45
26-35
18-25
00-17
% of Deaths
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2012
2013
2014
2015
2016
Year
4
10
21
33
38
4
6
10
21
35
37
6
2
5
20
35
51
6
4
14
29
47
42
6
8
4
20
37
35
6

VICTIM PROFILE – PRODUCTIVE YEARS – 2012 – 2016 (RBPF)



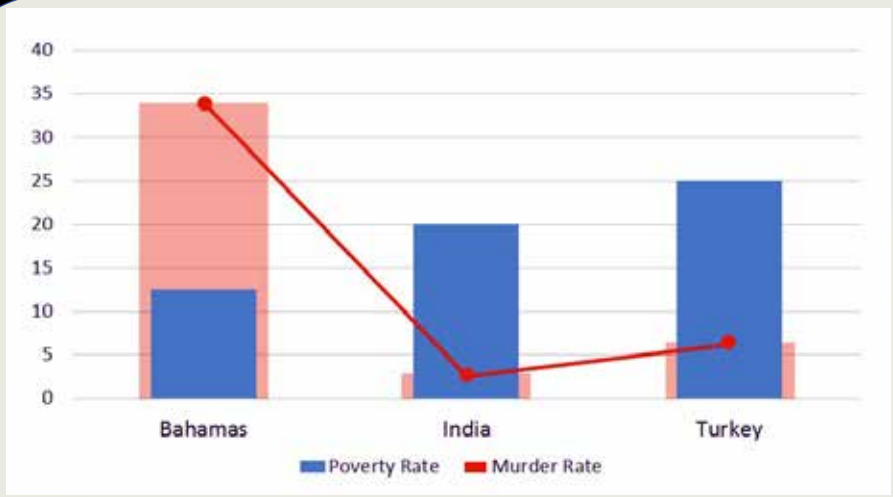
IS THERE A LINK: POVERTY, HOUSEHOLD SIZE AND VIOLENCE?



Source: Bahamas Household Expenditure Survey, 2013
Graph: Planning Unit

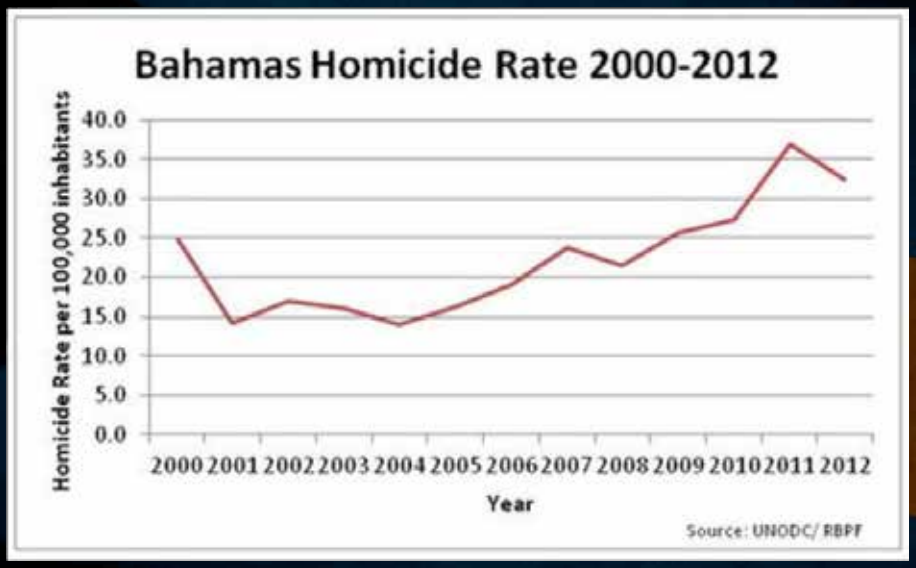
- National poverty rate 9.3% (2001) vs. 12.8% (2013)
- Poverty Line - $4,247 per person per year (2013).

IS POVERTY A CAUSE OF CRIME?



The Bahamas' poverty rate is at least 8 percentage points lower than India and Turkey. Yet, its murder rate is almost 6X higher per 100'000.

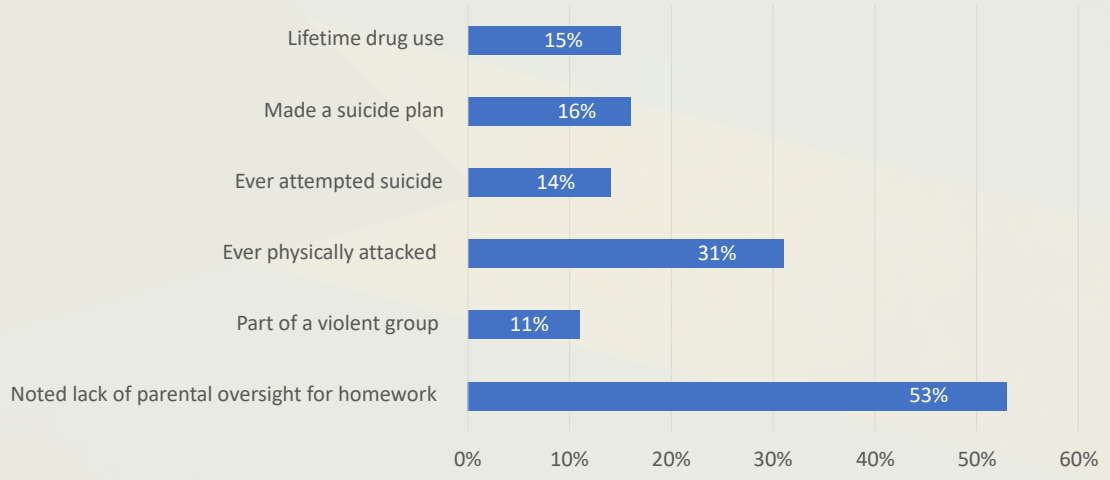
Source: World Bank
Graph: Planning Unit, MoH



15 most violent countries in the world (murders per 100,000 people, 2012)

#	Country	No. of Murders	Murder rate
1	Hondorus	7,172	90.4
2	Venezuela	16,072	53.7
3	Belize	145	44.7
4	El Salvadore	2,594	41.2
5	Guatamala	6,025	39.9
6	Jamaica	1,087	39.3
7	Saint Kitts	18	33.6
8	South Africa	16,259	31.0
9	Colombia	14,670	30.8
10	Bahamas	111	29.8
11	Trinidad and Tobago	379	28.3
12	DRC	18,586	28.3
13	Puerto Rico	978	26.5
14	Rwanda	2,648	23.1
15	Dominican Republic	2,268	22.1

VIOLENCE & OUR YOUTH (GSHS, 2013)



Source: The Bahamas' GSHS, 2013
Graph: Planning Unit

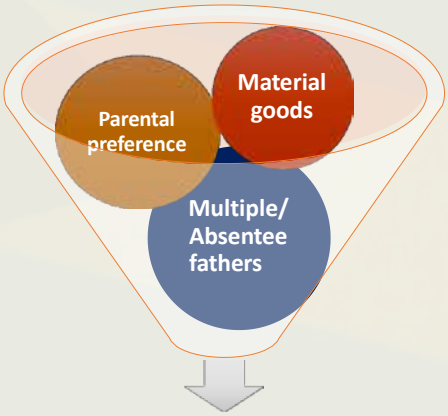
PARADIGM SHIFTS IN HISTORY

- Miasma theory replaced by germ theory
- Theodor Billroth “The surgeon who would attempt to suture a wound of the heart should lose the respect of his colleagues…”
- From small, closed units to larger, more open ICUs
- Peptic ulcer disease: From “Stress” to H. Pylori.

QUESTIONS TO BE ASKED?

- Is aggression related to hormone levels in our young males?
- Is aggression stimulated by external v. organic factors? Or do organic factors precede trigger factors?
- What role do ‘spiked’ soft drinks, psycho-trophic substances, weed etc. plays?
- Alternative lifestyles?
- Male prowess?
- Maternal psycho-pathology?
- Early indicators of early aggression?

WHAT MIGHT ACCOUNT FOR DIFFERENT AGGRESSION PATTERNS AMONG MALES IN THE SAME HOUSEHOLD?



AGGRESSION?

TRIGGERS AND AMPLIFIERS?

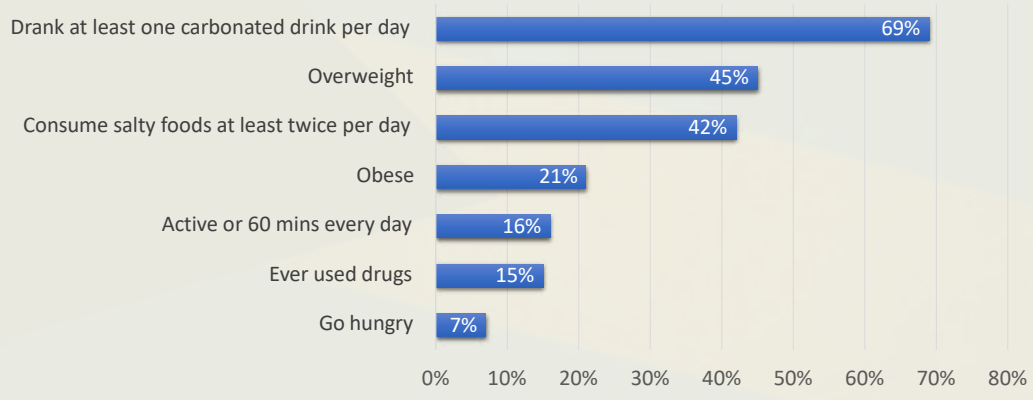
HOW DO WE ANSWER?

- Interventions currently in place **DO NOT** work
- Perhaps we should question what we believe to be truth… and re-examine the problem with a public-health methodology!
- PAHO's assistance with the study proposal design

NON-COMMUNICABLE DISEASES

PRIORITY #2

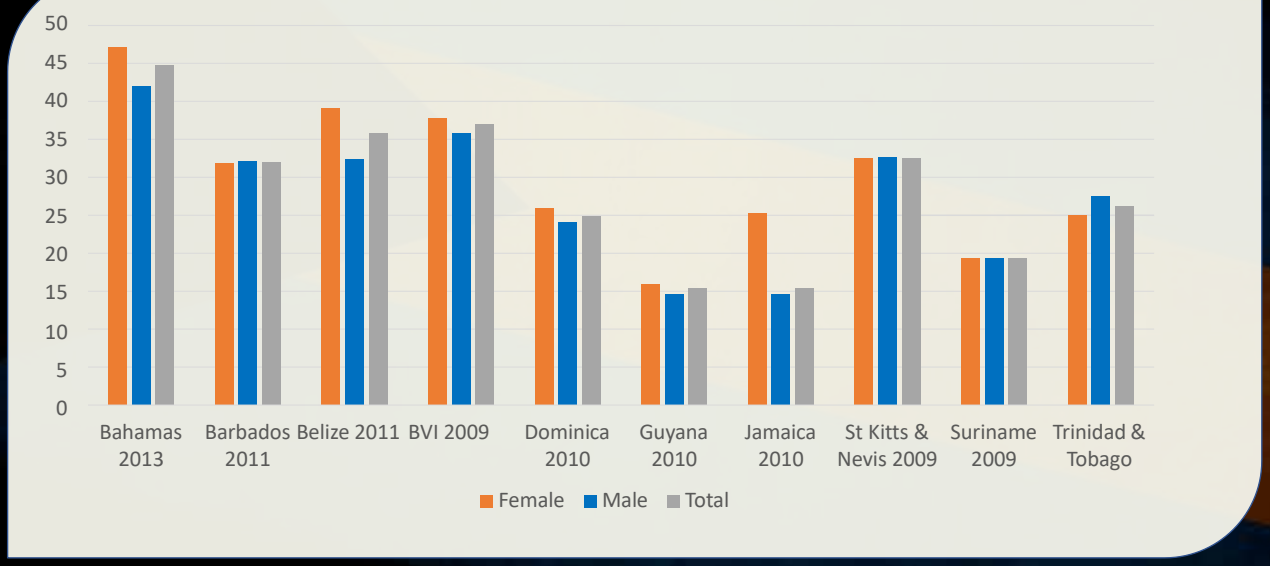
WHAT ABOUT THE CHILDREN? (GSHS, 2013)



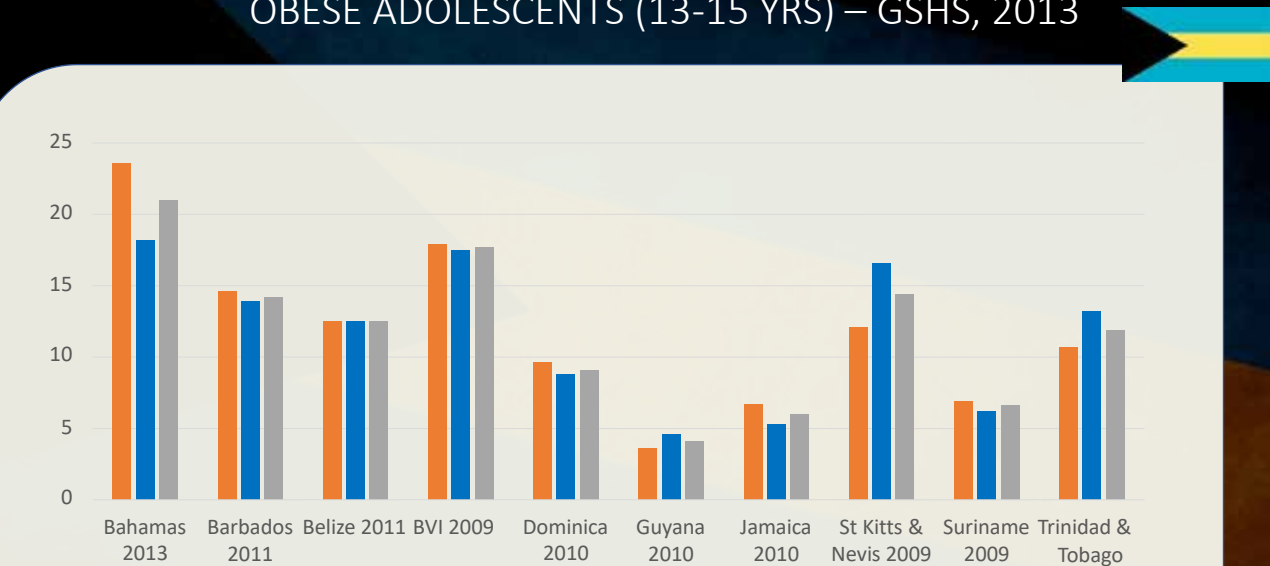
- Over the last two decades, the Bahamian society has drifted more and more away from an agricultural one towards an industrialized, instant society
- The 'drug' of choice for many is sugar, and this addiction starts early in life
- Breastfeeding rates are low

Source: Planning Unit, MoH

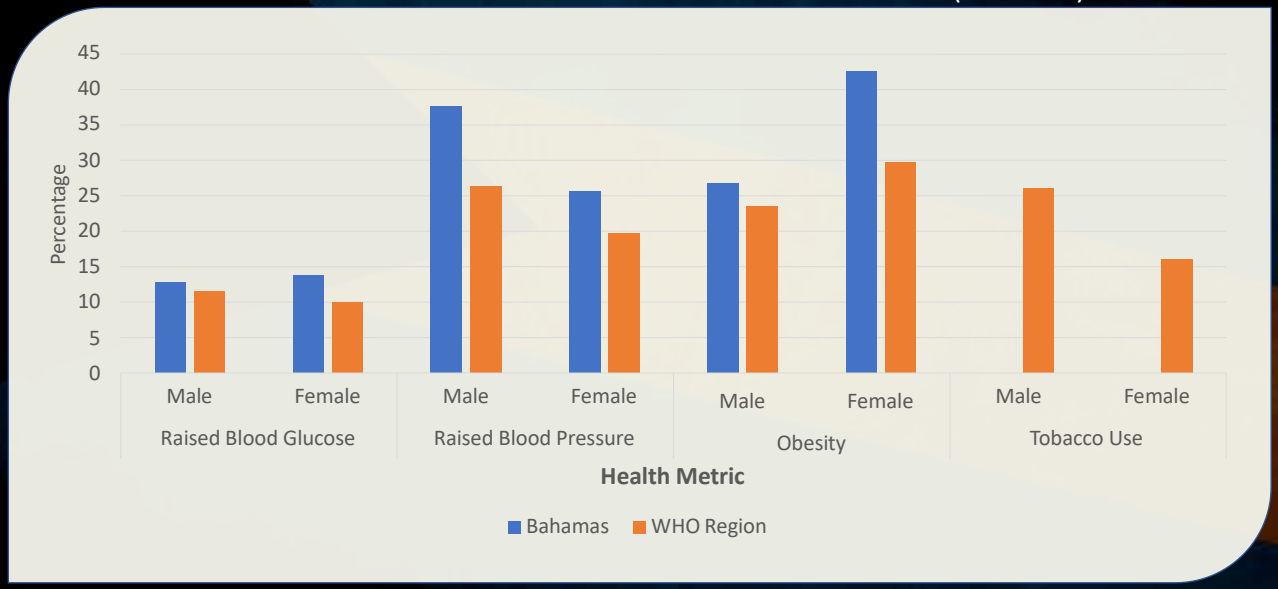
OVERWEIGHT ADOLESCENTS (13-15 YRS) – GSHS, 2013



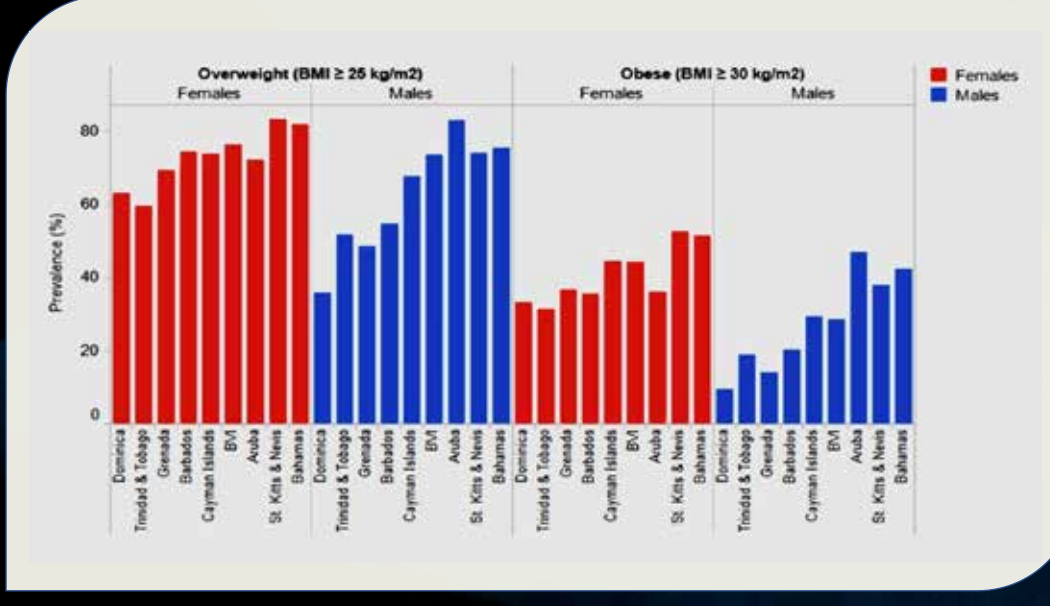
OBESE ADOLESCENTS (13-15 YRS) – GSHS, 2013

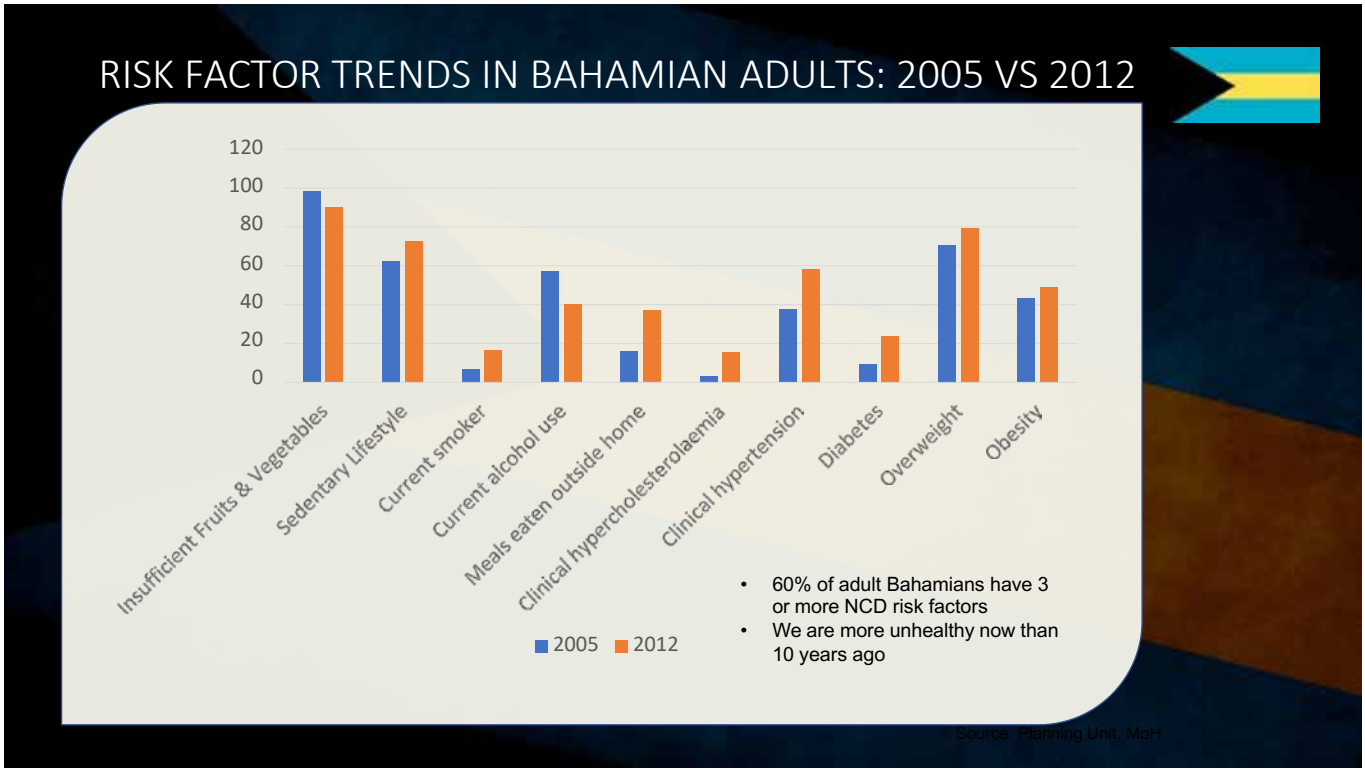


HOW DOES THE BAHAMAS' PREVALENCE OF NCD RISK FACTORS COMPARE TO THE WHO REGION (AMRO)



HOW DOES THE BAHAMAS' PREVALENCE OF OVERWEIGHT & OBESITY COMPARE TO CARICOM MEMBER STATES?

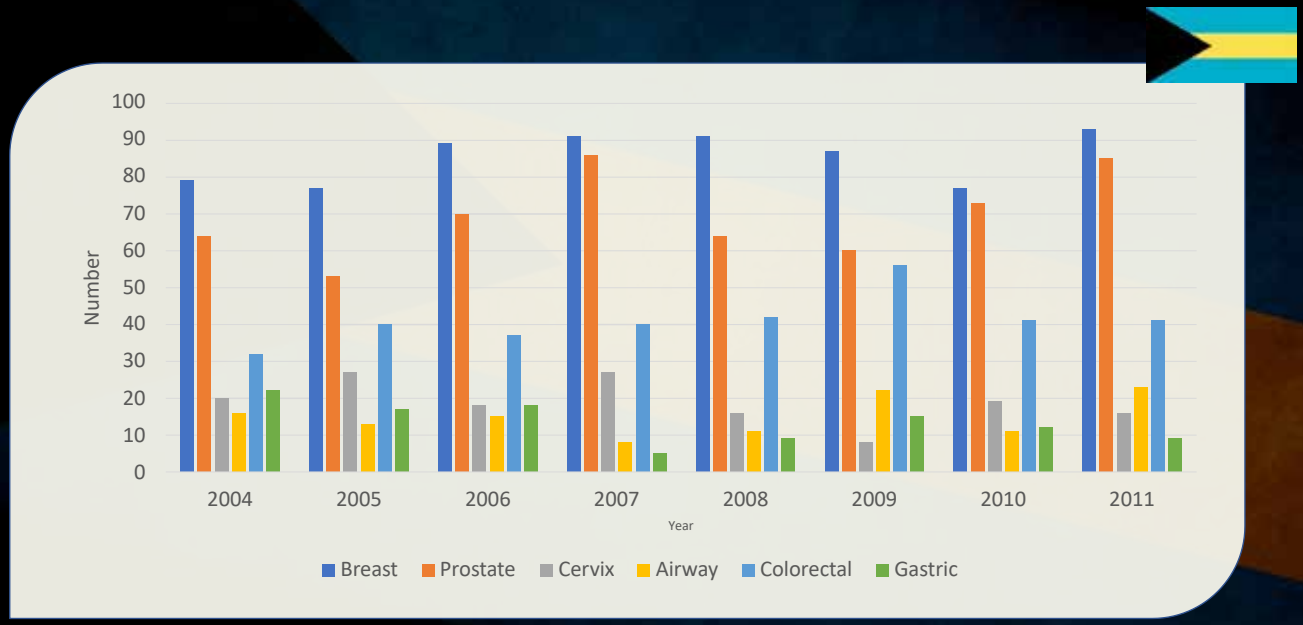


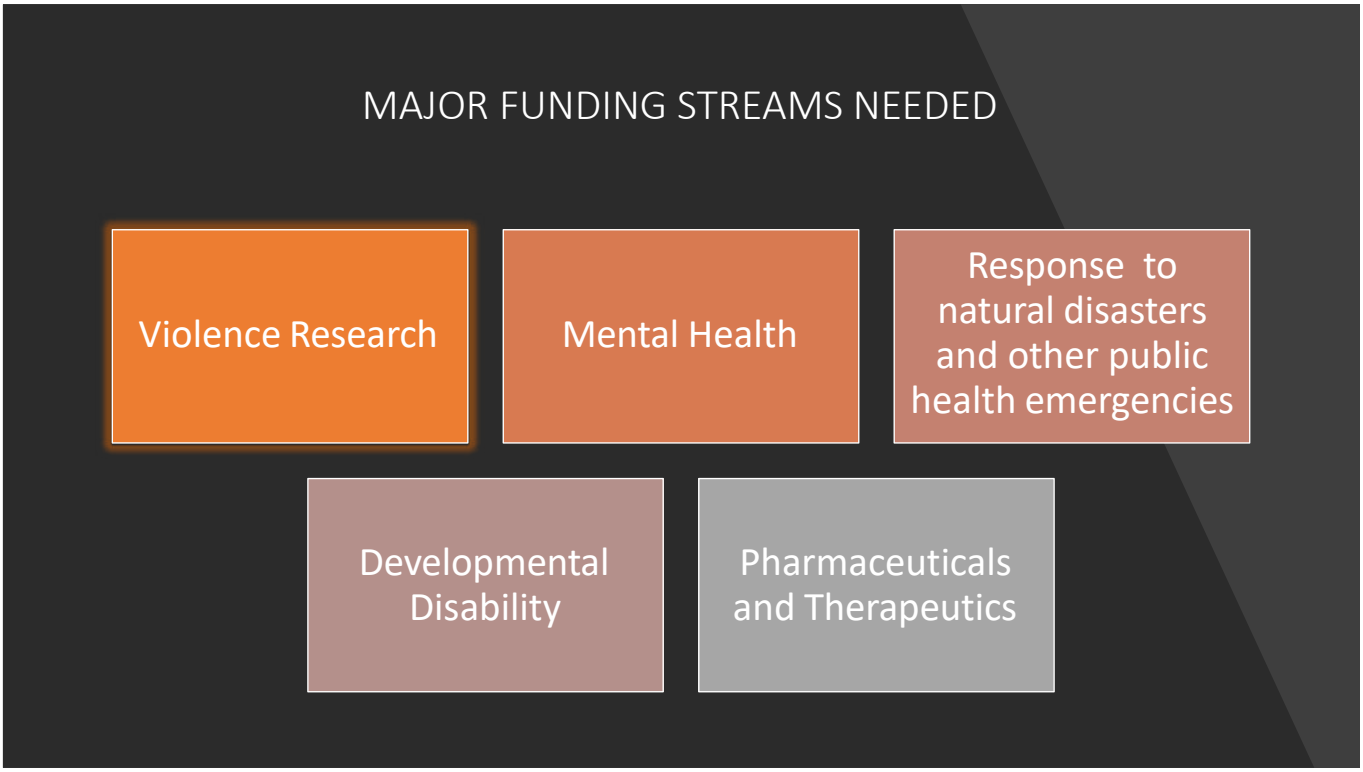

RISK FACTOR TRENDS IN BAHAMIAN ADULTS: 2005 VS 2012
120
100
80
60
40
20
0
Insufficient Fruits & Vegetables
Sedentary Lifestyle
Current smoker
Current alcohol use
Meals eaten outside home
Clinical hypercholesterolaemia
Clinical hypertension
Diabetes
Overweight
Obesity
2005
2012
60% of adult Bahamians have 3 or more NCD risk factors
We are more unhealthy now than 10 years ago
Source: Planning Unit, MoH

DISTRIBUTION OF IMPORTED FASTFOOD FRANCHISES, 2013

PER WEEK	POOR	NON-POOR
Once per day	1.3	8.0
5 - 6X	5.2	7.1
2 - 4X	15.6	22.4
1 – 3X	41.1	37.9
< 1/month	36.8	24.5

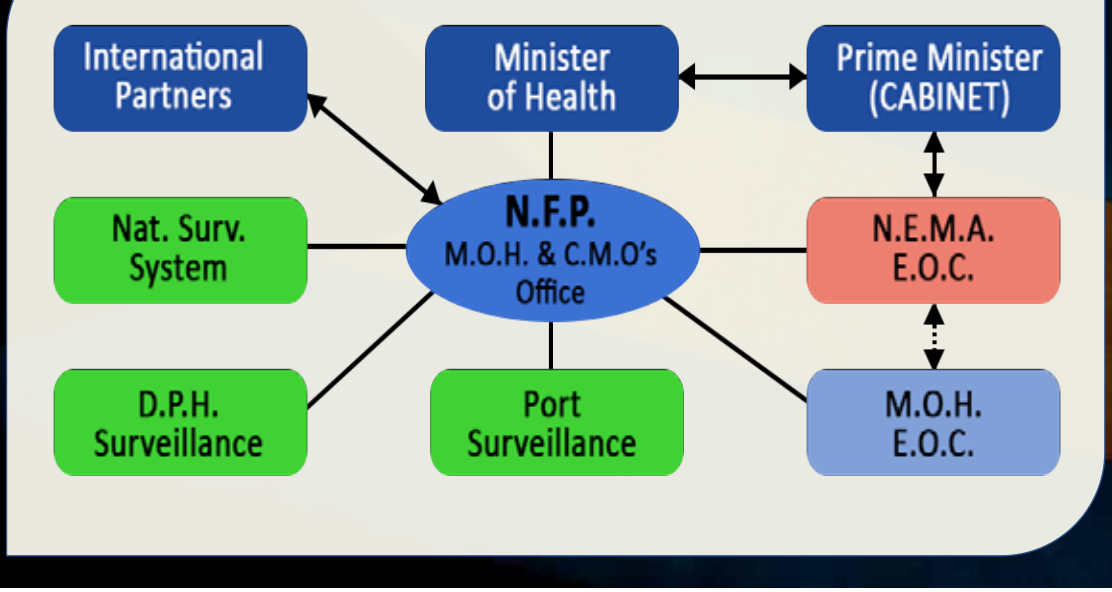
TREND FOR TOP CANCERS IN THE BAHAMAS 2004-2011 (HIRU, MOH)




MAJOR FUNDING STREAMS NEEDED
Violence Research
Mental Health
Response to natural disasters and other public health emergencies
Developmental Disability
Pharmaceuticals and Therapeutics


HEALTH SYSTEMS STRENGTHENING
PRIORITY #3

NATIONAL FOCAL POINT (NFP) COORDINATION



AUTHORIZED PORTS OF ENTRY

- Nassau, New Providence (also a Designated POE)
- Freeport, Grand Bahama (also a Designated POE)
- Alice Town, Bimini
- Governors Harbour, Eleuthera
- Marsh Harbour, Abaco
- New Bight, Cat Island

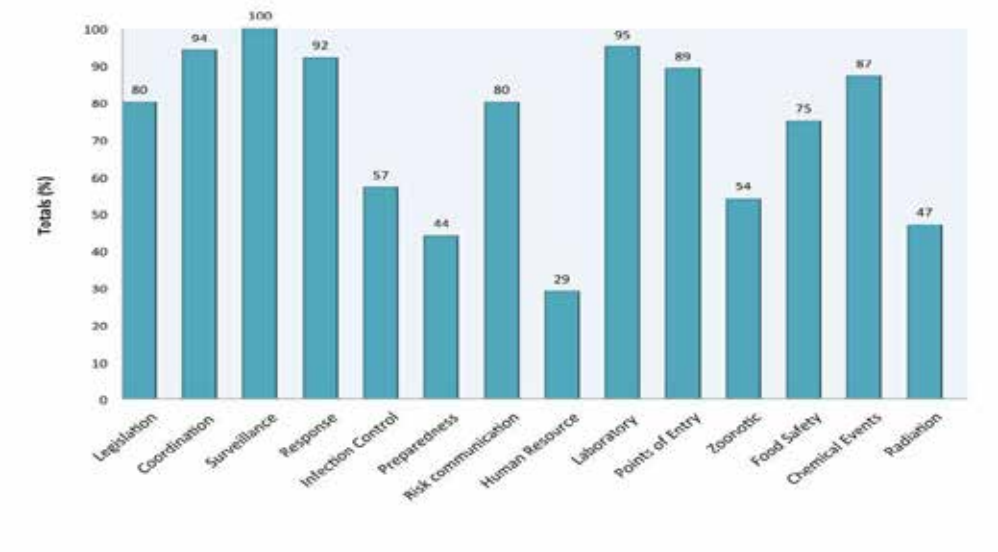
IHR ACHIEVEMENTS TO DATE

- Revision of Public Health Rules Law (Draft)
- Membership in the **International Atomic and Energy Agency** (IAEA) for Radiation Emergencies
- **Strategic Approach to International Chemicals Management** (SAICM) grant awarded and completed to strengthen the country's response to and ability to manage Chemical Emergencies
- Completion of Nassau Airport Development's Communicable Disease Mitigation and Response Plan
- Cholera Response Plans for The Bahamas completed

ACHIEVEMENTS TO DATE (CONT'D)

- Commencement of The National Health Disaster Plan (All Hazards Plan)
- IHR webpage www.bahamas.gov.bs/health - **left navigation bar**
- Food Safety & Quality, Animal Health & Plant Health Acts passed in 2016
- Training of new recruits Border Control Agents (Customs and Immigration)
- Training of health staff in level one of basic epidemiology course hosted by PAHO
- Ongoing multi stakeholder trainings and cross trainings

CORE CAPACITY ACHIEVEMENTS: THE BAHAMAS 2016



HSS: LABORATORY ACHIEVEMENTS

- International Laboratory accreditation
- DNA PCR capability
- Expansion of testing panels to include viruses of public health importance
- Committee to design National Laboratory Strategic Plan
- Partnership with PAHO and PHA for infrastructural improvements including expansion of bench space

CHALLENGE: CROSS-CUTTING WEAKNESSES

- Legislation
- Health Planning – including Epidemiologist & Health Economist
- Human Resources for Health
- Health Financing
- Data Management & Report Writing
- Information & Communications Technology
- Established relationships and vehicles for data sharing across Government agencies

CHALLENGE: LEGISLATION

- Governance
- Framework Convention on Tobacco Control (FCTC) – Tobacco Control Bill
- Pharmacy Act
- Nurses & Midwives Act
- National Health Insurance Act
- Public Health Agency

NHI Bahamas
modern | affordable | accessible

CHALLENGE: HUMAN RESOURCES FOR HEALTH

- Engaging skill-sets and not simply personnel
- HRH assessment for model of care
- Allied Health
- Nutritionist
- Developmental Disabilities
- Health Economist & Epidemiologist

CHALLENGE: MENTAL HEALTH

- National Strategic Plan development
- Strengthening of evaluation and implementation of results from Mental Health Gap Action Programme (mhGAP) pilot
- Training for members of the community
- Revision of legislation
- Supportive services and facilities including home care
- Mental health support program for persons with developmental disabilities and their families/caregivers

CHALLENGE: LABORATORY STRENGTHENING

- DNA PCR capacity building
- Proposal writing and development of business plans
- Training medical technologists & laboratory technicians
- Integration of laboratory information systems across private and public sectors
- Development of a National Strategic Lab Plan
- Maintaining CAP Accreditation

CHALLENGE: INFORMATION & COMMUNICATION TECHNOLOGY

- Expanding IT infrastructure and management capacity
- Immediate HMIS needs not addressed
- Strengthened eHealth and Telemedicine across the archipelago to improve efficiencies, training and monitoring for better health outcomes,
- Procurement of data registry software for national cancer program

HEALTH IN ALL POLICIES

- Core data sets for sharing
- Work plan and timetable for accomplishments (M&E)
- Secured web-based communication
- Regularly scheduled meetings of Ministers
- Formalize partnerships for specified projects

MY COUNTRY'S PRIORITIES IN THE FACE OF IT'S FISCAL REALITY

- The direct, indirect, health, social and other costs associated with our leading morbidities and mortalities are not sustainable and will cripple my nation.
- To rescue our health system and nation, the scales now need to be tipped toward primary care while ensuring appropriate capacity / intervention for catastrophic illnessess.

PRIORITY:INTERNATIONAL RELATIONSHIPS

Pan American Health Organization/World Health Organization

CARICOM/PANCAP/CARPHA

Other UN Agencies

InterAmerican Development Bank

World Bank

International Monetary Fund

US Government

TECHNICAL SUPPORT, BILATERAL ARRANGEMENTS & NORTH-SOUTH/SOUTH-SOUTH COOPERATION?

- Advancing models of services & standards of care
- Monitoring & Evaluation programme to document and strengthen service
- Legislation/Single governance
- Evaluation and research on the root causes of violence
- Technical support to address human resource gaps
- Disaster Preparedness & Emergency Response
- Health Financing
- Community engagement

CONCLUSION

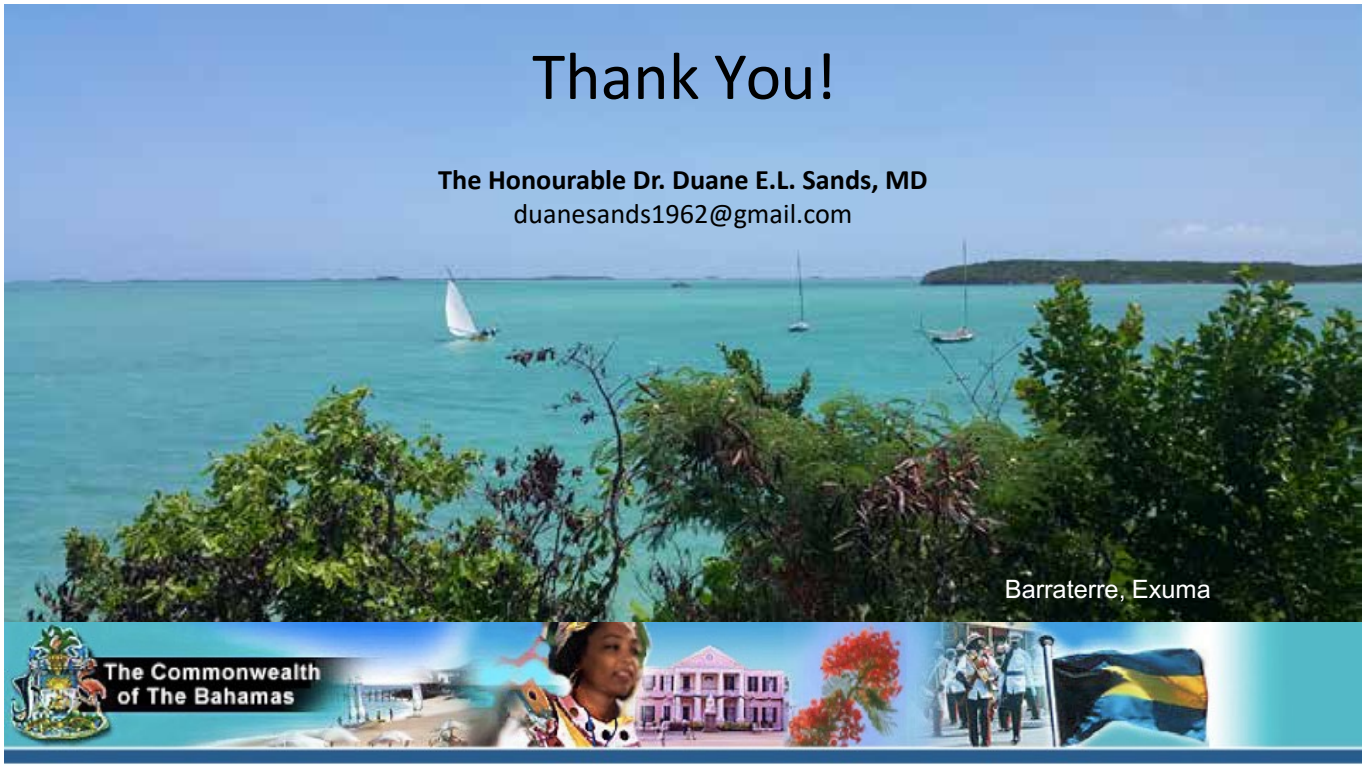
The Bahamas has:

- Overcome many challenges in the past but has a restored will to achieve real progress.
- We face the daunting threat of the one of the worst health profiles in the Americas… complicated by a geographic (archipelagic) handicap and an economic assessment that is unhelpful.
- Addressing violence in the Bahamas may lead to the public health breakthrough of the century.
- We require a Bahamian solution to manage our unique(peculiar) circumstances – yet one that is based on the principles of international best practices and evidence.

Forward, Upward, Onward, Together

Thank You!

The Honourable Dr. Duane E.L. Sands, MD
duanesands1962@gmail.com



Women's Health: Disparities in the Caribbean Population Locally and Globally

Ambereen Sleemi, MD, MPH
Urogynecologist, Executive Director
International Medical Response

Purpose and Objectives

PURPOSE

Discuss the health disparities in caring for women in the Caribbean.

OBJECTIVES

- Understand women's health disparities in the Caribbean
- Outline factors leading to disparities
- Demonstrate solutions to alleviate these disparities

FINANCIAL DISCLOSURE

I have no financial disclosures.

Topics to be covered

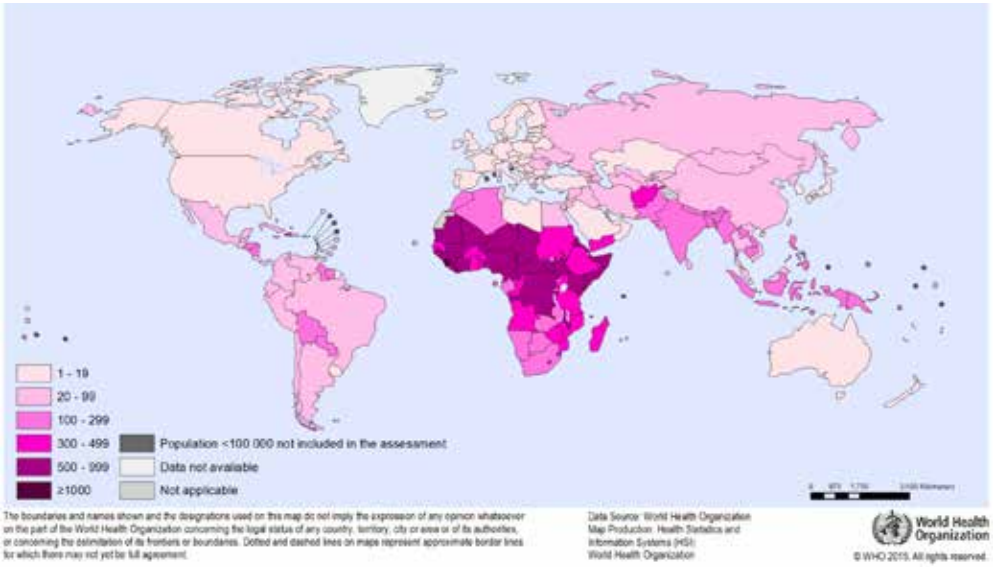
- Global state of women's health
- Maternal health
  - Death and disability
- Gynecologic Health
  - Cancers
  - Uterine conditions
    - Fibroids
    - Endometriosis
  - Prolapse and Incontinence
- Overall health
  - Chronic conditions

International Medical Response

- Founded in 2013
- to support and enhance healthcare systems through local partnerships
- Support surgical training focused on fistula and pelvic reconstruction
- Current programs in Haiti, Liberia, Malawi

Global state of women's health

- Maternal Health
  - How are we doing in caring for pregnant women?
  - Depends where you are born
  - Access to maternal care



Where is it deadly to have a baby?

MMR per 100,000 live births, 2008

Current state of global maternal affairs

- Birth around the world: 800 women die/day due to pregnancy related complications; leading cause of death in 15-19 yo adolescents
- Current rates of maternal mortality- 1 maternal death every 2 minutes (cut by 44% from 1990-2015) Alkema, et al 2015
- 99% in SSA
- "Women are not dying of diseases we can't treat…They are dying because societies have yet to make the decision that their lives are worth saving"- former FIGO President, Mahmoud Fathalla

Caribbean Maternal Health

- Rates of mortality
- Rates in the diasporic populations
  - Maternal Health in the USA
  - Increased rates in minority populations

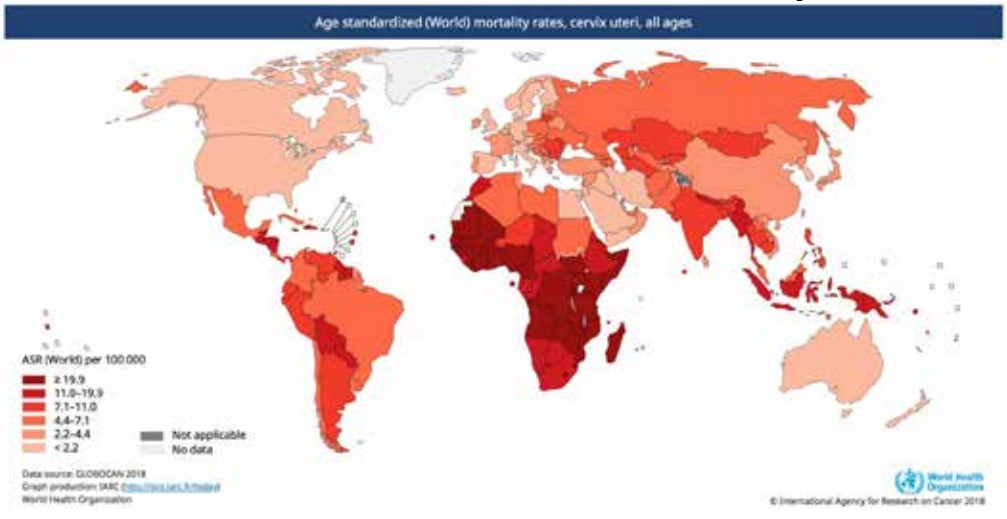
Gynecologic conditions

- Health disparities in rates of cancer detection
  - Cervical cancer
  - Endometrial cancers
- Deaths from cancer
  - Disparities in death rates for gynecologic cancers
  - Breast cancer and health disparities

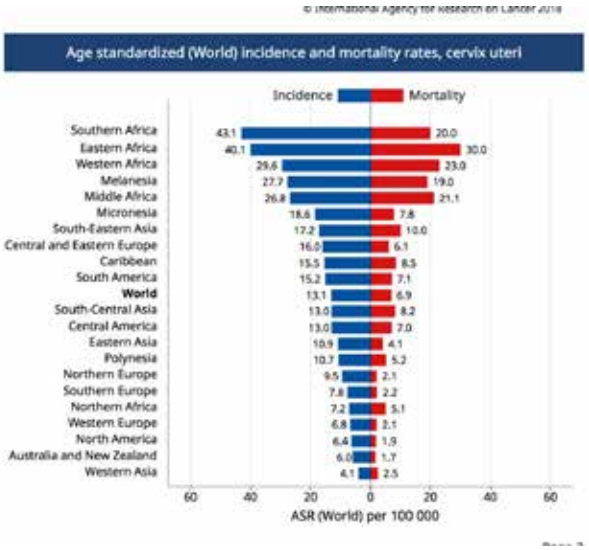
Cervix cancer

- Incidence in global populations
- Cervix cancer in Caribbean populations
  - Locally
  - Globally
- Access to treatment
- Vaccine prevention

Cervical cancer mortality



Global incidence and mortality



Endometrial cancers

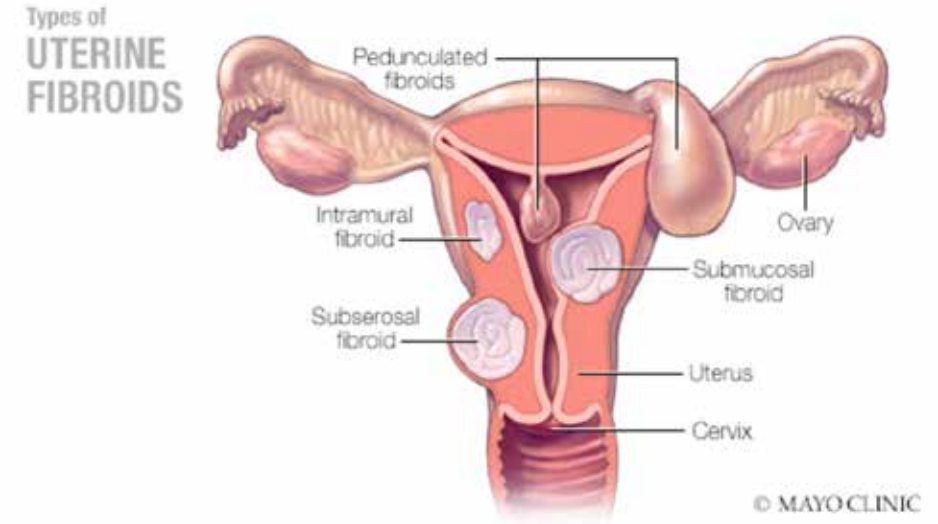
- Rates of screening in global populations
- Screening in Caribbean populations
  - Locally
  - Globally
- Access to treatment

Breast cancer

- Rates of screening in global populations
- Screening in Caribbean populations
  - Locally
  - Globally
- Access to treatment
- Vaccine prevention

Gyn Conditions

- Uterine Fibroids
  - Rates of distribution
    - Global occurrence
  - Disparity in access to care
    - Surgical
    - Non-surgical
    - Health sequelae

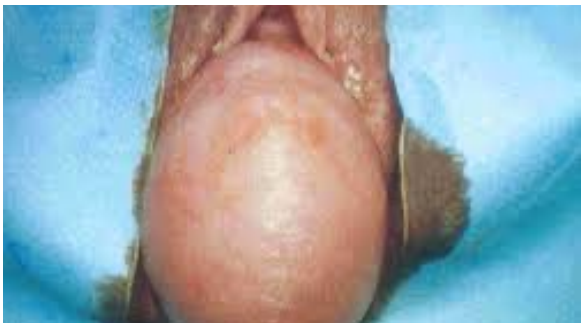


Gynecologic Conditions

- Pelvic Organ Prolapse
  - Diagnosis
  - Treatment
  - Access to care
- Urinary Incontinence
  - Diagnosis
  - Treatment
  - Access to care

Pelvic Organ Prolapse

- Diagnosis



- Treatment
- Occurrence in the Caribbean population
  - Access to care

Urine Incontinence

- Diagnosis
- Treatment
- Occurrence in the Caribbean Population
  - Access to treatment
  - Disparities in care
  - “natural” aging

Women’s Health

- Overall disparities in women’s health care:
  - Heart disease/stroke
    - Lack of diagnosis
    - Access to care
    - Death and disability
  - Other chronic conditions

Summary

- Overall disparities exist in caring for women globally
- Local disparities in the Caribbean population exist
  - Awareness
  - Vigilance
  - Advocacy

Thank you!

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Twitter:
@IMR_MedResponse
@globalgyno

State of the Art: Hand-held Ultrasound & Teleradiology

June 3, 2021

Berndt P Schmit, MD MBOE

Associate Professor of Radiology
Section Chief Emergency Radiology
University of Arizona

Disclosures

- Founder of Humanitarian Radiology Development Corps (501c3)
- Consultant with Radiology Business Solutions
- Co-founder of SonoArmour
- Advisor for VistaScan

- No financial conflicts

Objectives

- Review Hand-held Ultrasound
- Review Teleradiology
- Review Concept for off-site Ultrasound deployment in the Bahamas
- Review CT & MRI systems: unique market opportunity in the USA

Hand-held Ultrasound Equipment

- New Era
  - The new Stethoscope
- Point of Care Ultrasound
- Augmented Physical Exam
- Austere environment
  - Military
  - Disaster events
  - Low-Income regions
  - Isolation
    - Geographic dispersion
    - Maritime & Space

Normal Rockwell

ARTUS

Hand-held Ultrasound Equipment

- Many options
- Improving quality
- Decreasing price

Hand-held Ultrasound Equipment

Butterfly
Apple or Android
$2000 + Subscription

Clarius
Color Doppler
Multiple Probes
Apple or Android
$7-10,000

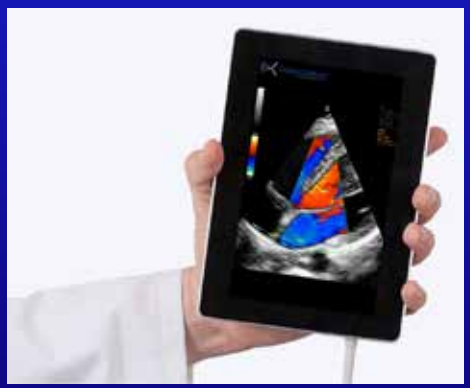
Hand-held Ultrasound Equipment

GE V-scan
2 headed probe
Color Doppler
$15,000

Philips Lumify
3 probes
Color Doppler
$7,777

Hand-held Ultrasound Equipment

SonoQue
Wireless
Apple
Multiple probes
Some have Doppler
$1899 - $5000



SonoScanner (France)
Color Doppler
3 sizes

Hand-held Ultrasound Equipment

VistaScan
Android or PC
Multiple probes
No Doppler
$1995

Teleradiology

- Teleradiology
  - Part of Telemedicine
  - Mature industry in the Developed world
  - Established Regulatory & Billing processes
    - No final reads from outside USA for Medicare
    - Military bases – USA equivalent
- Driver of Teleradiology
  - Specialization
  - Access
  - Time zone diversification for night coverage

Teleradiology

- PACS
  - Picture Archiving Communication System
  - DICOM
  - HIPPA compliance & data security
- Equipment
  - Storage
    - Terabytes of data
    - Cloud vs local storage
  - Hardware
    - Monitors – Diagnostic quality & regulations
    - Agnostic equipment – not a proprietary computer
    - Simplification
      - Web enabled
      - Thin Client
      - Client side rendering

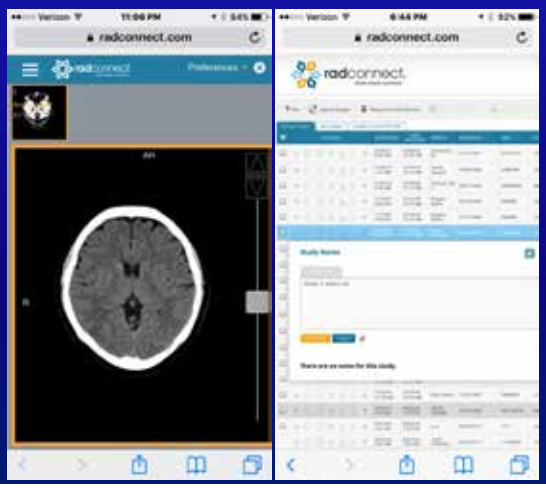
Digital Image Access

Viewing solutions beyond PACS

Smartphone

- Mobile, secure, simple
- Texting - Chat style report
- Scrollable images

Convenience is Key!



Teleradiology

- Data management
  - Client side rendering (average CT scan is 50Mb)
  - Server side rendering
- Data Transmission
  - Cell phone: 5-7 Mbs
  - Cable & Fiber: 1Gb is now residential service
  - Satellite: 512k, very expensive!
  - Need 100Mb service
  - Bottle neck is often the Hospital firewall & hospital network
  - 10 servers to cross the country causes significant latency issues

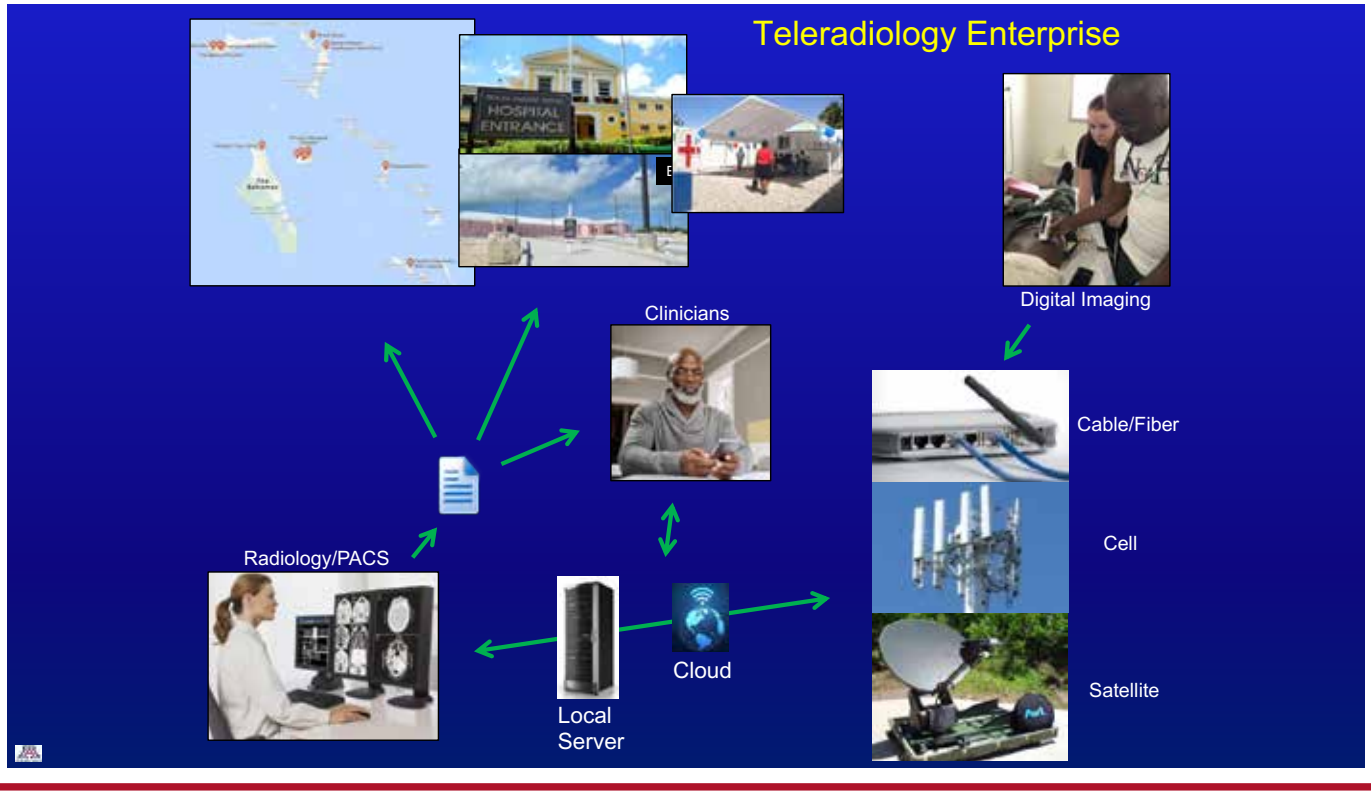
Teleradiology

- Capacity Development in Low Income Countries

  Trying to build independent local radiology

  - Promote local autonomy
    - Consults
    - Teaching
    - Backup – vacation or illness
  - Dis-employment
    - HRD Corps provides no final reads

      We don't want to take someone's job!



Equipment Market Trends - USA

- NEMA rule XR-29:
  - Radiation dose reduction technology for CT scanners
  - Into effect January 2016

The NEMA XR-29 standard (MITA Smart Dose) specifies four attributes of CT scanners that "contribute to or help perform optimization and or management of doses of ionizing radiation while still enabling the system to deliver the diagnostic image quality needed by the physician." CT scanners meeting the XR-29 Standard have the following:

- DICOM-compliant radiation dose structured reporting. See NEMA XR 29-2013 (Standard Attributes on CT Equipment Related to Dose Optimization and Management) and http://dicom.nema.org/.
- Dose check features. See NEMA XR 25-2010 (Computed Tomography Dose Check).
- Automatic exposure control. See NEMA XR-28-2013 (Supplemental Requirements for User Information and System Function Related to Dose in CT).
- Reference adult and pediatric protocols. See NEMA XR-28-2013 (Supplemental Requirements for User Information and System Function Related to Dose in CT).

Equipment Market Trends - USA

- XR-29 impact on CT scanners
  - Upgrade costs about $100,000
  - Many 4, 8, 16 slice helical CT scanners were rendered obsolete in the USA
  - These CT scanners are “Junk priced” (Vendor Communication)
  - Most expensive wear component is the X-ray generating ‘tube’
    - Costs about $60,000

Equipment Market Trends - USA

- MR systems are to be ACR accredited to meet payor requirements
- Many low field MR systems are not being accredited
  - $3000+ per year
  - Multiple Phantoms
  - Multiple exam types

ACR will use phantom images to assess:
- Limiting high-contrast spatial resolution
- Slice thickness accuracy
- Distance measurement and accuracy
- Signal uniformity
- Image ghosting ratio
- Low-contrast detectability
- Slice positioning accuracy
- Image artifacts

Equipment Market Trends - USA

- Unique time in Medical imaging market
- 4-16 slice helical CT scanners and Low field MR systems are being refurbished & sent to L/MIC
- Acquisition cost is minimal
- Real cost for implementing CT or MR:
  - De-installation ($20,000)
  - Refurbishment (0 – $ 60,000)
  - Transport ($20,000)
  - Construction (0 - $60,000)
  - Installation & calibration ($30,000)
  - *Total: $70,000-190,000*

Summary

- Teleradiology is a mature technology
- Hand-held Ultrasound is game changer
- Excellent mid-life CT & MR systems have low acquisition cost due to regulatory changes in the USA

Thank You!

St Francois Hospital, Port au Prince
PACS implementation, Jan 2018

bpschmit12@gmail.com

Implementing Point of Care Ultrasound in an Austere Setting

June 3, 2021

Berndt P Schmit, MD MBOE

Associate Professor of Radiology
Section Chief Emergency Radiology
University of Arizona

Disclosures

- Founder of Humanitarian Radiology Development Corps (501c3)
- Consultant with Radiology Business Solutions
- Co-founder of SonoArmour
- Advisor for VistaScan

- No financial conflicts

Objectives

- Review Ultrasound training in the USA
- Review Ultrasound training in a Low Income Country
- Review Ultrasound training for the Pre-hospital environment

Ultrasound Training

- USA Ultrasound Technologist
  - 2 year dedicated program, after bachelors degree
  - Often need extra-experience before fully comfortable with scanning
- Broad spectrum of exams require broad spectrum of skills
  - Easy Exams: large anatomic stationary structures
    - Gall bladder, kidney
  - Difficult Exams: Small, mobile, distant, vascular
    - Renal Arteries, Fetal

Ultrasound Training

- Partial training
  - The “80-20 rule”
  - 20% of the training allows one to do 80% of the patients
- POCUS (point of care ultrasound)
  - FAST (Focused Assessment with Sonography for Trauma)
  - eFAST (Extended = pleural exam for pneumothorax & effusion)
- Obstetrical
- Cardiac
- Vascular
- New Paradigm
  - Focused training to match clinical needs

GHESKIO Ultrasound Training Program
Port au Prince, Haiti

- Goal: train existing clinical staff to become a basic Ultrasound technologist.
- Episodic Hands-on training with distance learning
- Six 1 week training modules
- Testing
- Independent scanning together

- Selected 2 mid-wives and 1 X-ray Technician
- Commitment to stay at GHESKIO and to train the next cohort
- Began July 2019
- Anticipated completion August 2020

GHESKIO Ultrasound Training Program
Port au Prince, Haiti

- Selecting the students
- Donating the ultrasound equipment

GHESKIO Ultrasound Training Program
Port au Prince, Haiti

- Hands-on training



GHESKIO
Port au Prince, Haiti

- Long-term goal
  - Full radiology department
  - Begin with Ultrasound section

Ultrasound FAST Exam Training Project

Green Valley, Arizona

- Two 45 min training sessions
  - Phase 1: Morrison's Pouch
  - Phase 2: FAST Exam
- Paramedics & Emergency Technicians
- Hand-held ultrasound
- Ultrasound images obtained on volunteers in moving ambulance
- *70% of images were diagnostic*

Abstract presented ARRS April 2021

Ultrasound FAST Exam Training Project

Green Valley, Arizona

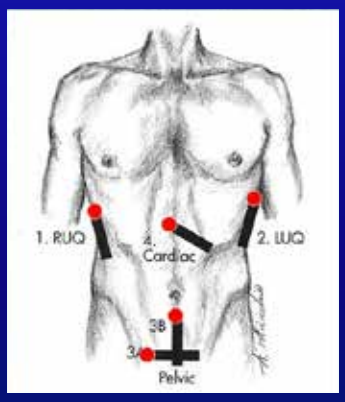
- Two 45 min training sessions
  - Phase 1: Morrison's Pouch
  - Phase 2: FAST Exam
- Paramedics & Emergency Technicians
- Hand-held ultrasound
- Ultrasound images obtained on volunteers in moving ambulance
- *70% of images were diagnostic*

Abstract presented ARRS April 2021

Fire Department Paramedics
Ultrasound FAST exam training project

- FAST: Focused Assessment with Sonography for Trauma

Morrison's Pouch



Green Valley Paramedics

- Phase 1: Morrison's Pouch
  - 30 min lecture and 10 minutes of hands on training of Morrison's pouch
  - Imaged volunteers in the back of a moving ambulance
    - 60 seconds per attempt. 3 attempts each.
    - 71% success

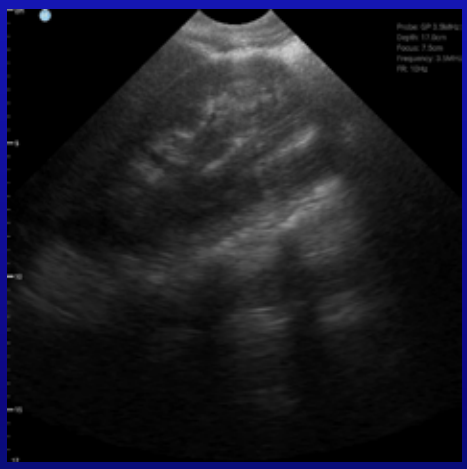
Green Valley Paramedics

- Phase 2: FAST Exam
  - Another 30 min lecture and additional 10 minutes of hands-on training for FAST exam
  - Imaged volunteers in the back of a moving ambulance
    - Average of 43 seconds for each of the 4 images
    - 70% success

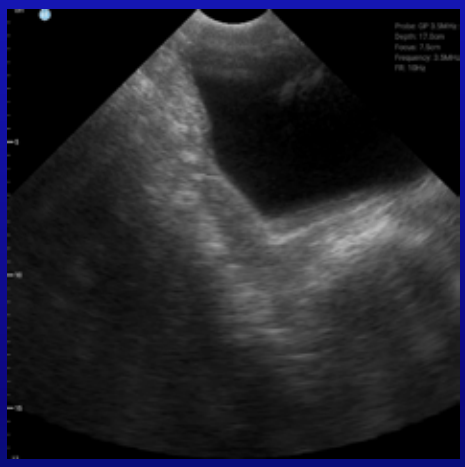
Green Valley Paramedics

Green Valley Paramedics

FAST Images from paramedic exam in Moving Ambulance on volunteer patient



Morrison's Pouch



Bladder

Green Valley Paramedics
Results

- Paramedics were able to generate adequate FAST images 70% of the time in a field setting after brief focused training
- After the Phase 2 lecture, the paramedics were able to correctly identify free fluid on control FAST images 79% of the time
- Post study follow up exam, paramedics were able to correctly identify free fluid on control FAST images 93% of the time

Green Valley Paramedics
Conclusions

- Focused training of novices can lead to adequate ultrasound scanning capability in a field setting
- Seeing images of Normals and Pathology leads to quick recognition capability
- Hands-on training is key to develop scanning skills
- We only used static images
  - Using video clips would increase the visualization success
- Cell phone can text, or email the images
  - Send Video?

Northern Haiti Obstetric Programs
Cap Haitien, 2021

- Partnership between HRD Corps and Konbit Sante
- Two OB Clinics
  - Serving Sante
  - Unite De Lutte Pour La Sante

Summary

- Ultrasound training is a sophisticated skill
- Focused ultrasound training may be appropriate for the austere environment

Thank You!

bpschmit12@gmail.com

Changing Paradigms of Pulmonary Tuberculosis:
A Radiologist's Perspective

Michelle Hershman, MD

Health Disparities Conference 2021

Disclosures

- No relevant disclosures

Goals and Objectives

- Describe the classic radiographic appearances of pulmonary tuberculosis (TB)
- Review the origins of the classing teaching of pulmonary TB
- Differentiate radiographic appearance of TB in immunocompetent vs immunocompromised patient
- Describe the role of CT and future direction of TB treatment in second and third world countries

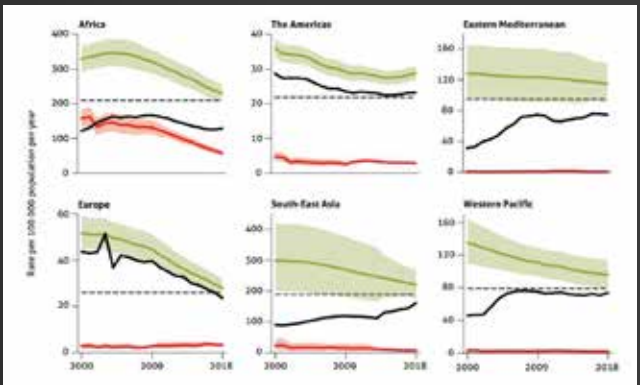
Introduction

- Tuberculosis (TB) is caused by one of several mycobacterial species
  - M. tuberculosis most common, M. bovis, M. africanum, and others
- Airborne mycobacteria transmitted by droplets
  - Suspended in the air for hours after an infected person coughs, speaks, or sneezes

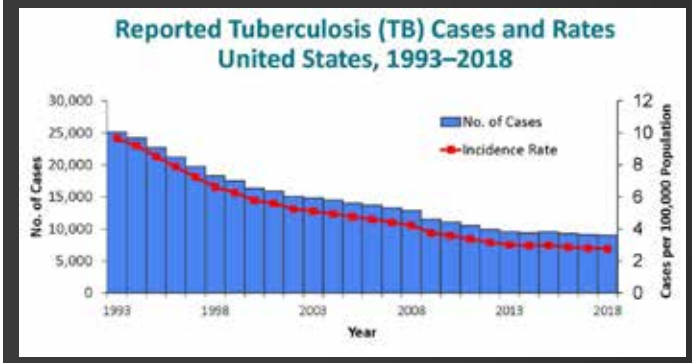
https://www.1stclassmed.com/

Epidemiology

- TB is one of the top 10 causes of death worldwide
- Approximately 25% of the world's population infected



Global tuberculosis report 2019. Geneva: World Health Organization; 2019. License: CC BY-NC-SA 3.0 IGO.



https://www.cdc.gov/tb/publications/factsheets/statistics/tbtrends.htm

Primary vs Post Primary TB - Classic Teaching

Inhaled TB Droplets

5% → **Primary TB**
- Immune system inadequate
- Active TB within 1-2 years

90% → **Latent**
- No symptoms
- Noncontagious
- Negative CXR

5% → **Reactivation TB**
- Immune system effective
- Reactivate at later time

Primary TB- Classic Teaching

- Traditionally considered a disease of childhood
  - Often not suspected in adults → misdiagnosis
- However, 23-34% of adult TB cases are primary in developed countries
- Develops shortly after infection

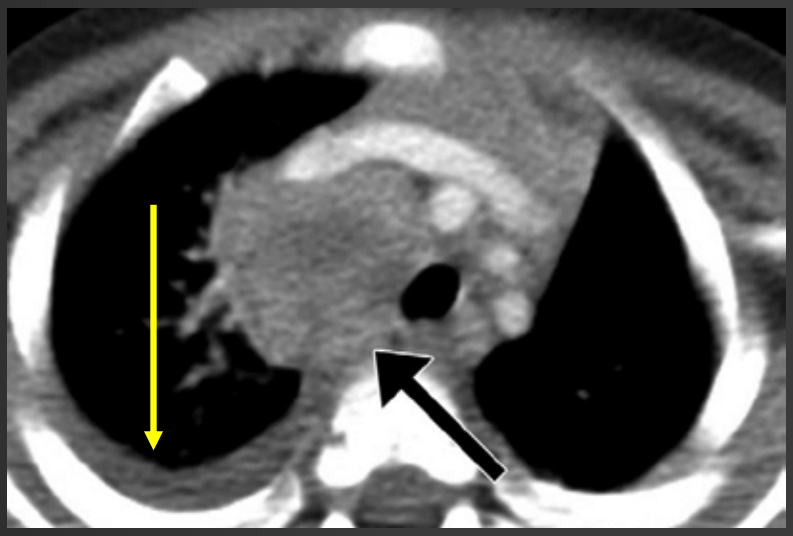
Post Primary TB- Classic Teaching

- Traditionally considered reactivation of latent disease
- Typically in adults
- Develops after long period of latent infection
- Patients in endemic areas more likely to be infected by a second strain of TB rather than reactivation
- Opposite holds true in developed countries

Primary TB- Radiographic Appearance

- Consolidation in any lobe (middle and lower more common)
  - Looks like bacterial pneumonia + LAD
    - No response to conventional abx
- LAD- more common in children
  - 96% children, 43% adults

Primary TB- Lymphadenopathy



Nachiappan et al. RadioGraphics 2017;37:52-72

- Central low attenuation
  - Necrosis
  - Suggests active disease
- Peripheral enhancement
  - Granulomatous inflammatory tissue
- Can be sole feature of TB, particularly in infants and children
- CT more sensitive to detect LAD

“King’s Evil” Scrofula

https://en.wikipedia.org/wiki/Mycobacterial_cervical_lymphadenitis

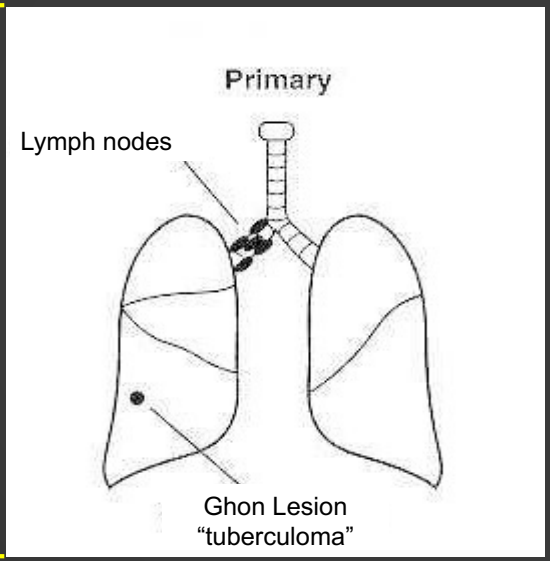
http://broughttolife.sciencemuseum.org.uk/broughttolife/techniques/kingsevil

“Angel” Gold Piece

https://www.bl.uk/collection-items/gold-coin-used-in-the-ceremony-of-touching-for-the-kings-evil

Ghon Lesion and Ranke Complex

Ghon Complex



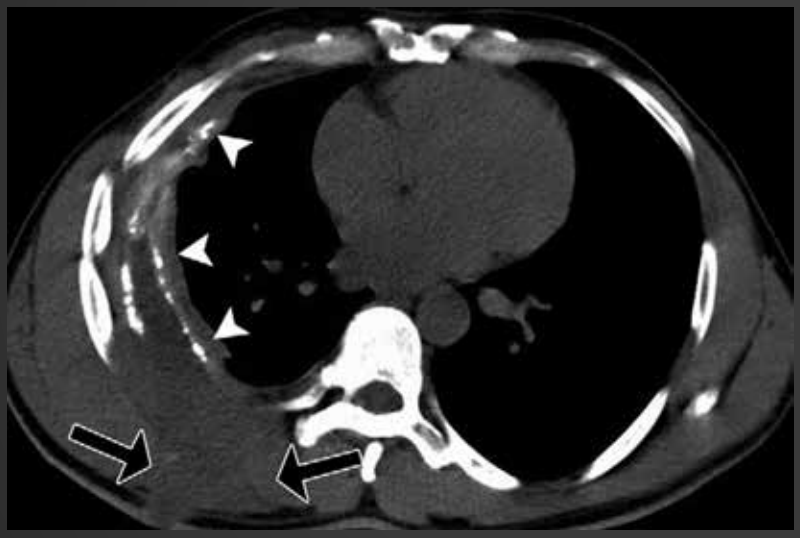
Calcification → Ranke Complex

Adapted from https://myradnotes.wordpress.com/2010/01/12/tuberculosis/

Primary TB- Radiographic Appearance

- If cavitation occurs → "Primary Progressive"
  - 29% in one study
  - Hematogenous spread→ Can be miliary
- Pleural effusions (25% of proven TB cases)
  - Mostly unilateral
  - Rarely complicated
    - Empyema
    - Fistulas
    - Bony erosion

Empyema



Nachiappan et al. RadioGraphics 2017;37:52-72

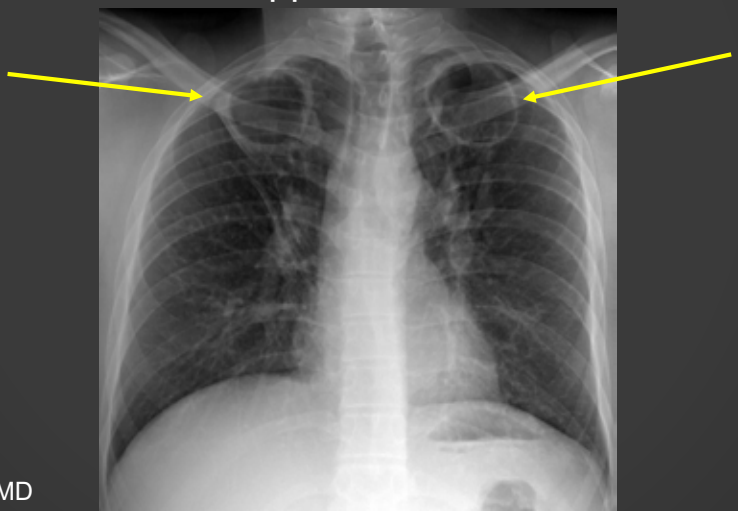
35 y/o male with chronic empyema due to TB infection. Arrows show extension into the chest wall. Arrowheads show marked pleural thickening and calcification.

Post Primary TB- Radiologic Appearance

- Cavities
- Consolidation (upper lobes more common)
  - Upper lobe disease perhaps related to
    - increased oxygen tension
    - reduced lymphatic drainage and vascular perfusion
    - reduced movement of lung apices
- Centrilobular nodules- indicator of active disease (95%)
  - Endobronchial spread

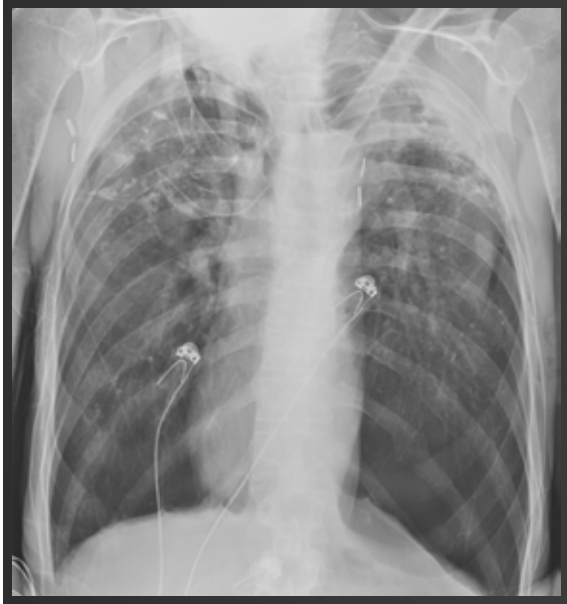
Post Primary TB- Radiographic Appearance

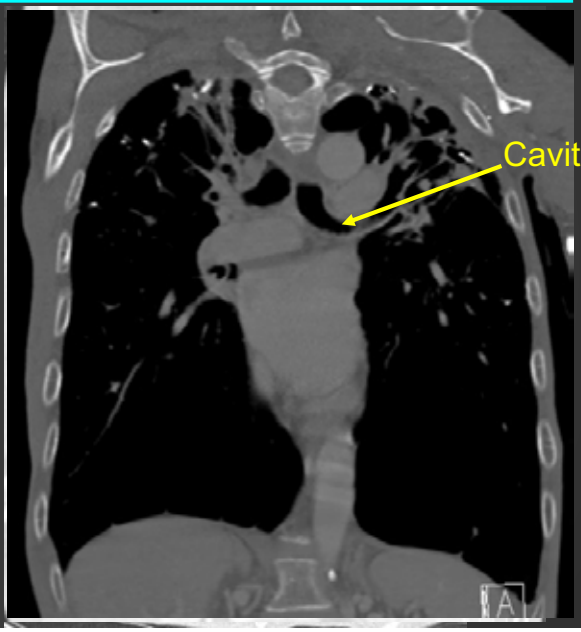
Cavities in
Upper Lobes



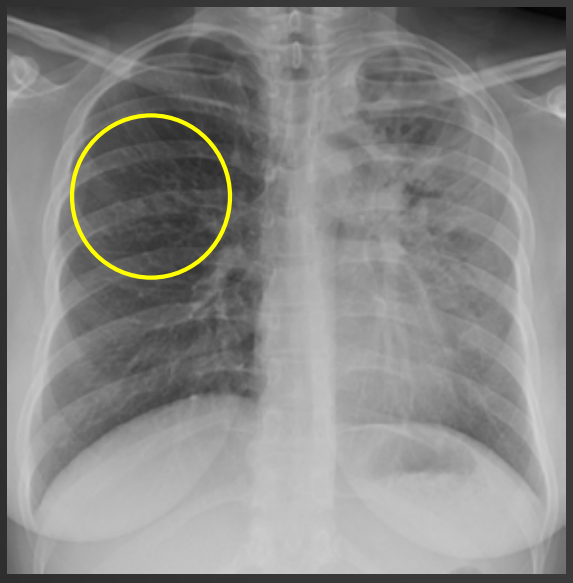
Courtesy of Diana Palacio, MD

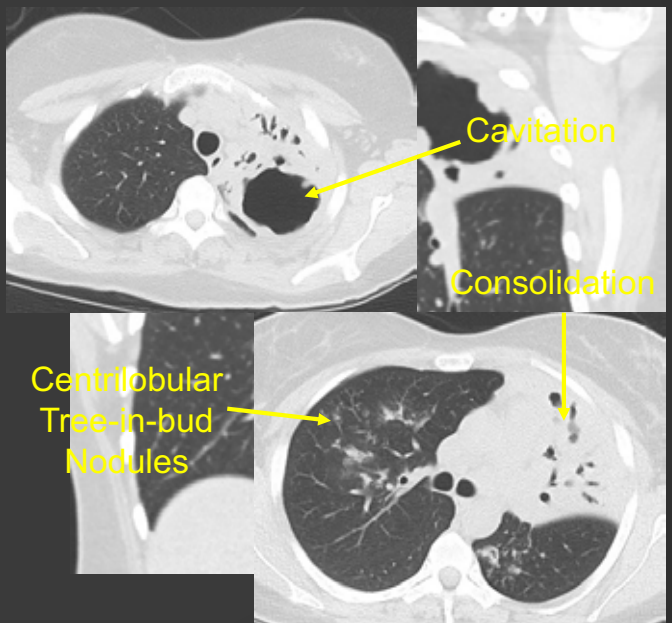
Post Primary TB- Radiographic Appearance



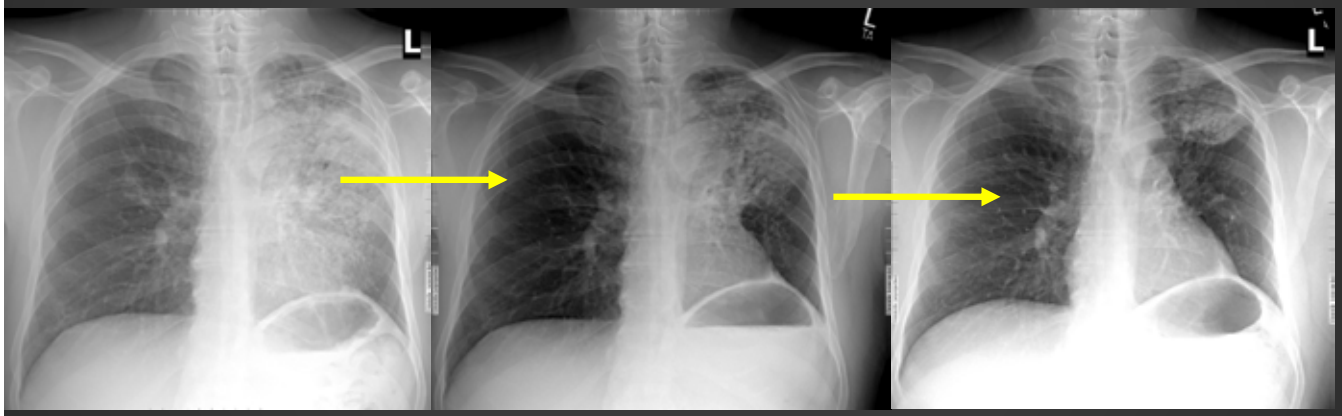


Post Primary TB- Radiographic Appearance



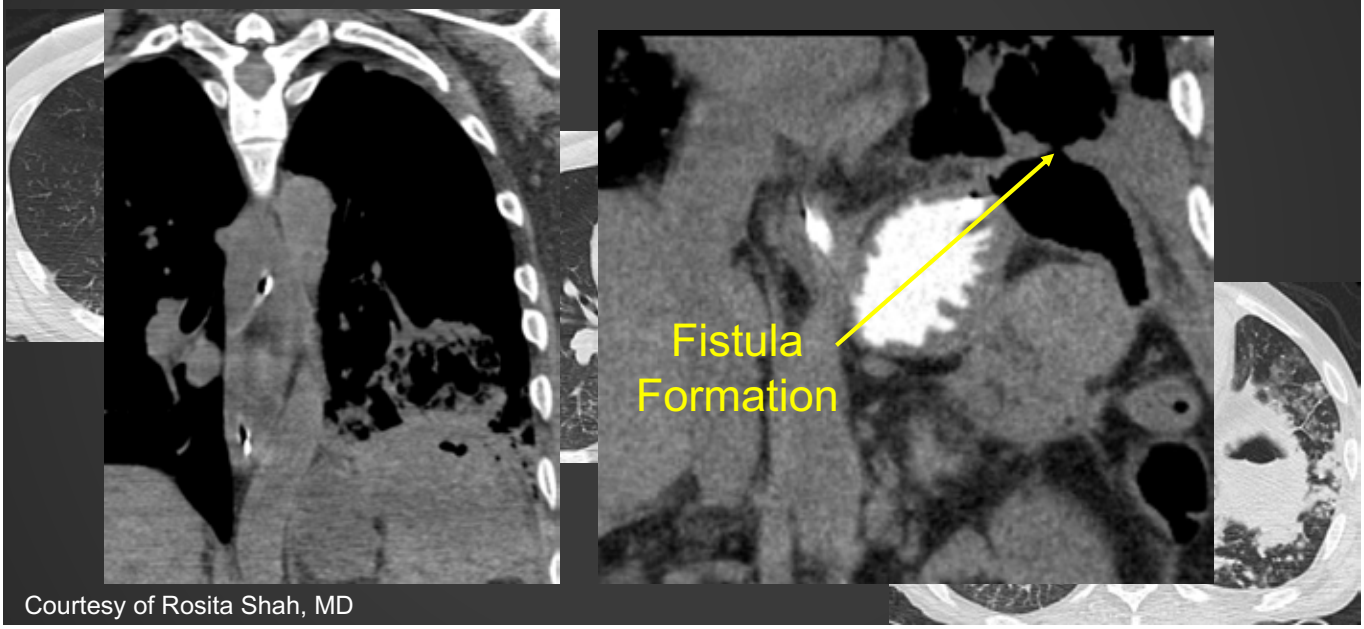


Post Primary TB- Radiographic Appearance



Courtesy of Diana Palacio, MD

Post Primary TB- Radiographic Appearance



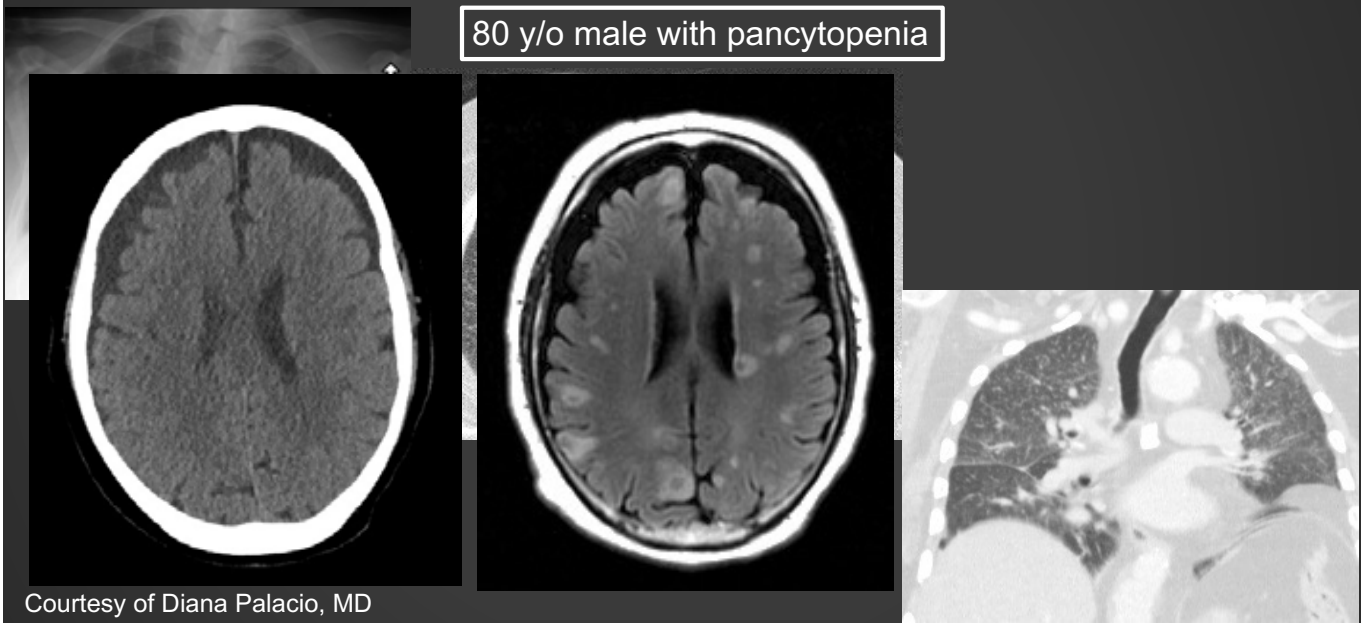
Courtesy of Rosita Shah, MD

Miliary TB- Radiologic Appearance

- Results from hematogenous spread of TB
- Affects 1-7% of infected patients
- Usually in children or immunocompromised patients
- Can be in primary or post primary disease
- 2-3 mm nodules in random distribution
- CT more sensitive than XR

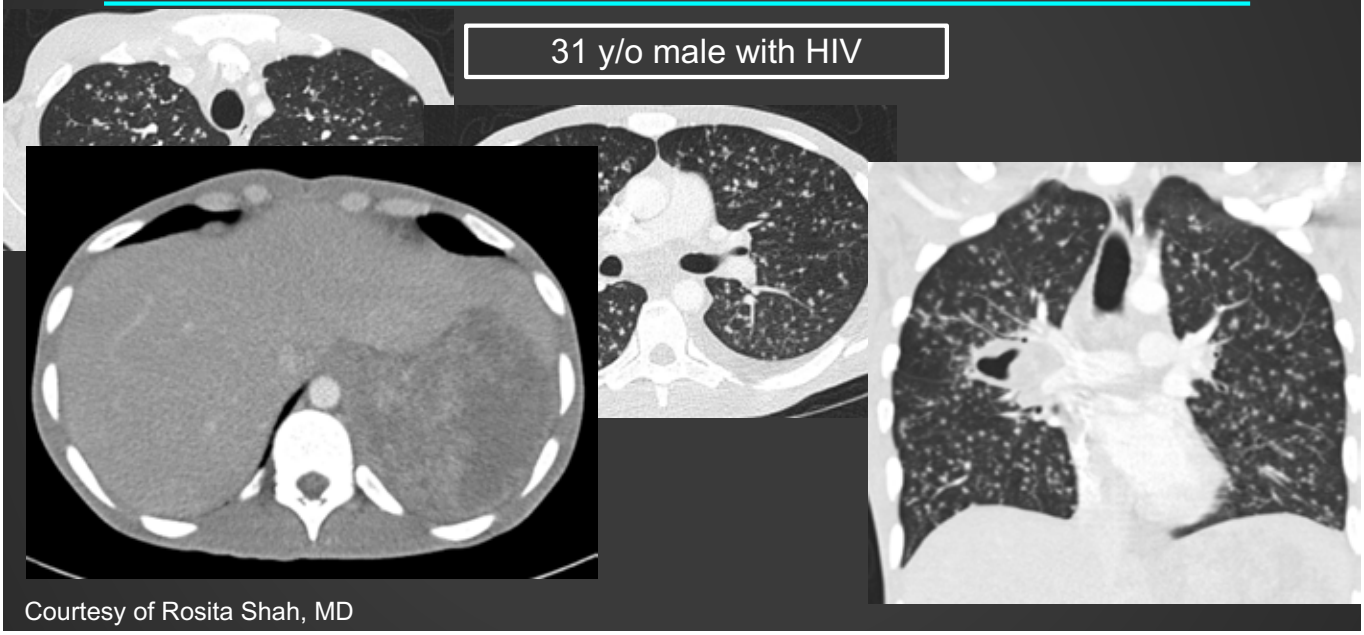
Miliary TB- Radiologic Appearance

80 y/o male with pancytopenia



Courtesy of Diana Palacio, MD

Miliary TB- Radiologic Appearance



Courtesy of Rosita Shah, MD

Classification Paradigms

1. Primary and post primary imaging features often overlap
   - Some say they can look identical!

Looks at historical trajectory of individual patient. Interesting, but probably not relevant because post primary disease in endemic areas are likely NEW infection

Classification Paradigms

2. Active vs inactive or latent disease

Concern is: ARE YOU CONTAGIOUS?
Problem is: Active disease with negative CXR

"Growing" active infection before "bomb goes off" and develop pneumonia and cavitation

Classification Paradigms

3. Immunocompetent vs immunocompromised

Relevant because correlates better with behavior of TB based on what is seen on imaging.

Classification Paradigms

1. Primary and post primary imaging features often overlap
   - Some say they can look identical!

2. Active vs inactive or latent disease

3. Immunocompetent vs immunocompromised

Active vs Inactive TB

Table 3: Imaging Findings of Active Tuberculosis and Previous (Inactive) Tuberculosis

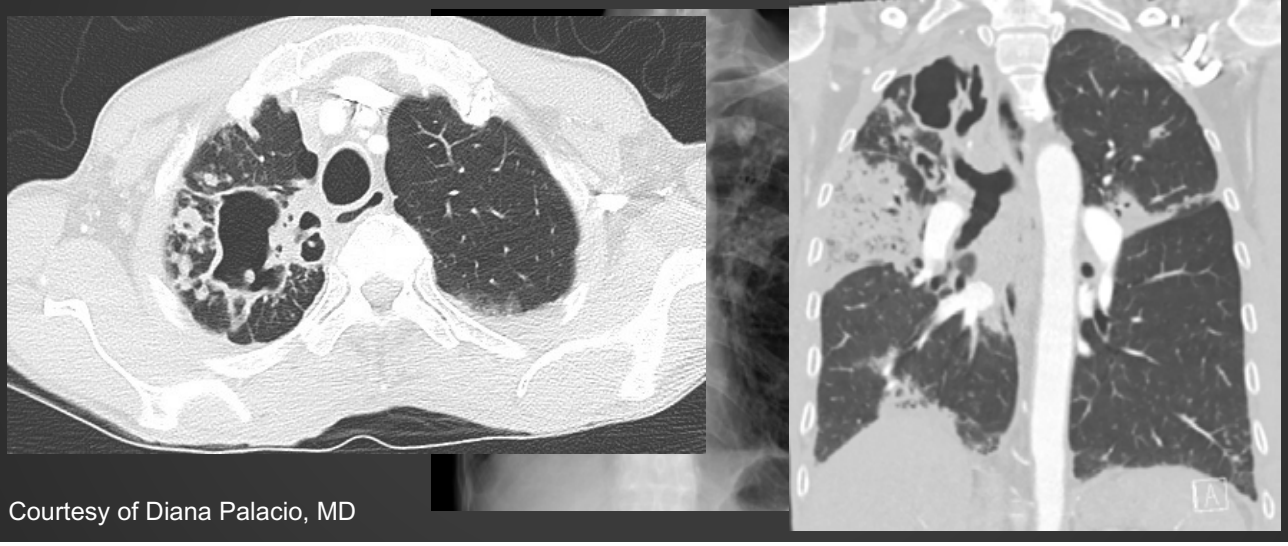
Active tuberculosis
Cavitation
Consolidation
Centrilobular and tree-in-bud nodules
Miliary nodules
Lymphadenopathy
Pleural effusion
Previous (inactive) tuberculosis
Fibronodular scarring*
Peribronchial fibrosis
Well-defined nodular opacities
Traction bronchiectasis
Apical and upper lung zone volume loss
Calcified granulomas or lymph nodes‡

*Findings must be stable for at least 6 months.
‡If calcified granulomas or lymph nodes are the only finding, this finding would be grouped[26] with latent tuberculosis infection.

Nachiappan et al. RadioGraphics 2017;37:52-72

Active TB

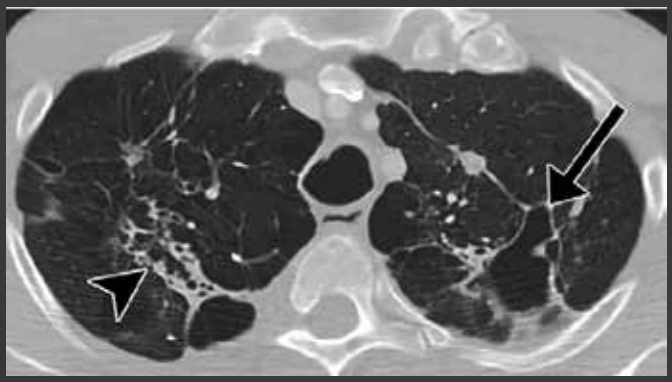
56 y/o male with known TB



Courtesy of Diana Palacio, MD

Latent vs Inactive TB- Radiographic Appearance

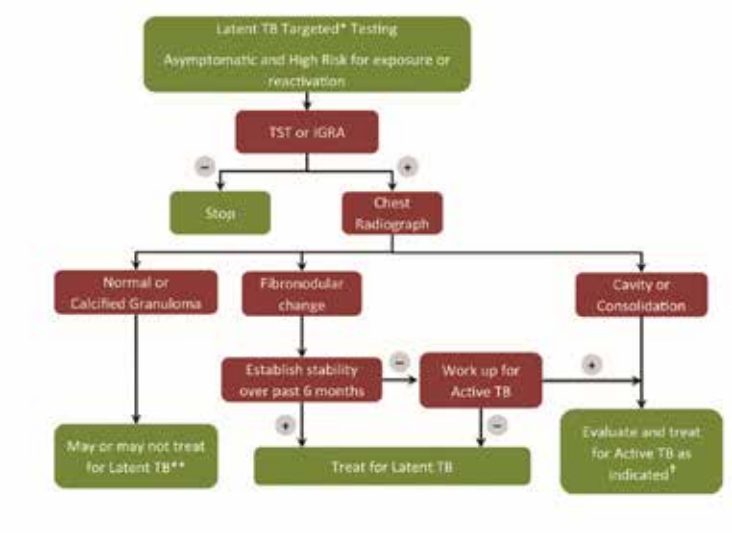
- Latent TB- normal CXR
- Inactive disease- abnormal, but stable CXR findings



46 y/o male with prior TB infection. Arrow points to a cavity and arrowhead points to peribronchial fibrosis and architectural distortion.

Nachiappan et al. RadioGraphics 2017;37:52-72

Latent vs Active TB- Treatment Algorithm



Nachiappan et al. RadioGraphics 2017;37:52-72

Best approach for classification?

- Primary and post primary imaging features often overlap
  - Some say they can look identical!
- Active vs inactive or latent disease?
- Immunocompetent vs immunocompromised?

Dogma Disproved

- Rozenshtein et al. argue that radiographic appearance of TB *does not depend* on time since infection
- Immunocompetent host- upper lobe cavitary disease
- Immunocompromised host- lower lung disease, adenopathy, effusions

Dogma Disproved

- NO DIFFERENCE in radiographic appearances of primary or post primary TB
- Prevalence of TB high throughout history
  - Most people presumably infected in childhood and reactivated later in life
  - If not adherent to classic teaching→ “atypical” disease

Dogma Disproved

- HIV+ patients had “atypical” disease (lower lobe disease and adenopathy)
- Jones et al.- radiographic appearance of TB in HIV+ patients correlated with stage of HIV infection
  - CD4>354 cells/μL → upper lobe disease
  - CD4> 200 cells/μL → pleural effusions
  - CD4< 200 cells/μL → adenopathy
- Post et al.- PPV lower lung disease for CD4<200 cells/μL was 89%

Dogma Disproved

- Molecular epidemiology- powerful new tool using DNA fingerprinting with restriction fragment length polymorphisms in TB strains
- Clustered cases observed in miniepidemics→ primary disease
- Unique cases→ reactivation of latent infection

Dogma Disproved

- Jones et al. and Geng et al.- used molecular techniques to correlate with radiographic findings in patients with primary and reactivation TB and found no difference
  - HIV- group: 86% reactivation (unique isolates) and 80% primary (clustered) cases had upper lobe disease
  - HIV+ group: 63% reactivation and 63% primary disease had atypical pattern

Origins of Classic Teaching

- Frostad et al.(1944) - TB originating in apex of lung was “infrequent occurrence”
  - 52% adult and 82% peds active TB patients had upper lobe disease
- Poulsen (1947) - small sample size, homogeneous population, unusually virulent strain
- Gedde-Dahl (1952) - WWII created multiyear gaps in PPD testing, impoverished and malnourished patients

Origins of Classic Teaching

- Lack of human tissue to validate animal models

- M. tuberculosis an obligate human pathogen
  - Much of current understanding based on studies of M. bovis
  - No evidence that M. bovis produces post primary TB in any species
  - Aggressive primary TB with M. bovis that develops cavities by erosion of caseating granulomas

Origins of Classic Teaching

- M. tuberculosis is most successful when it infects a child, hiding for decades, contagious with no/mild symptoms
  - Sufficient immunity to prevent infection in every other part of body
- MTB protected from macrophages→ forms toxin that causes necrosis and cavitation

Why does it matter?

- Post primary TB - contacts of patient undergo screening for conversion
  - If none→ treatment of index patient prevents spread
- Primary TB - search for source of infection
  - Treatment of index patient insufficient to control spread

Chest Radiography (CXR)

- Chest radiography is mainstay for diagnosis of TB
  - Poor specificity for diagnosis
- Single PA view considered adequate
- Diagnosis of active disease based on stability of pulmonary lesions
- 15% of proven TB cases have normal CXR

Computed Tomography (CT)

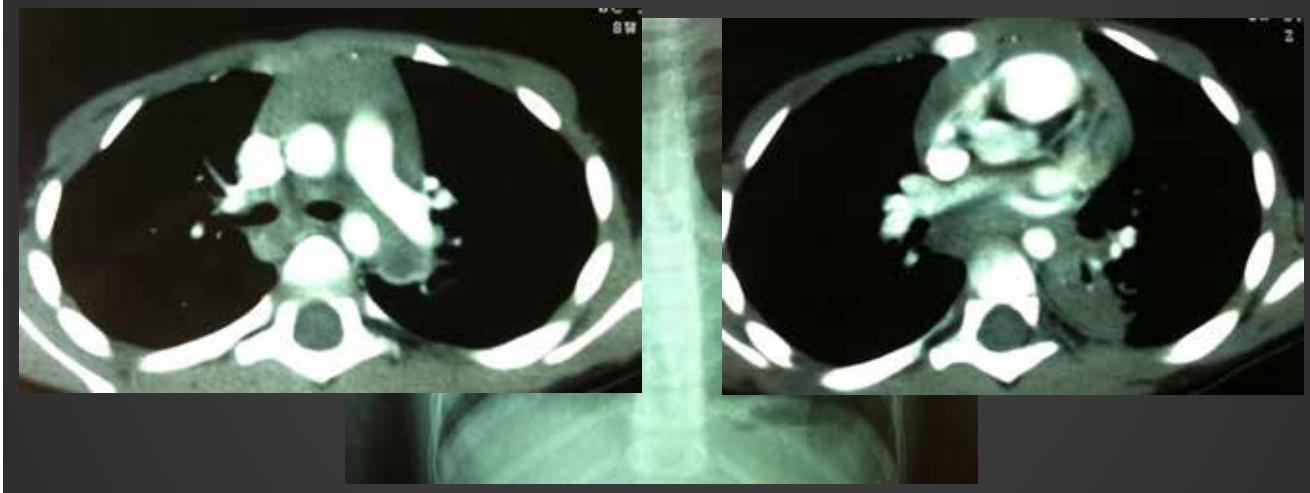
- Computed tomography (CT) 2x sensitive than CXR to detect cavities
- Useful in detection of active vs inactive TB
- Increased sensitivity in detecting miliary TB
- Superior modality to detect airway stenosis (10-40% of reported active TB cases)

Computed Tomography (CT)

- Can correctly diagnose 91% of pulmonary TB cases
- Can correctly diagnose 80% of active TB cases
- Can correctly diagnose 89% of inactive TB cases
- More sensitive in detecting parenchymal disease and adenopathy than CXR

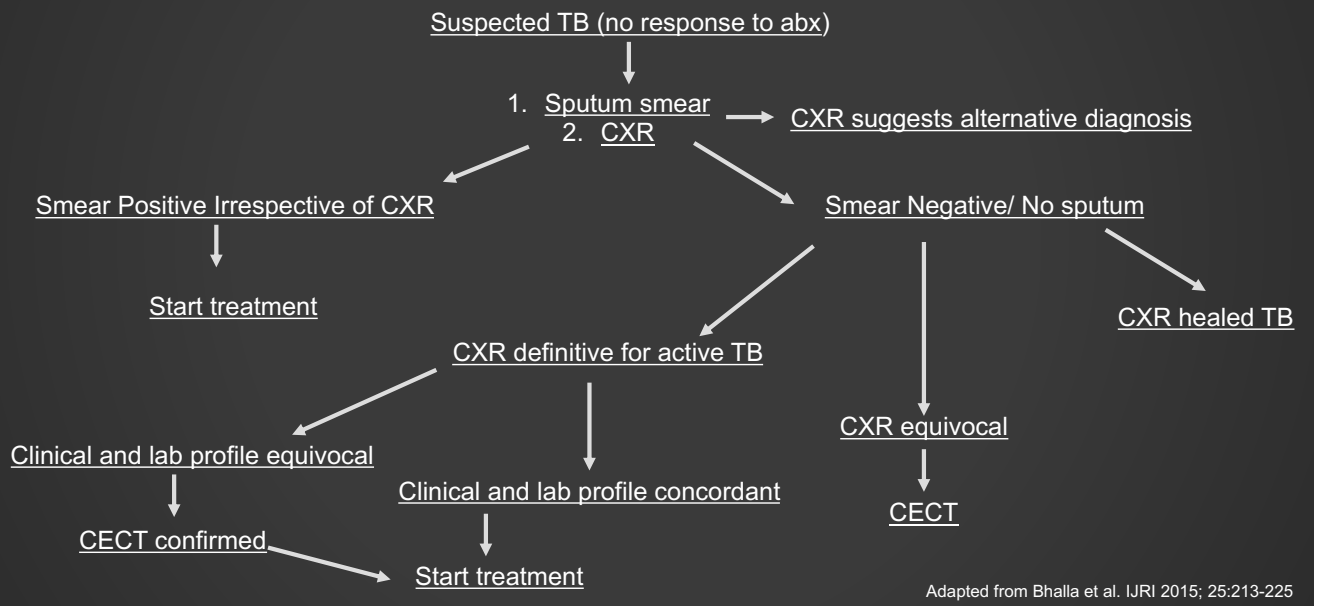
CXR vs CT

Pediatric patient with normal CXR



Garrido et al. Ped Pulm 2012;47:895-902

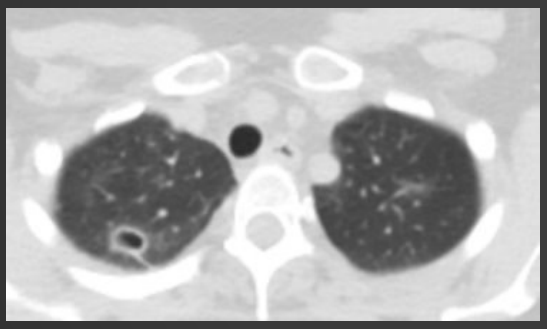
Algorithm for Role of Imaging in TB Diagnosis

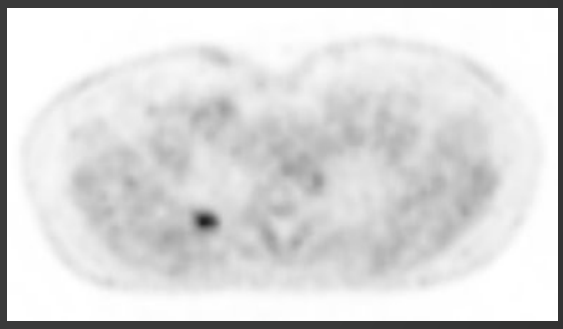


Adapted from Bhalla et al. IJRI 2015; 25:213-225

Other Useful Imaging Modalities- PET/CT

- PET/CT- useful for diagnosis, staging, and assessing response to therapy





Other Useful Imaging Modalities- MRI

- MRI- useful to evaluate mediastinal nodes
  - No ionizing radiation like CT- used for follow up
    - Pleural abnormalities
- Limited by cost and availability

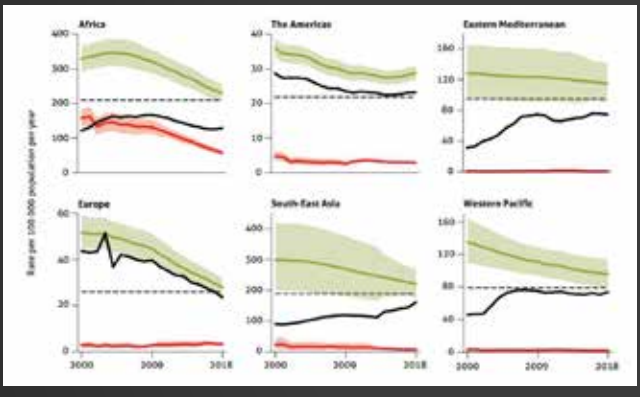
Role of CT- what if limited access/availability?

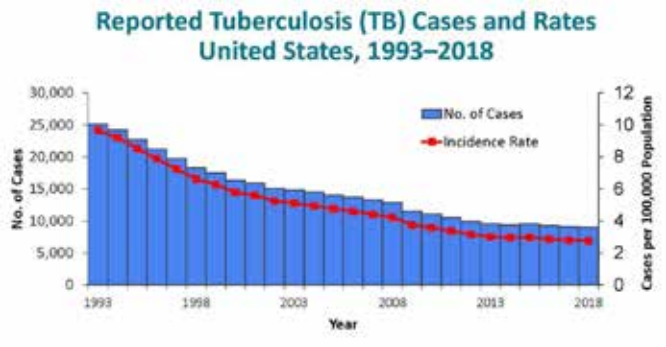
Role of CT- what if limited access/availability?

How can we improve?

Biology	Exposure	"Developing" Viable	Active	Cavity
CXR	Normal	Normal	15% missed	Positive
CECT	Normal	?	Positive	Positive

Good Enough?



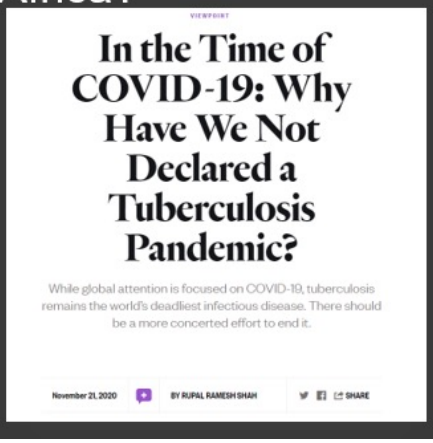


COVID vs TB- highlighting the disparity gap

- 4000 COVID-19 trials vs 1100 TB trials
- TB disproportionately affects Africa, Asia, and Eastern Europe vs US, Canada, UK, Australia
- BCG vaccine reduced cases in developed nations
  - focus shifted to other diseases
  - continued to spread in developing countries

Why haven't we declared a TB pandemic?

- Would the response to TB have been different if the countries heavily affected were in the US and Europe versus those in Africa?



VIEWPOINT

In the Time of COVID-19: Why Have We Not Declared a Tuberculosis Pandemic?

While global attention is focused on COVID-19, tuberculosis remains the world's deadliest infectious disease. There should be a more concerted effort to end it.

November 21, 2020 BY RUPAL RAMESH SHAH SHARE

Conclusions

- Classic paradigms and terminology regarding reactivation and primary TB should be reconsidered
- Role of radiologist may be to determine active vs inactive or latent disease
- TB manifestations are highly dependent on immune status

Conclusions

- CT more sensitive and specific in diagnosis and differentiating between active and inactive disease
  - Are we content with current diagnosis and treatment algorithms?
  - Low dose CT screening program for early detection of TB?
  - How do we narrow the disparity gap?
- May be difficult to acquire CT due to lack of radiology capacity in certain areas of the world
  - Rely more on CXR, sputum, clinical suspicion

Thank You

Contact: Michelle Hershman, MD
Michelle.Hershman@pennmedicine.upenn.edu

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Use of System-Level Improvements for Diabetes Management

Gail Nunlee-Bland, M.D.
Professor, Pediatrics and Medicine
Howard University College of Medicine

Purpose and Objectives

PURPOSE

Improving Diabetes Care and Promoting Health in Populations at Risk.

OBJECTIVES

- Ensure treatment decisions are timely and evidenced based
- Use of the Chronic Care Model for patient centered approach
- Use of team-based care and community involvement
- Assess diabetes health care maintenance using data metrics

FINANCIAL DISCLOSURE

I have no financial disclosures.

Agenda

- Diabetes statistics North America and Caribbean
- Evidence-based treatment guidelines
- Glucose targets for prevention of macro and microvascular disease
- Use of the Chronic Care Model
- Using E-health as a component of the Chronic Care Model
- Patient centric management
- Government's role in diabetes population management

HOSPITAL OVERVIEW

Population

- Predominantly African Americans
  - 54% of District of Columbia residents
- Low income
- Metropolitan Service Area includes
  - District of Columbia
  - Maryland
  - Virginia

HOSPITAL OVERVIEW

MISSION

The mission of Howard University Hospital is to provide exemplary education, service and research that promote patient centered collaborative care and advocate for the elimination of health disparities

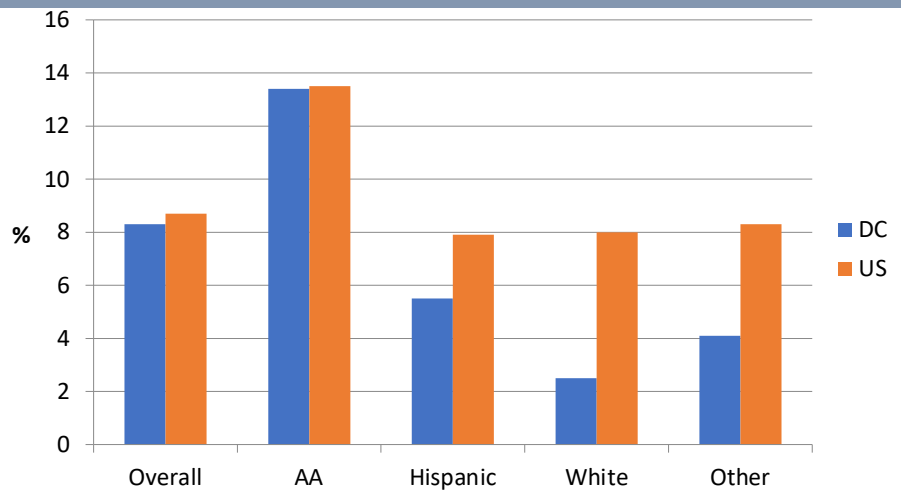
VISION

Leaders in the advance of health care and health equality, locally and globally.

VALUES

C	Collaboration
A	Accountability
R	Respect
E	Excellence
S	Service

Diabetes Prevalence By Race



Source:DC DOH, BRFSS 2010 CDC BRFSS, 2010

INTRODUCTION

INTRODUCTIN

In 2019, IDF estimates that:

1 in 11 adults (20-79 years) have diabetes
463 million people

10% of global health expenditure is spent on diabetes
USD 760 billion

1,110,100 children and adolescents below 20 years have type 1 diabetes.

1 in 2 adults with diabetes are undiagnosed
232 million people

1 in 13 adults (20-79 years) have **impaired glucose tolerance** 374 million people

1 in 6 live births (20 million) are **affected by hyperglycaemia in pregnancy**
84% of which is due to gestational diabetes

Over 3 in 4 people with diabetes live in low- and middle-income countries

1 in 5 people with diabetes are above 65 years old
136 million people

Highlights:

38 million more adults with diabetes than in 2017

13 million more adults above 65 years old with diabetes than in 2017

3,600 more children and adolescents have type 1 diabetes than in 2017

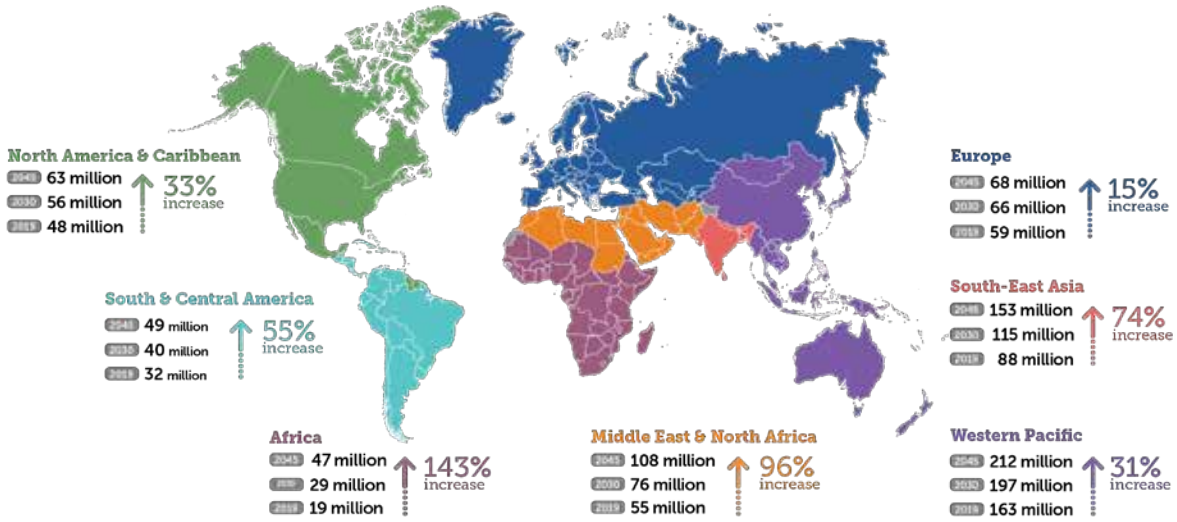
22 million more adults are at risk of developing diabetes than in 2017

Almost two-thirds (63%) of people with diabetes are of working age (under 60 years)

USD 33 billion more is spent on diabetes than in 2017

20 million more adults with diabetes are undiagnosed than in 2017

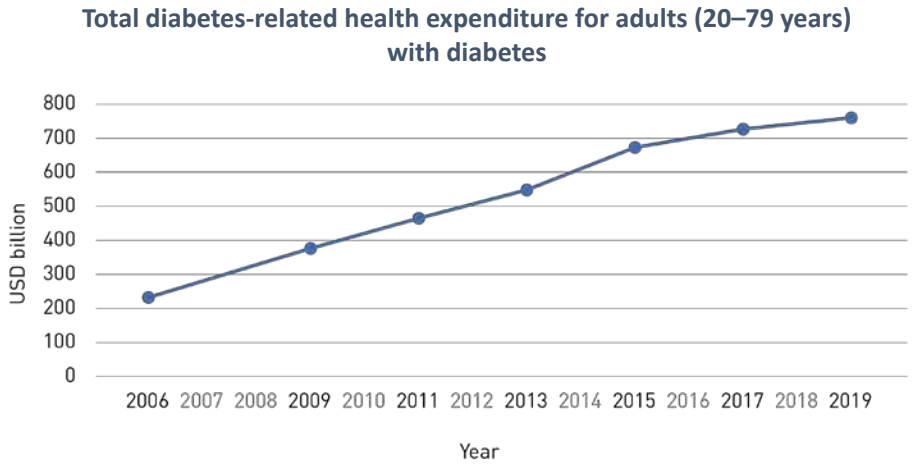
Number of people (20-79 years) with diabetes globally and by IDF Region



North American and Caribbean Key Country Data

IDF Diabetes Atlas 9th edition 2019

HEALTH EXPENDITURE



ADA-Recommended Glucose Goals

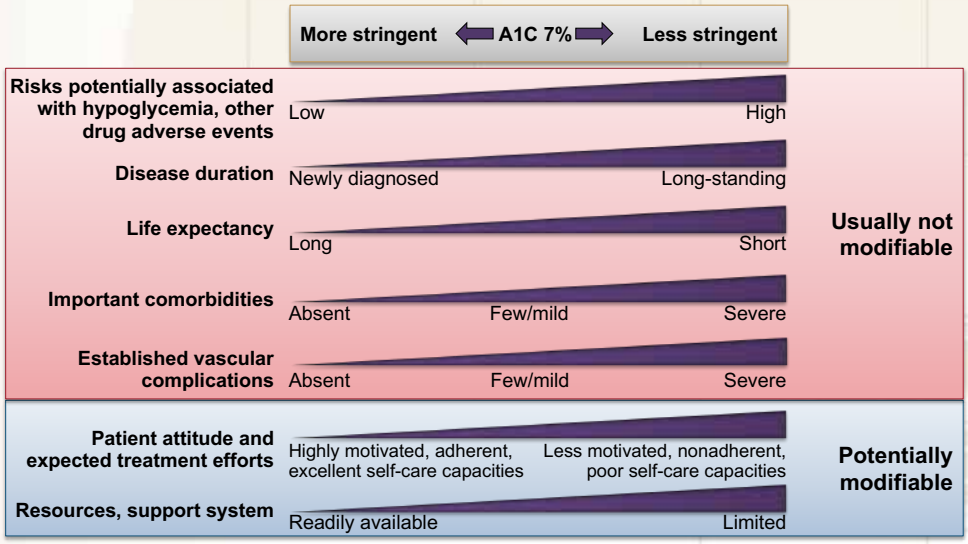
Parameter	Treatment Goal for Nonpregnant Adults
A1C (%)	Individualize • <7.0% for most nonpregnant adults • <6.5 if it can be achieved without significant hypoglycemia or other adverse effects of treatment* • <8% for those at risk†
Preprandial glucose (mg/dL)	80-130
Peak postprandial glucose (mg/dL)	<180

*Appropriate patients
- Short duration of diabetes
- T2D treated only with lifestyle or metformin
- Long life expectancy
- No significant cardiovascular disease

†At risk patients
- History of severe hypoglycemia
- Limited life expectancy
- Advanced micro- or macrovascular complications
- Extensive comorbid conditions
- Long-standing T2D in which A1C goal has been difficult to attain despite intensive efforts

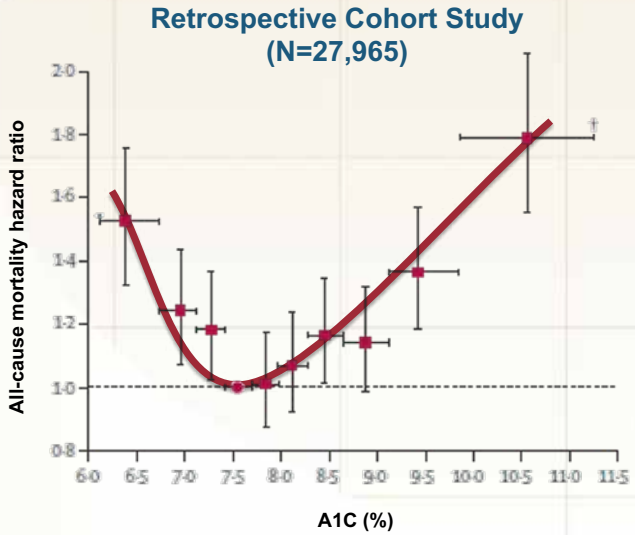
ADA. *Diabetes Care*. 2018;41:S55-S64.

ADA-Recommended Approach to Management of Hyperglycemia



ADA. *Diabetes Care*. 2018;41:S55-S64.

A1C and Mortality in Clinical Practice



Currie CJ, et al. *Lancet*. 2010;375:481-489.

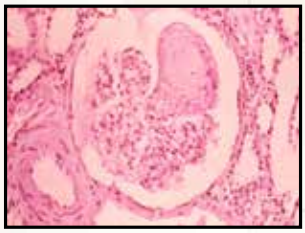
Macrovascular Benefits of Glycemic Control Depend on Duration of Diabetes

VADT, Veterans Affairs Diabetes Trial.

Duckworth WC, et al. *J Diabetes Complications*. 2011;25:355-361.

Microvascular Complications of Diabetes

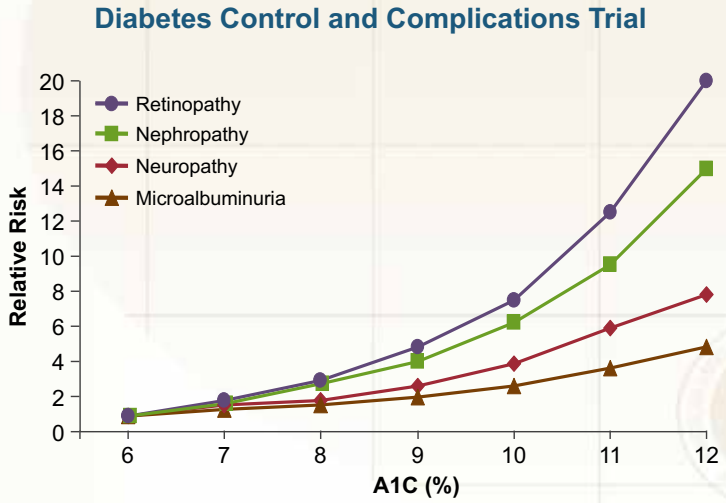
Nephropathy



Retinopathy

Neuropathy

Microvascular Complications Increase With Increasing A1C



Skyler JS. *Endocrinol Metab Clin North Am.* 1996;25:243-254.

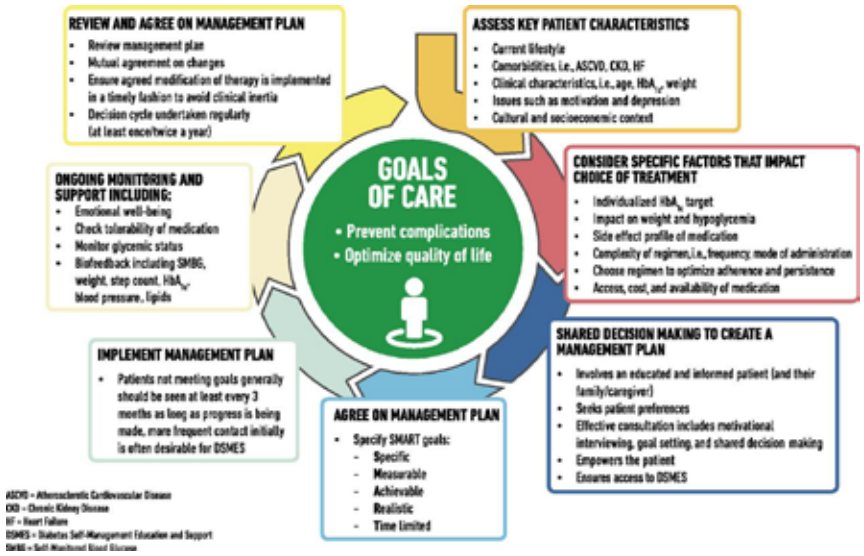
17

Chronic Care Model

- Delivery System – Team-based approach
- Self-management support
- Decision support – evidence based
- Clinical information systems – registries for patient specific and population-based
- Health systems –quality-oriented culture

18

Decision cycle for patient-centered glycemic management in type 2 diabetes.



American Diabetes Association Dia Care 2019;42:S34-S45

American Diabetes Association.

eHealth Enhanced Chronic Care Model

Community resources

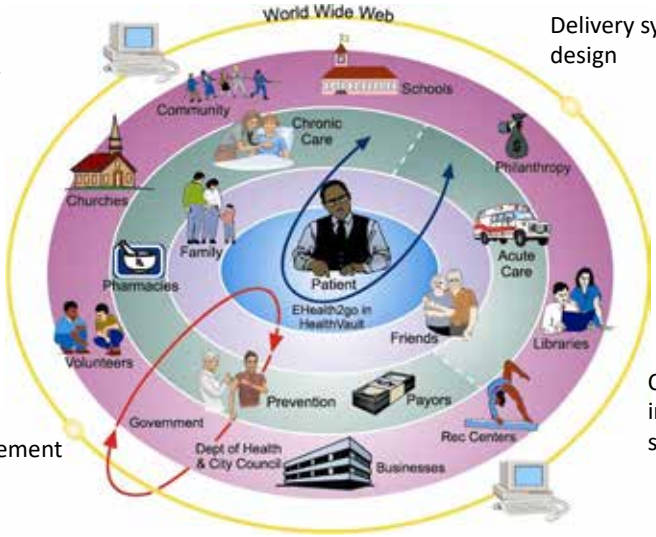
Health system support

Self-management support

Delivery system design

Decision support

Clinical information systems



eHealth for Chronic Illness

- Institute of Medicine, Agency for Healthcare Research and Quality recommend eHealth as a tool to support self-management in chronic illness
- eHealth technology should have a complete feedback loop of 5 stages
  - Transmission of data and information regarding the health status of the consumer
  - Interpretation of data and information using previously established knowledge and use of evidence- based standards
  - Address the specific need of the individual consumer
  - Timely feed back to the consumer addressing their requirements
  - Regular repetition of the feedback loop

Components of eHealth to Support Chronic Care Model

- Information technology
  - Internet for health information
- Social Networking
- Telehealth
- mHealth (including wearable devices)
- Electronic health records
- Personal health records

Internet for Self-Management Support

- Connecting providers and consumers to secure portals, health applications, social networks, and large databases

Social Networking

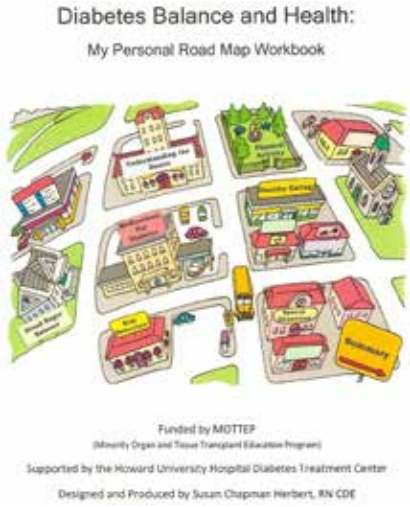
- Diabetes online community
- Virtual community
- May encourage consumer empowerment for improved patient-centered care

Telehealth

- Effective in the management of diabetes
- Nurse-led, multi-disciplinary telehealth interventions were effective in improving A1c outcomes
- Telehealth nurse coaching produced higher self-efficacy scores

Video eLearning

Diabetes Workbook



Telehealth Study Summary

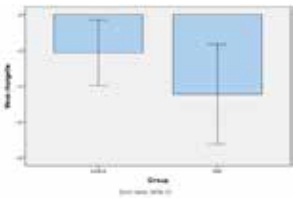
- Treatment group reported increased knowledge of diabetes and improved adherence
- Behavior change in better self-management
- More likely to reach a healthy BMI
- More likely to reach and A1c of < 7

PHR Adult Patient Characteristics

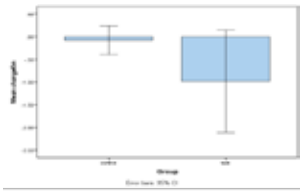
	PHR n=118 Non PHR n=66	Mean	Std. Dev
Age*	Yes	49.84	17.35
	No	59.15	15.2
BMI	Yes	31.43	8.11
	No	32.19	8.88
Pre A1c PHR	Yes	9.22	2.77
	No	9.25	2.78
Post A1cPHR	Yes	8.29	2.12
	No	8.55	2.45
A1c % Change*	Yes	-7.51	16.4
	No	-3.11	27.17
*significance Age ($p<0.0001$) and Δ in A1c in PHR group ($p<0.003$)			

Patient Web Portal

3-month A1c

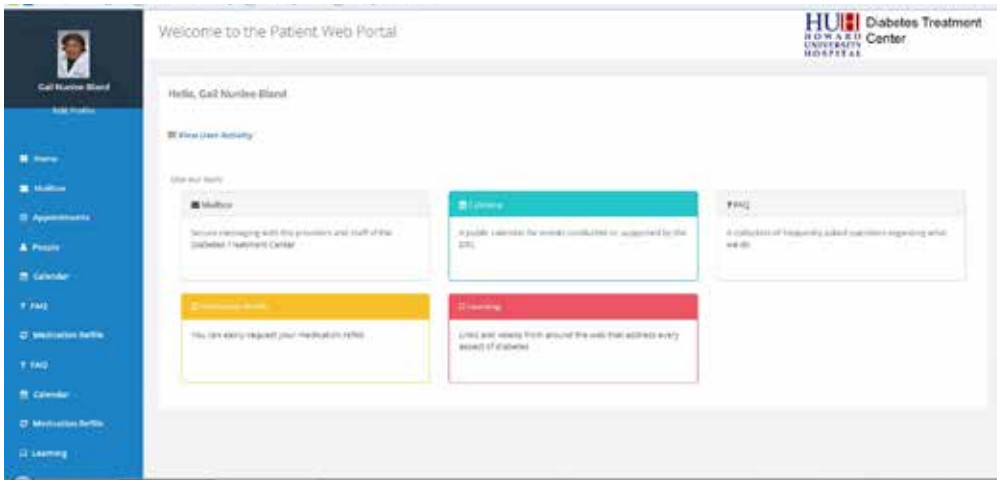


6-month A1c



Patient Demographics		
	Test group	Control group
Number (n)	165	202
Age (yrs)	54.3 +/- 14.14	60.27 +/- 12.96
Female (%)	66.1	64.9
Male (%)	33.9	35.1

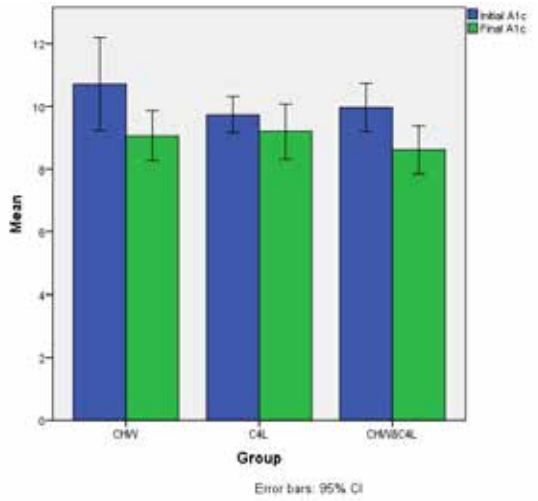
"This project has been funded in whole or in part with Federal funds (1G08LM011545-01) from the National Institute of Health National Library of Medicine. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health."



Community Health Workers & Cell Phone Intervention

- Specific Aim – To compare the effectiveness of A1c reduction using cell phone text reminders, CHWs and the combination of both in a Medicaid population
- Methods
  - 18-70 years
  - A1c >8%
  - Randomly assigned to cell phone, CHW, cell phone plus CHW
  - Medicaid or Medicare
  - Baseline, 3-month, 6-month A1cs obtained

Community Health Workers & Cell Phone Intervention



N= 20 CHW

N=19 cell phone

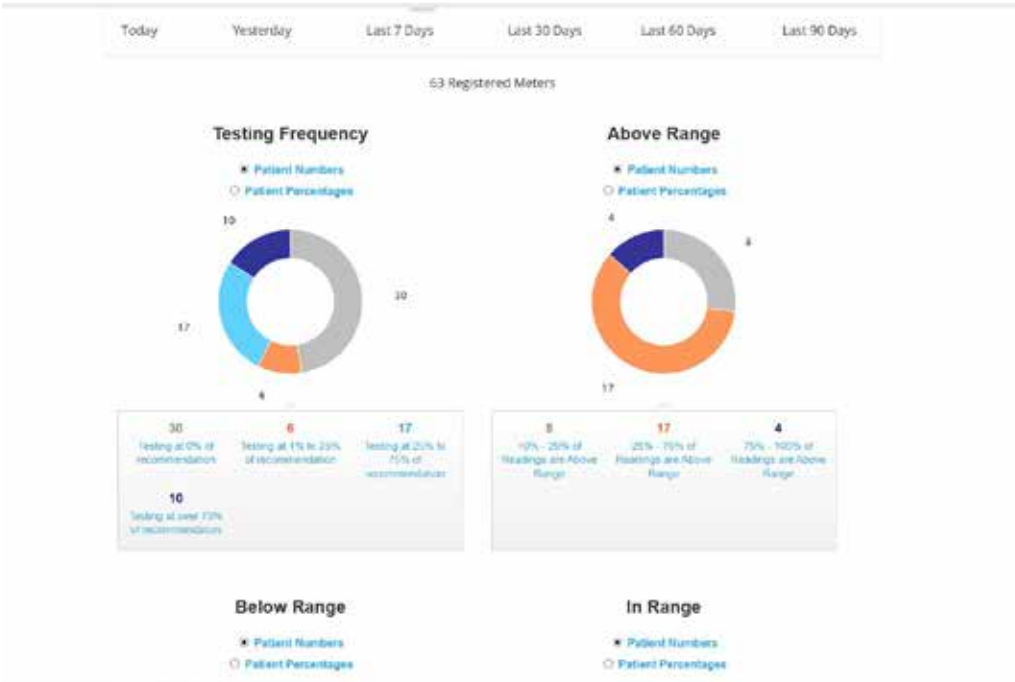
N= 24 CHW + cell phone

Outcomes

- Reduced hemoglobin A1C
- Reduced blood pressure
- Reduced cholesterol
- Fewer ER visits
- Fewer hospital readmissions
- Among an economically disadvantaged population with limited access to care where the differences in diabetes care are most dramatic

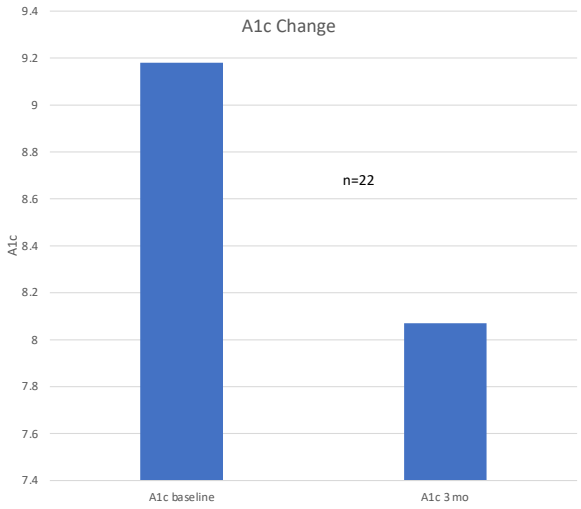
Cellular Enabled Glucometers

- Allow for real-time blood glucose result transmission
- Transmits to a physician dashboard
- Allows for implementing management changes between visits.



Results of Pilot Study Using Cellular Enabled Glucometers

- A1c change



Patient success story

I.S hemoglobin A1C trend

- Enrolled in the pilot study on 7/30/2018
- Completed pilot study on 10/30/2018
- Back on iGlucose in April 2019

	9/22/09	04/06/10	12/09/10	02/13/18	08/08/18	10/24/18	04/17/19	06/27/19
HbA1c (%)	11.5	12.4	9.4	9.3	11.7	5.9	10.5	7.5

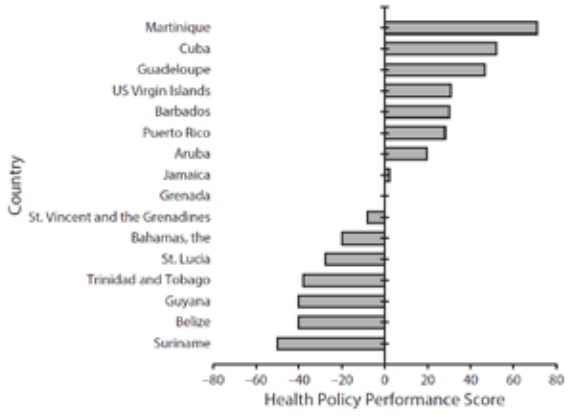
Patient Engagement Using Technology

- Self-management is key in successful diabetes control
- Traditional behavioral methods have shown efficacy, but require significant resources and patient commitment, limiting accessibility to large populations
- Mobile phone technologies have emerged as promising for patient engagement

World Health Organization Essential Diabetes Medication

- Intermediate-acting insulin
- Short-acting insulin
- Sulfonylurea
- Metformin
- Glucagon

Health Policy Performance Score by Country, 2010-2015



Am J Public Health. 2019;109:626-632

Summary –Government's Role in System Level Improvement for Diabetes Management

- Prioritize diabetes care and control
- Develop and implement national plans and strategies to reduce the impact of diabetes
- Extend health promotion programs to reduce the impact of diabetes and its complications
- Promote high-quality research on diabetes

Contact Information

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University of the West Indies

Reducing the Burden of Prostate Cancer in the Bahamas

Dr. Robin Roberts MD

UWI School of Clinical Medicine & Research, The Bahamas

Purpose and Objectives

PURPOSE

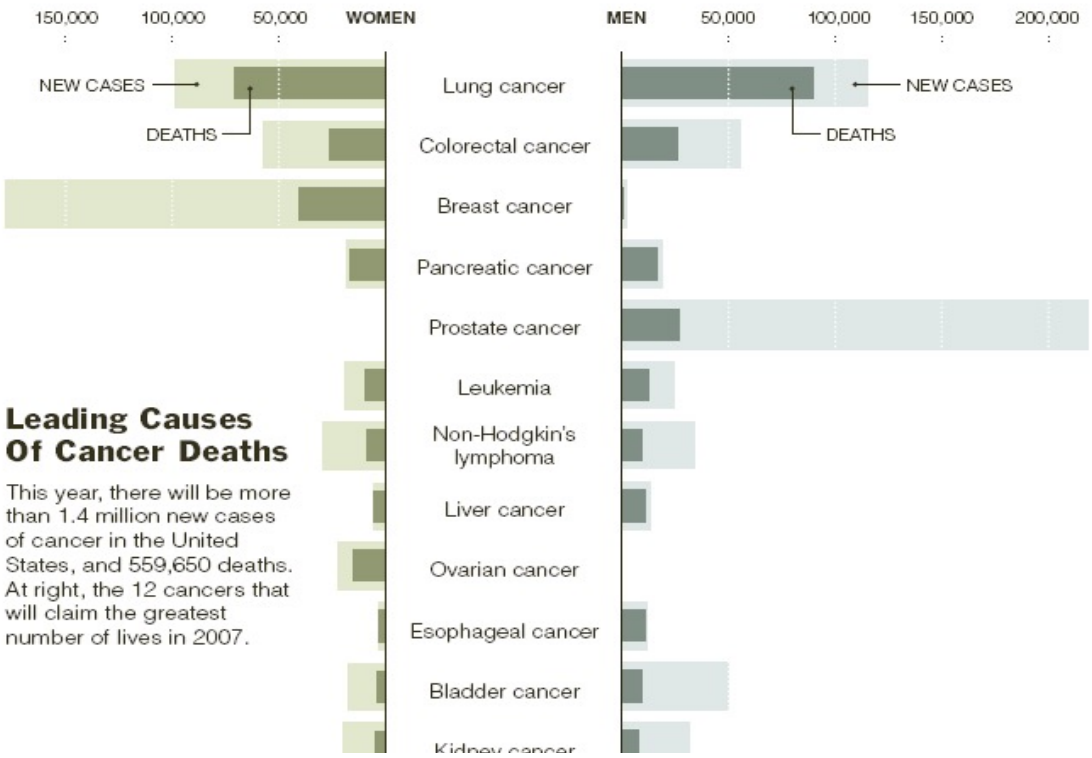
To highlight the burden of Prostate cancer in The Bahamas and the means to reduce it.

OBJECTIVES

- To highlight the epidemiology and financial impact of prostate cancer in the Bahamas
- To propose a community-based screening program to reduce the burden of prostate cancer in the Bahamas

FINANCIAL DISCLOSURE

There are no financial disclosures.

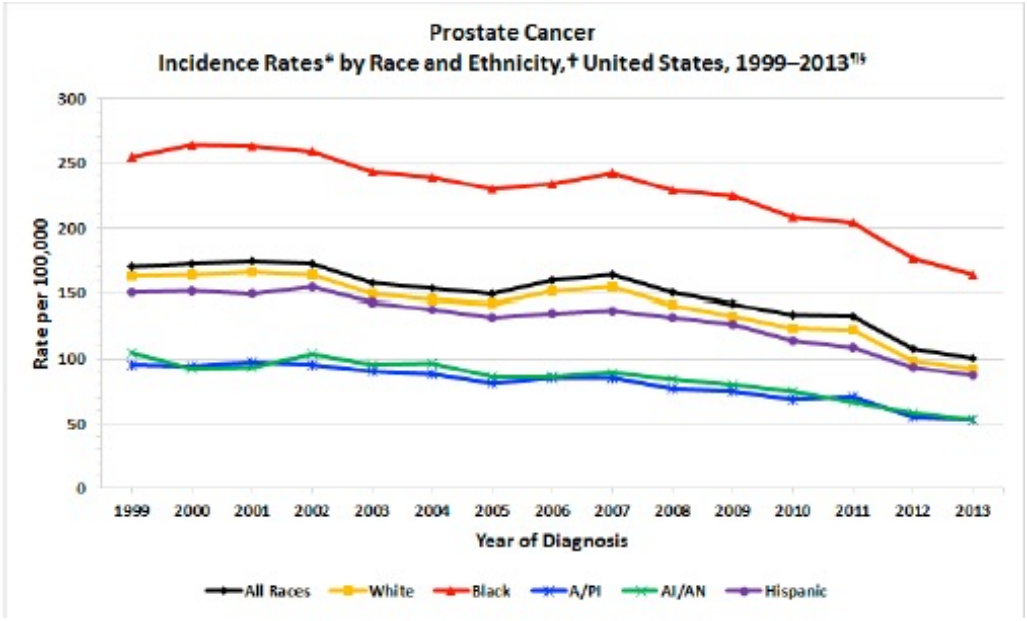


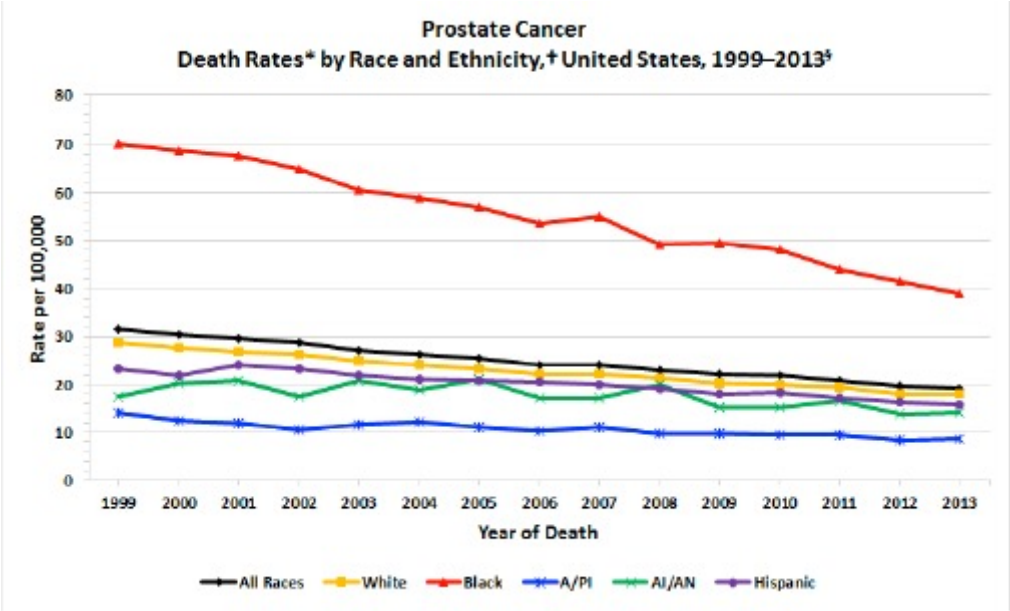
Leading Causes Of Cancer Deaths

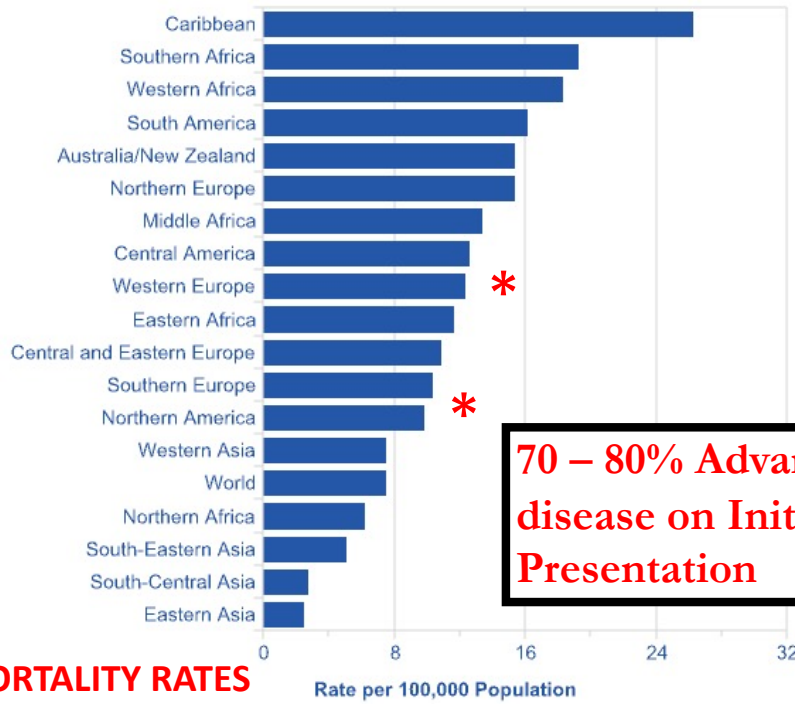
This year, there will be more than 1.4 million new cases of cancer in the United States, and 559,650 deaths. At right, the 12 cancers that will claim the greatest number of lives in 2007.

BLACK MEN

- **MORE AGGRESSIVE**
- **EARLIER AGE**
- **HIGHER PSA**
- **LESS LIKLEY SCREEN**
- **NEVER SCREEN**
- **MORE OBESE**


Prostate Cancer
Incidence Rates* by Race and Ethnicity,† United States, 1999–2013¶§
Rate per 100,000
300
250
200
150
100
50
0
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
Year of Diagnosis
All Races
White
Black
A/PI
AI/AN
Hispanic

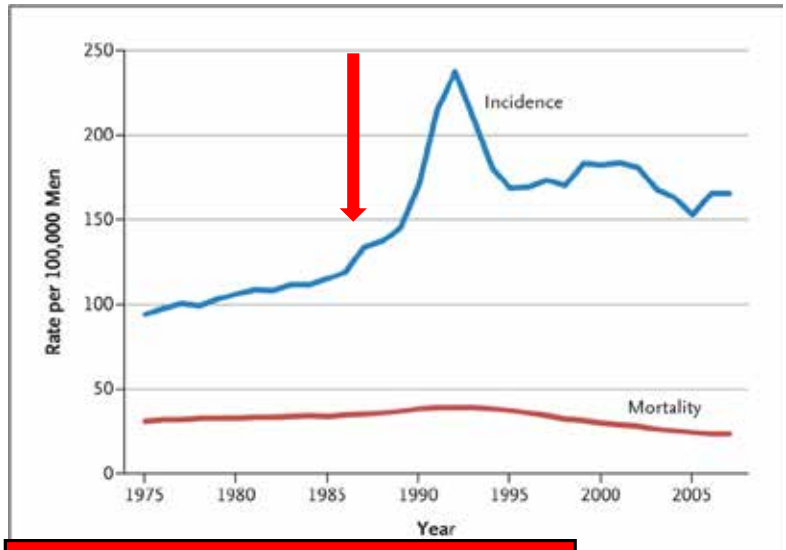

Prostate Cancer
Death Rates* by Race and Ethnicity,† United States, 1999–2013§
Rate per 100,000
80
70
60
50
40
30
20
10
0
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
Year of Death
All Races
White
Black
A/PI
AI/AN
Hispanic



MORTALITY RATES

70 – 80% Advanced disease on Initial Presentation

Age-Adjusted Incidence of and Mortality from Prostate Cancer in the United States, 1975–2007.

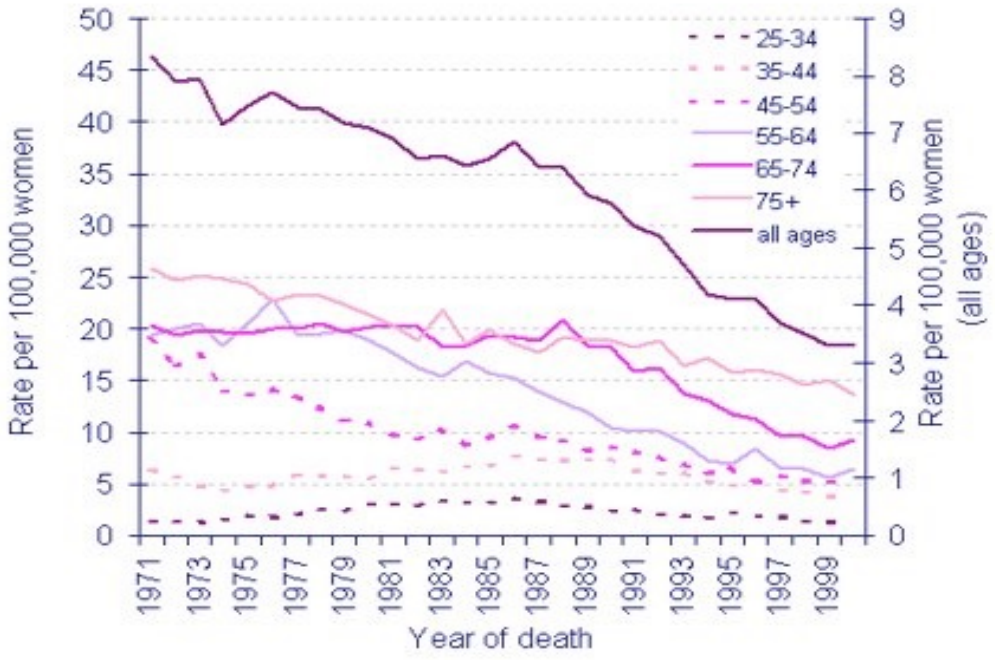


THE PSA STORY

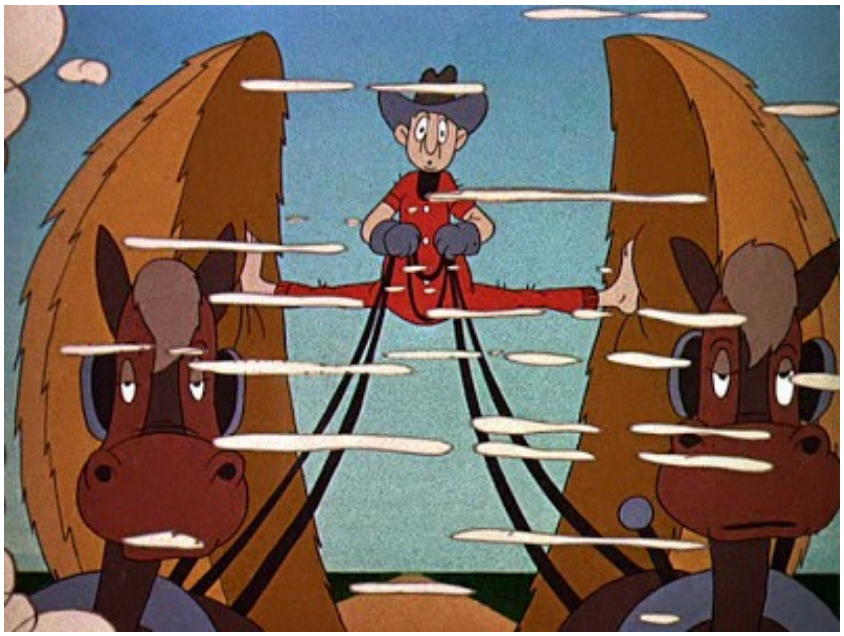
Hoffman RM. N Engl J Med 2011. DOI: 10.1056/NEJMcp1103642

The New England Journal of Medicine

Figure 3.4: Cervical cancer mortality, England and Wales, 1971-2000

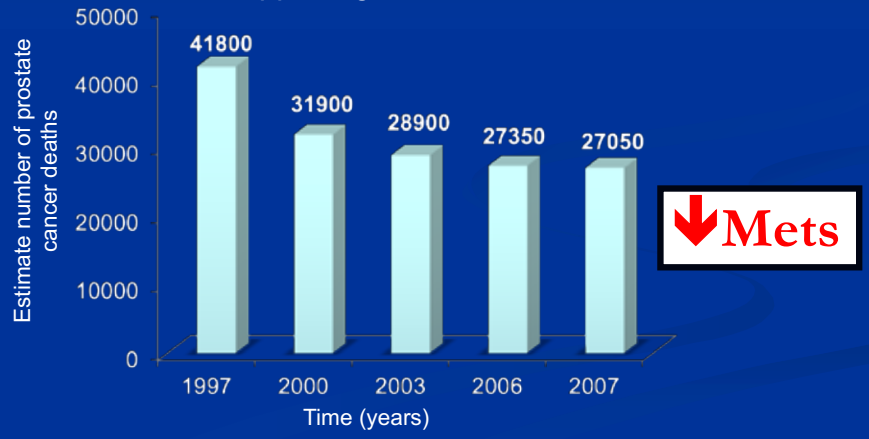


To Screen or Not to Screen??



Prostate Cancer: Decline in Number of Deaths

- Between 1997 and 2007, there was an approximate decline by 35% in prostate cancer deaths while there was a slight increase in 2008, the number dropped again in 2009



ACS, 1997, 2000, 2003, 2006, 2007, 2008, 2009.

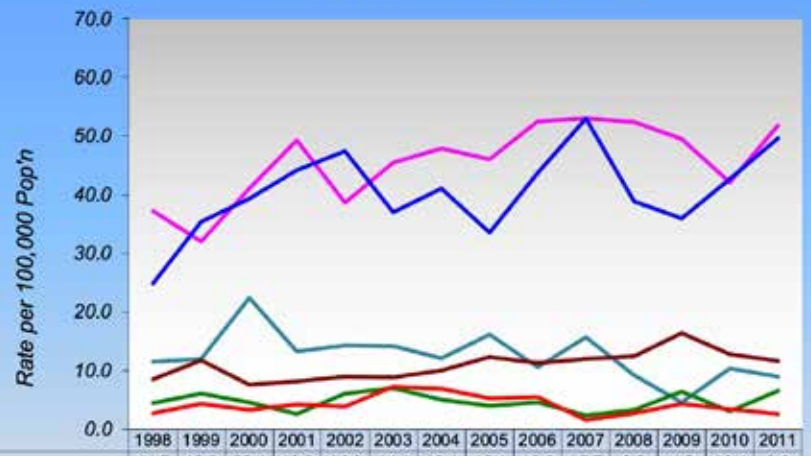
Death Rates (per 100,000) of Total, Breast, and Prostate Cancers, Bahamas 1994-2011

	1994	1995	1996	1997	1998	1999	2000	2001	2003	2004	2005	2006	2007	2008	2009	2010	2011
All Cancers	86.5	85.3	69.7	86.9	90.6	82.4	73.5	93.2	100.3	84.8	89.2	86.8	93.7	104.9	106.6	106.7	108.7
Prostate	20.0	20.3	24.9	25.1	26.1	23.6	23.0	27.6	32.6	23.7	23.4	25.0	25.9	35.8	28.2	27.6	29.7
Female Breast	18.0	18.4	16.0	20.6	20.3	19.3	17.8	27.7	21.3	24.8	25.1	32.5	25.6	25.4	22.8	37.0	32.8

N.B. 1. From 1994 to 2003, "All Cancer" mortality rates included Benign Neoplasms, which are not considered cancers.

Source: Department of Statistics
Prepared By: Health Information and Research Unit, 08/2014

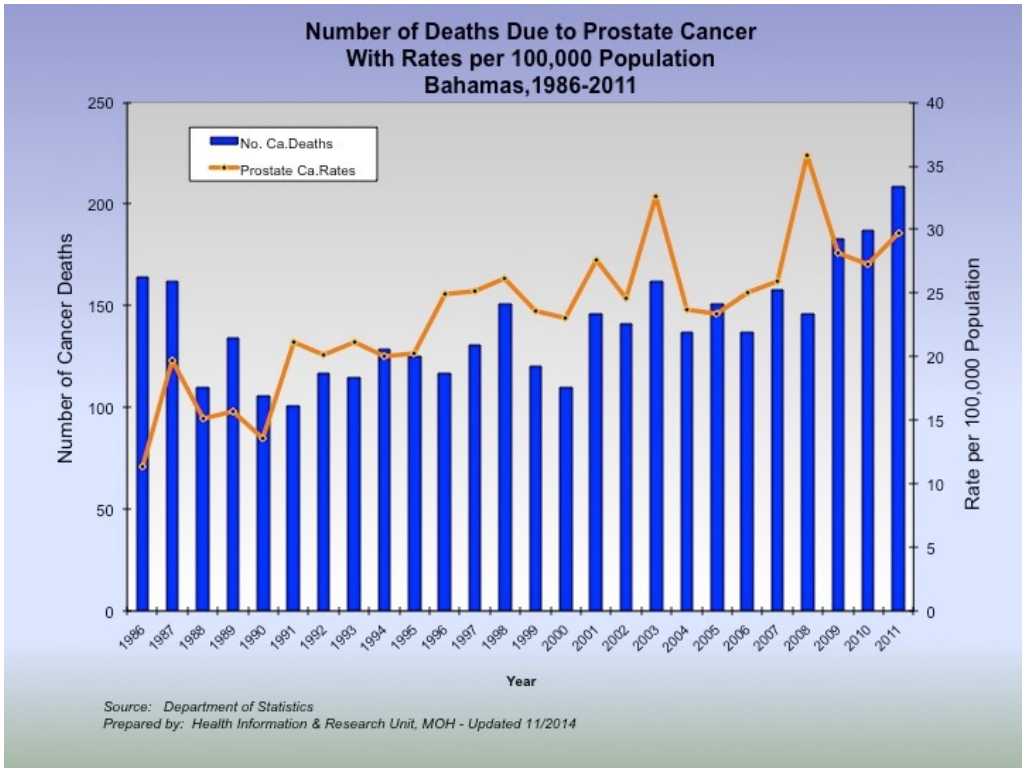
Incidence* Rates (per 100,000 Population) of Selected Cancers, Bahamas, 1998-2011

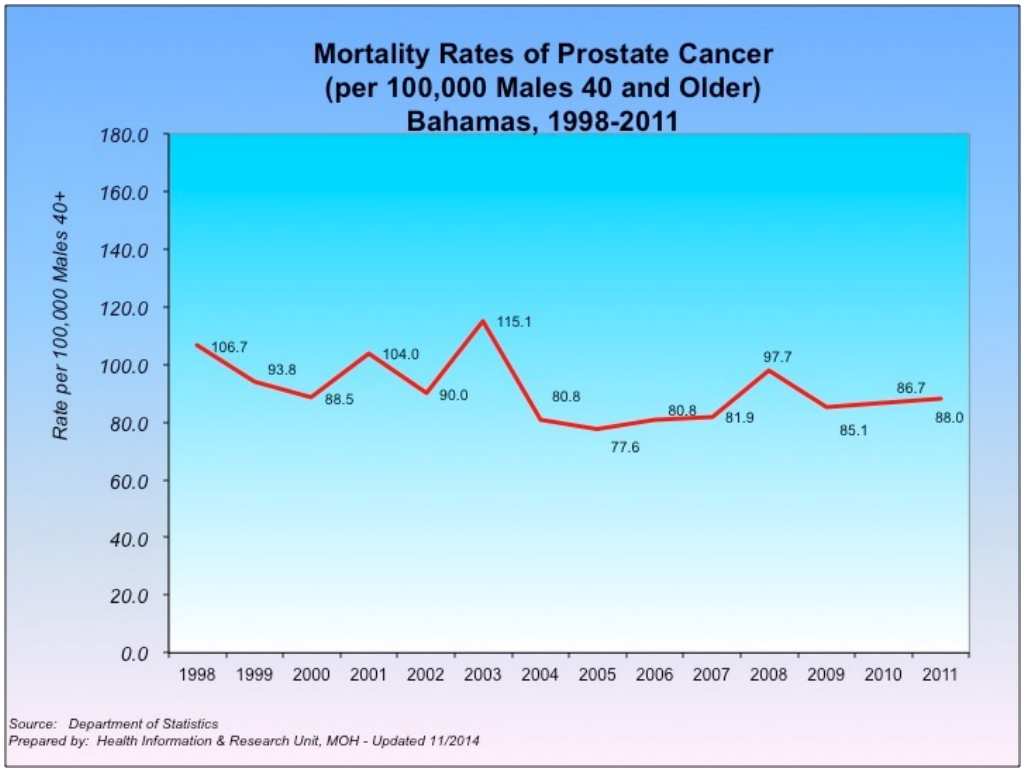


	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Cervix	11.5	12.0	22.4	13.3	14.3	14.1	12.1	16.1	10.6	15.7	9.2	4.6	10.4	8.9
Colon, Sigmoid, Rectum and Anus	8.5	11.7	7.6	8.1	9.0	8.8	10.0	12.3	11.2	12.0	12.4	16.4	12.7	11.7
Female Breast	37.2	32.0	41.0	49.3	38.7	45.5	47.9	46.1	52.5	53.0	52.4	49.5	42.1	51.8
Prostate	24.9	35.3	39.3	44.1	47.5	37.0	41.1	33.5	43.7	53.0	38.8	36.0	42.7	49.6
Trachea, Bronchus, and Lung	4.4	6.0	4.6	2.6	6.1	6.9	5.0	4.0	4.6	2.4	3.3	6.4	3.1	6.6
Stomach	2.7	4.4	3.3	4.2	3.8	7.3	6.9	5.2	5.5	1.5	2.7	4.4	3.4	2.6

N.B.Prostate, breast, and cervical cancer rates are sex-specific.

***Source:** *Princess Margaret Hospital Cancer Registry, Public Hospitals Authority*
***Prepared By:** Health Information and Research Unit, July2012*


Number of Deaths Due to Prostate Cancer
With Rates per 100,000 Population
Bahamas,1986-2011
No. Ca.Deaths
Prostate Ca.Rates
Number of Cancer Deaths
Rate per 100,000 Population
Year
Source: Department of Statistics
Prepared by: Health Information & Research Unit, MOH - Updated 11/2014


Mortality Rates of Prostate Cancer
(per 100,000 Males 40 and Older)
Bahamas, 1998-2011
Rate per 100,000 Males 40+
106.7
93.8
88.5
104.0
90.0
115.1
80.8
77.6
80.8
81.9
97.7
85.1
86.7
88.0
Source: Department of Statistics
Prepared by: Health Information & Research Unit, MOH - Updated 11/2014

Risk Groups for Clinically Localized Prostate Cancer

Risk group	Characteristics	Expected 10-yr PSA failure-free survival
Low	PSA < 10 and Gleason score < 7 and AJCC stage T1c, T2a	80 - 85%
Intermediate	PSA = 10 - 20 or Gleason score = 7 or AJCC stage T2b	50 - 60%
High	PSA > 20 or Gleason score > 7 or AJCC stage T2c, T3	30 - 40%

D'Amico A, et al. Oncology 2001; 15: 1049-1059; D'Amico A, et al. JAMA 1998; 280: 969-974.

PROSTATE CANCER SCREENING

SEPTEMBER 2009 Nassau, Bahamas

- **D'AMICO RISK STRATIFICATION**
- **85 Clinical: S/S + PSA**
- **LOW** 14% (12)
- **INTERMEDIATE** 27% (23)
- **HIGH** 59% (50)

SOLO PRACTICE – PRIVATE PRACTICE
NEW PCA:JAN-JUNE 2018

- **24 PATIENTS FOR PROSTATE BIOPSY**
  - **CLINICAL PCA**
  - **ELEVATED PSA**
- **21 POSITIVE**
  - **AVE AGE: 65 YRS**
  - **8 PSA > 100NG/ML**
  - **AVE PSA: 20.1**
  - **9 BONE SCANS: 3 POS. NEG: > 40 PSA**

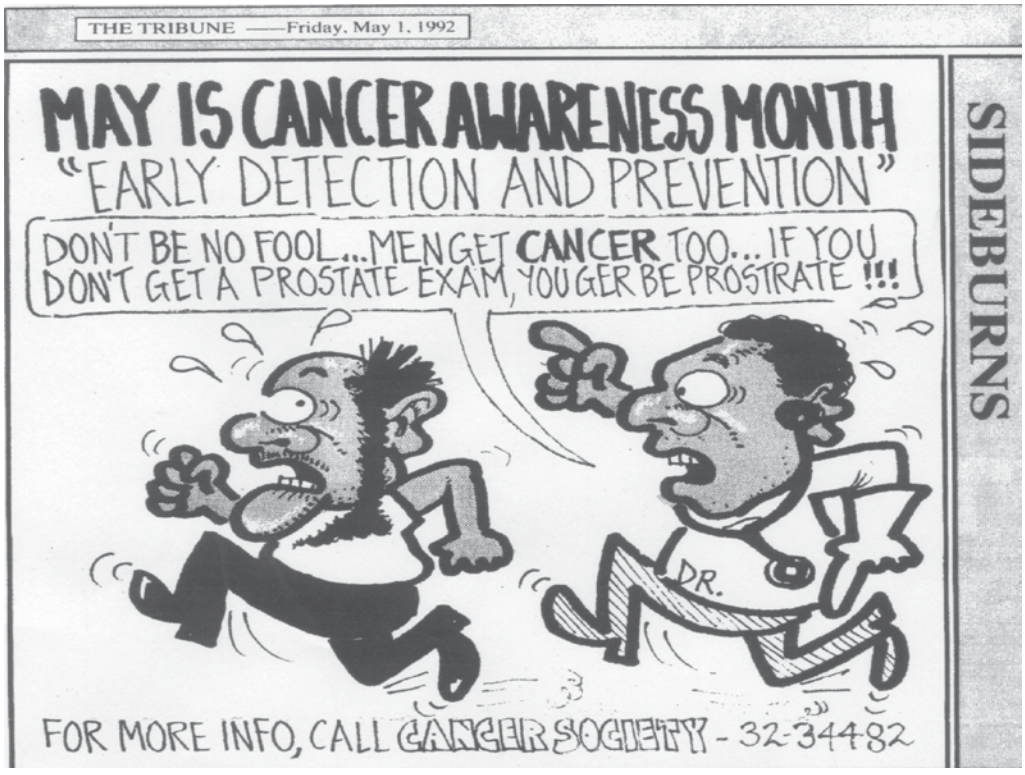
SOLO PRACTICE – PRIVATE PRACTICE
NEW PCA: JAN-JUNE 2018

- **D'AMICO CLASSIFICATION**
  - **14 HIGH RISK (67%)**
  - **7 INTERMEDIATE RISK (33%)**
  - **ZERO LOW RISK**

US TOO!!

PROSTATE CANCER: ALL MALES

- **EDUCATION**
- **AWARENESS**
- **SUPPORT**
- **CARE**
  - ***US TOO!! PARTNERS***



U.S. Preventive Services Task Force
October 7th 2011

PSA screening - "D" rating:

"there is moderate or high certainty that the service has no benefit or that the harms outweigh the benefits."

TV
- NEWS – PRIME TIME
- TALK SHOW
- DOCUMENTARY

RADIO
- NEWS – PRIME TIME
- TALK SHOW
- FREE ADS

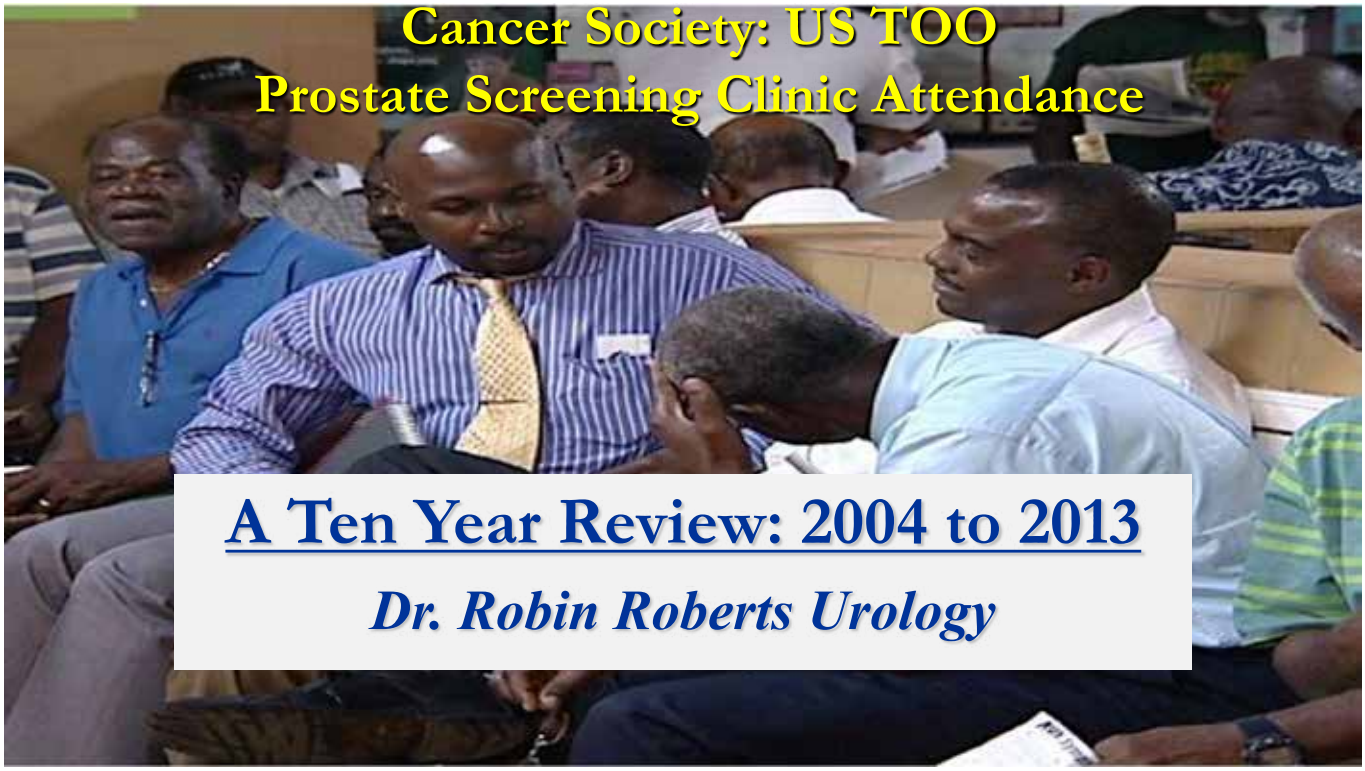
LECTURES
PUBLIC PRESENTATIONS
CHURCHES
NGOs

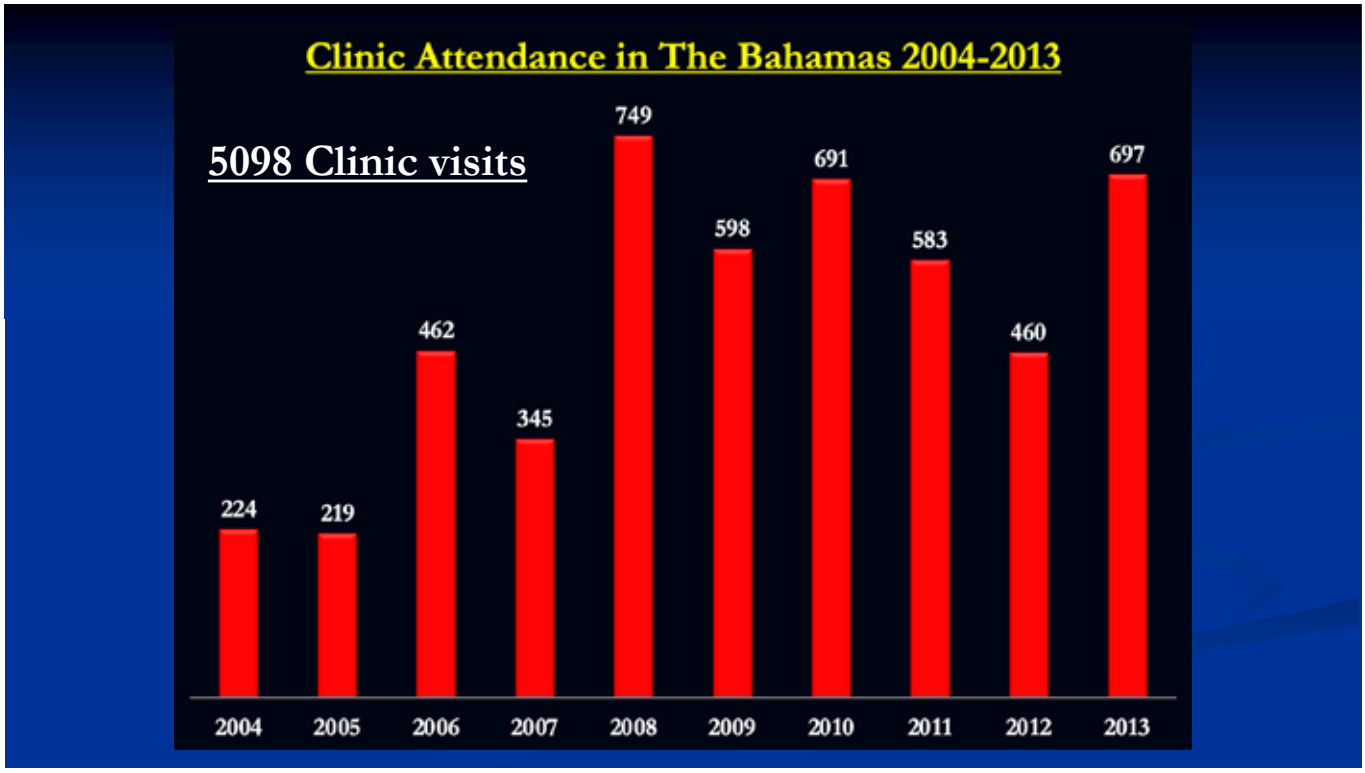
FLYERS

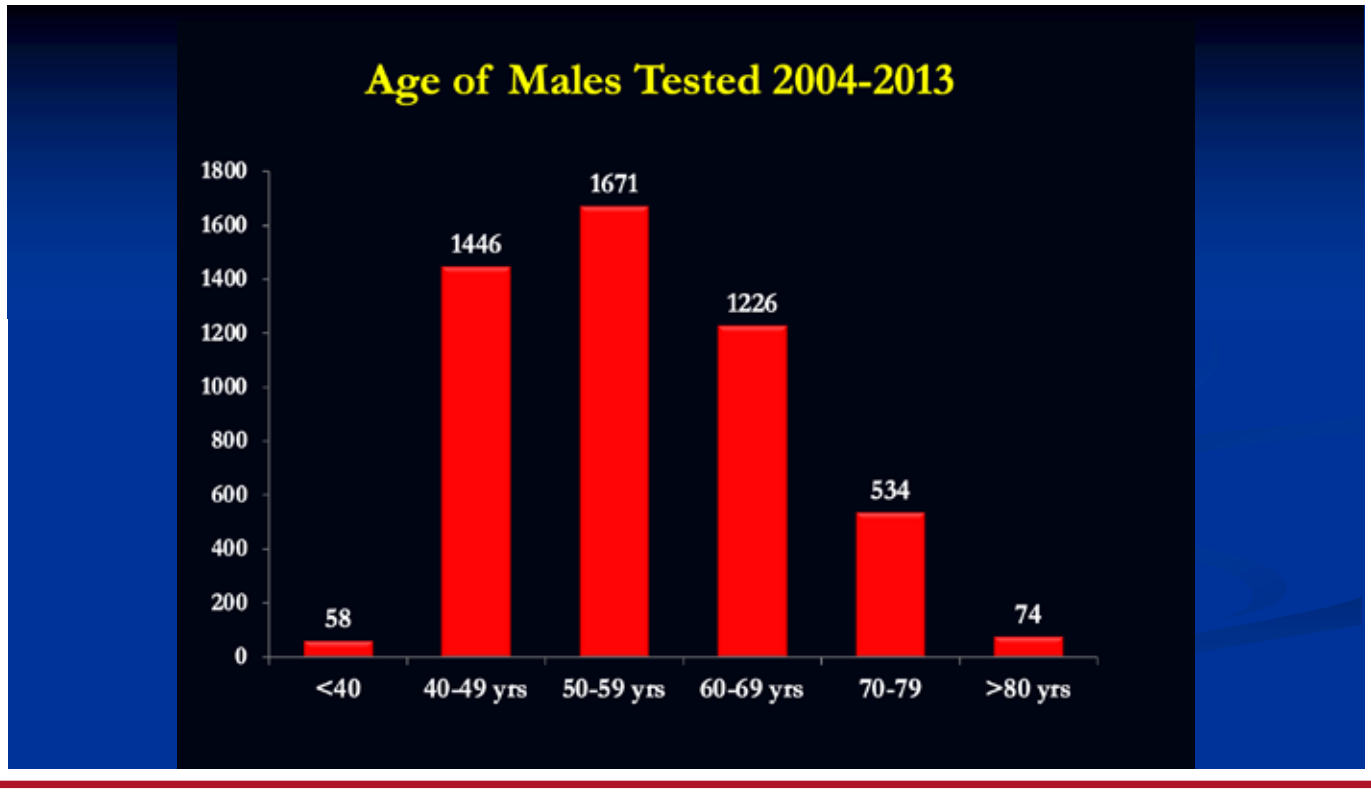
NEWSPAPER
- EDITORIALS
- ARTICLES
- ADS

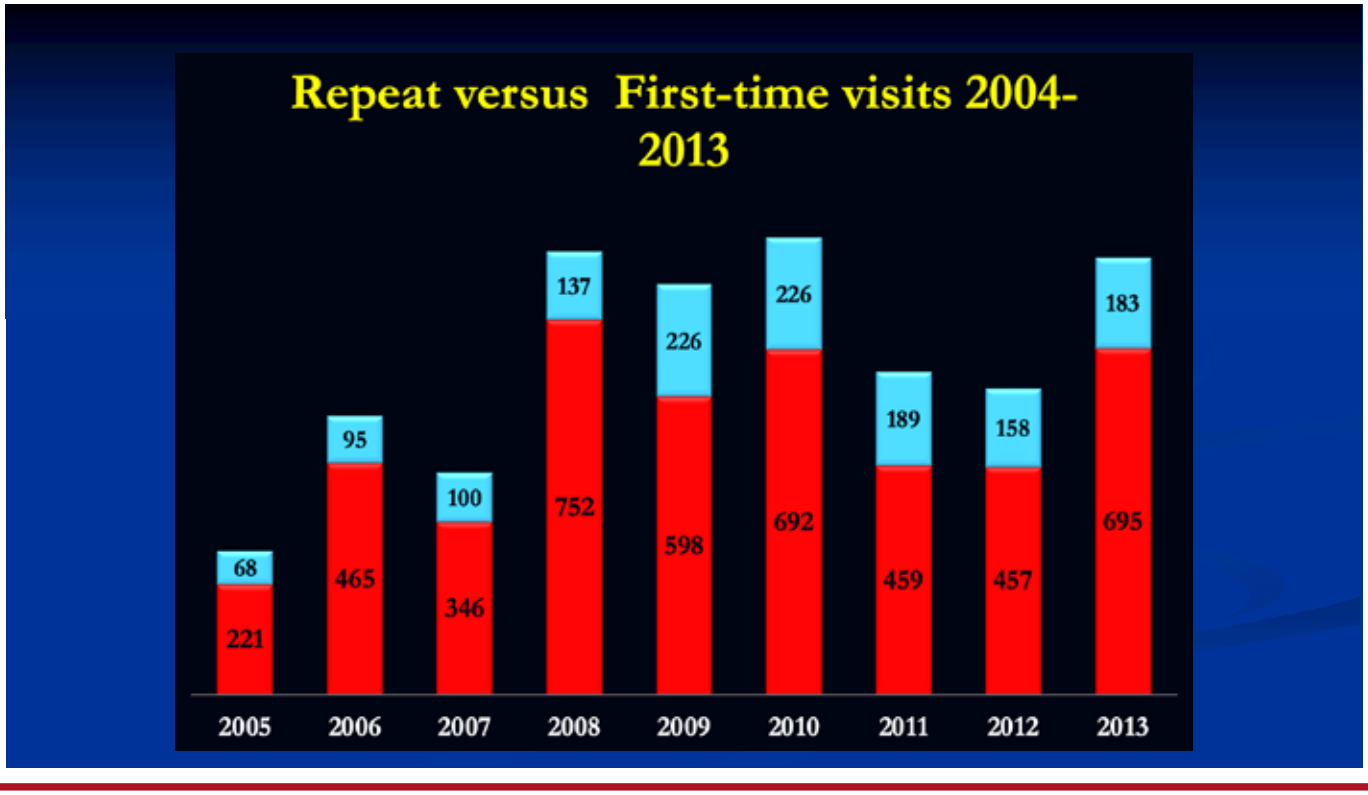
SOCIAL MEDIA

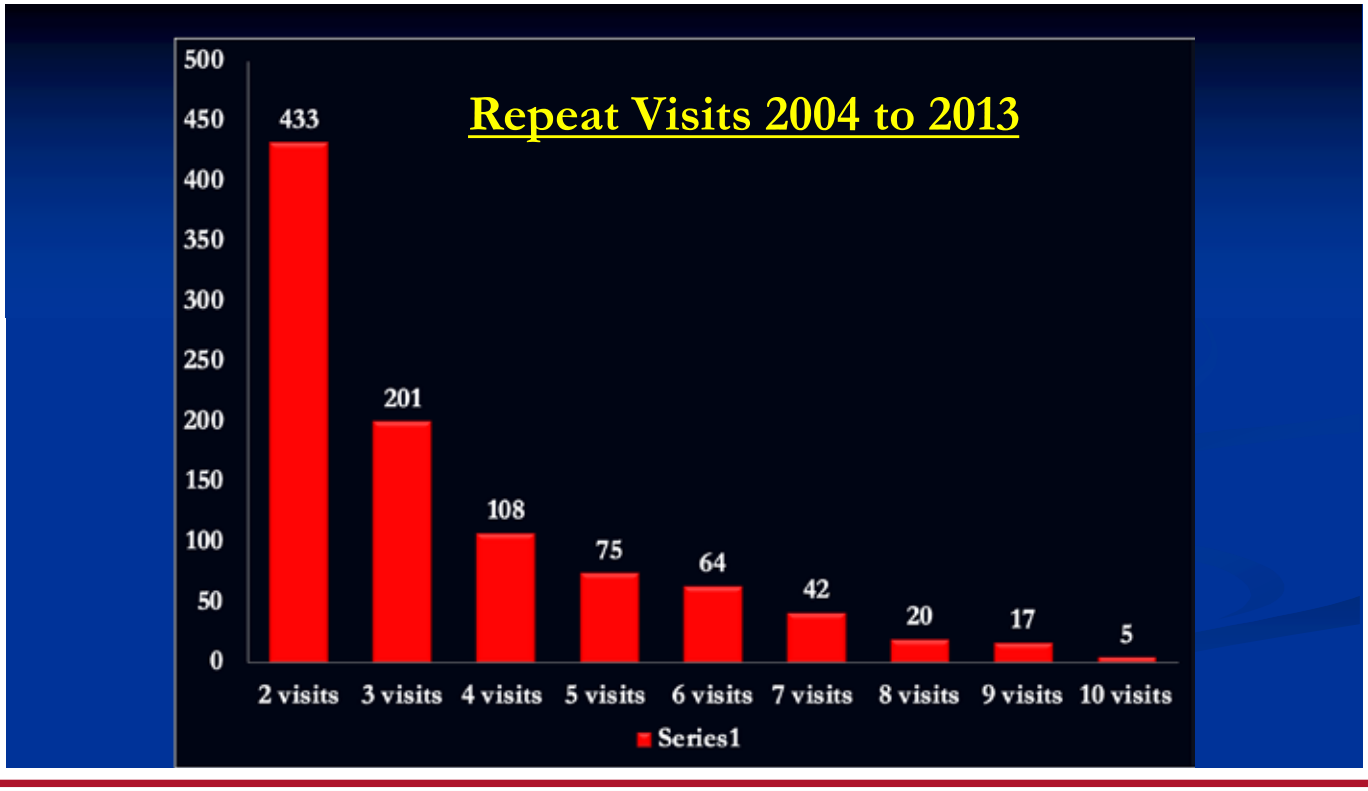

New Providence
21 miles
x
7miles
Cable Beach
Nassau
Mantaray House
200,000
Residents
Atlantic Ocean
NORTH


Cancer Society: US TOO
Prostate Screening Clinic Attendance
A Ten Year Review: 2004 to 2013
Dr. Robin Roberts Urology


Clinic Attendance in The Bahamas 2004-2013
5098 Clinic visits
224
219
462
345
749
598
691
583
460
697
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013


Age of Males Tested 2004-2013
1800
1600
1400
1200
1000
800
600
400
200
0
58
1446
1671
1226
534
74
<40
40-49 yrs
50-59 yrs
60-69 yrs
70-79
>80 yrs


Repeat versus First-time visits 2004-2013
68
221
95
465
100
346
137
752
226
598
226
692
189
459
158
457
183
695
2005
2006
2007
2008
2009
2010
2011
2012
2013


Repeat Visits 2004 to 2013
500
450
400
350
300
250
200
150
100
50
0
433
201
108
75
64
42
20
17
5
2 visits
3 visits
4 visits
5 visits
6 visits
7 visits
8 visits
9 visits
10 visits
Series1

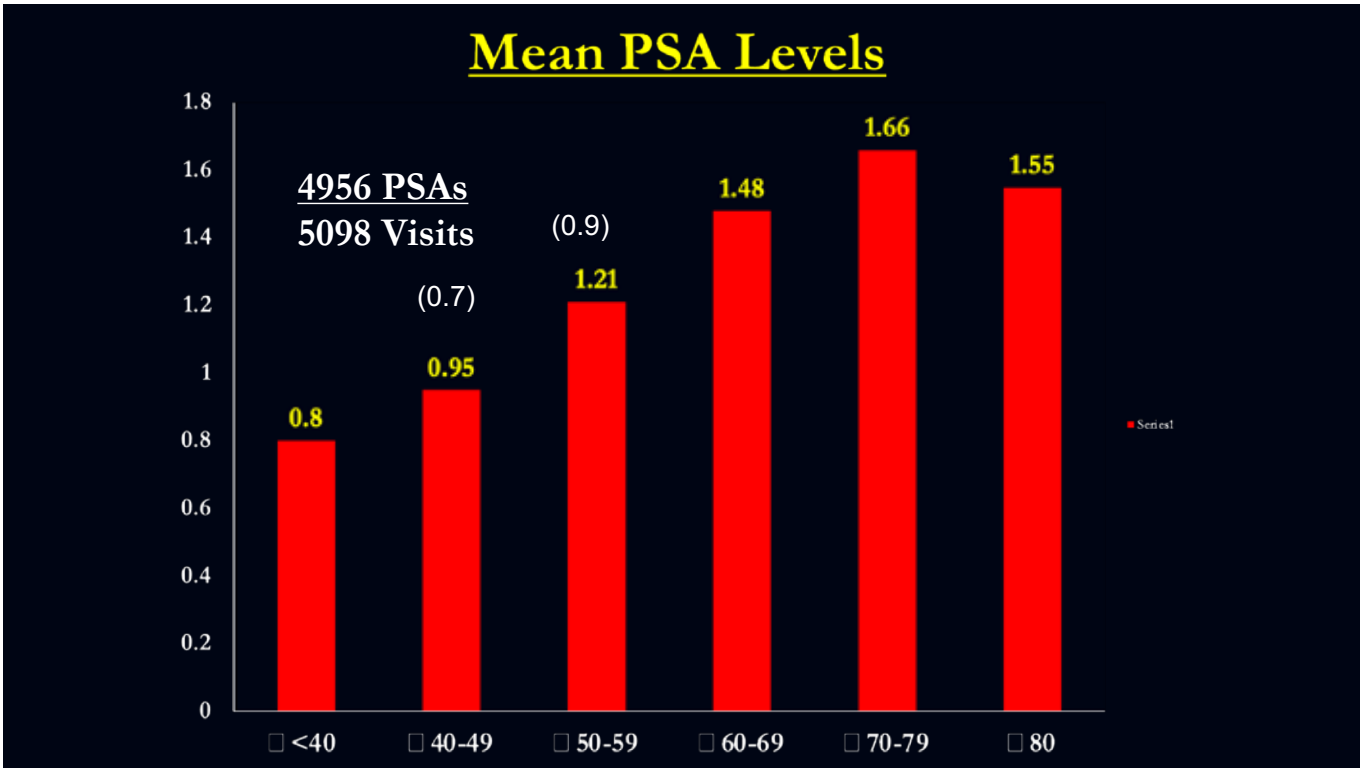
BASELINE & MEDIAN PSA

Urology. 2006 Feb;67(2):316-20. Epub 2006

- **PSA BASELINES:**
- **0.7ng/ml - 2.5ng/ml**
  - **40 – 49 YRS: ↑14.6X**
  - **50 – 59 YRS: ↑7.6X**

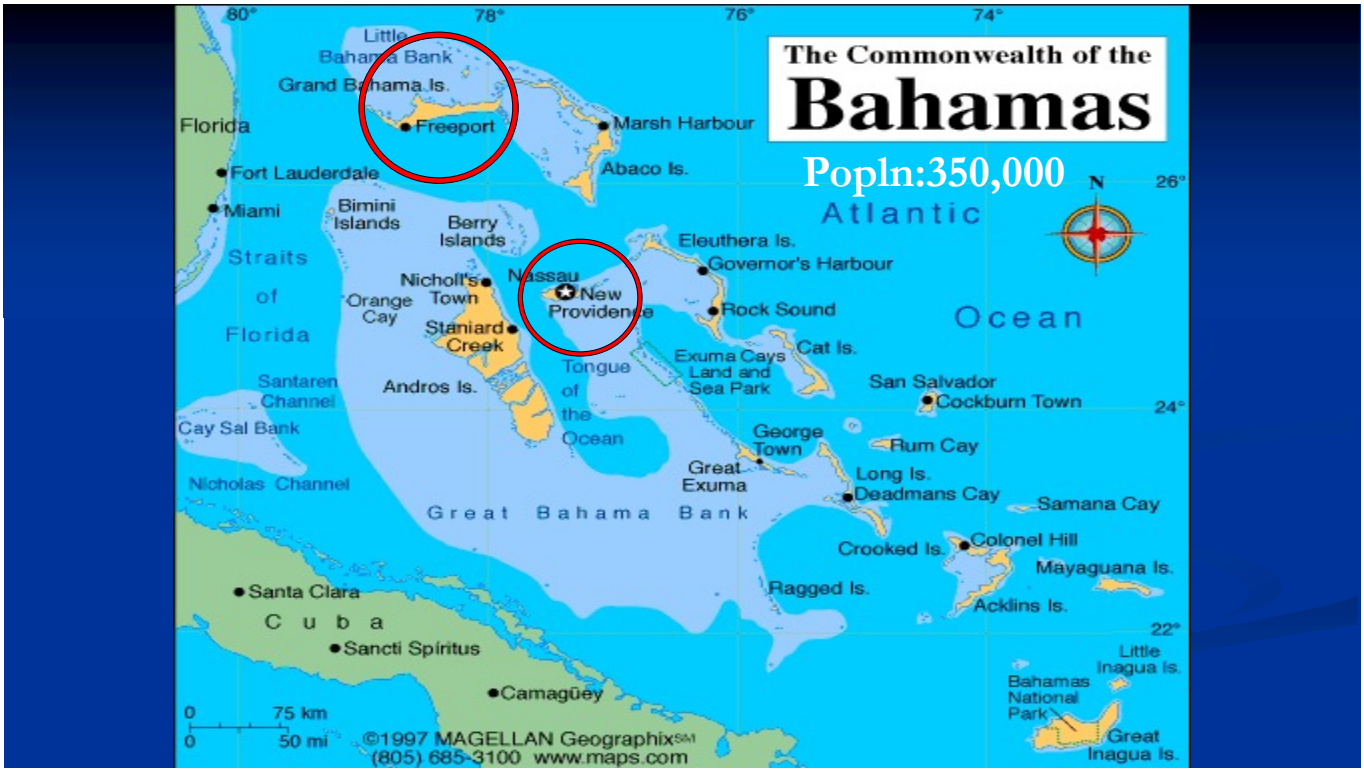
Selective PSA testing 1/Decade

- **BASELINES: Above Median**
  - **↑PSA VELOCITY**
  - **↑CA AGGRESSIVENES**
  - **↑BIOCHEMICAL PROGESSION**
  - **↑ MORTALITY RATE**



NASSAU PCA SCREENING

- 15 YEARS FOLLOW-UP (2018)
- TOTAL OF 7,268 PATIENT VISITS
- CISNET:
  - Statistical modeling to direct interventions



PROSTATE CANCER SCREENING
FREEEPORT GB, SEPTEMBER

- 2012 – 2015
- 1,993 MALE CLINIC VISITS
- TOTAL OF 1844 MEN (57.6y)
- 149 MEN > ONE OCCASION

PROSTATE CANCER SCREENING
FREEEPORT GB, SEPTEMBER

- 2012 – 2015
- 315 FOLLOW –UP VISITS
- ABNORMAL DRE OR PSA
- UROLOGIST ASSESSMENT

Clinical Criteria To Biopsy

- DRE abnormal
- Elevate PSA
- AGE < 75yrs
- Age Specific PSA
- PSA Velocity, Prostate Size
- Comorbidities - QOL
- Close Follow-up by Urologist

- No K4 Score
- No PHI
- No MRI

PROSTATE CANCER SCREENING

FREEEPORT GB, SEPTEMBER

- ❑45 MEN BIOPSIED
- ❑40 PROSTATE CA
- ❑PPV – 89%
- ❑Ave Age: 66.5yrs

PROSTATE CANCER SCREENING

FREEEPORT GB, SEPTEMBER

- **D'AMICO RISK STRATIFICATION**
- **40/45 PCA**

• LOW	10% (4)
• INTERMEDIATE	40% (16)
• HIGH	50% (20)

PROSTATE CANCER SCREENING

FREEEPORT GB, SEPTEMBER

- **PROSTATE POSITIVE BIOPSY**

- 7/40 had PSA values > 50 ng/ml
- 7/40 had values in the range of 20 and 50 ng/ml.
- Intermediate & High Risk: 30/36 men
  - Gleason 7 (4+3) or higher.

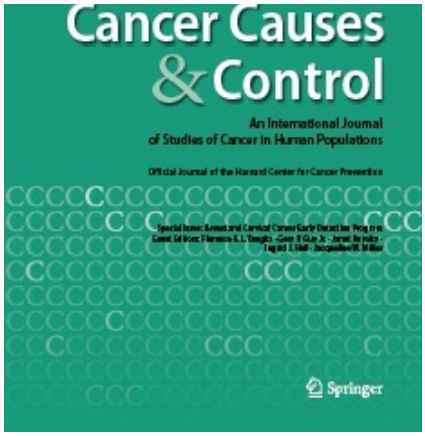
Cancer Causes Control
DOI 10.1007/s10552-017-0974-z

EDITORIAL

Cancer in populations of African Ancestry: studies of the African Caribbean Cancer Consortium

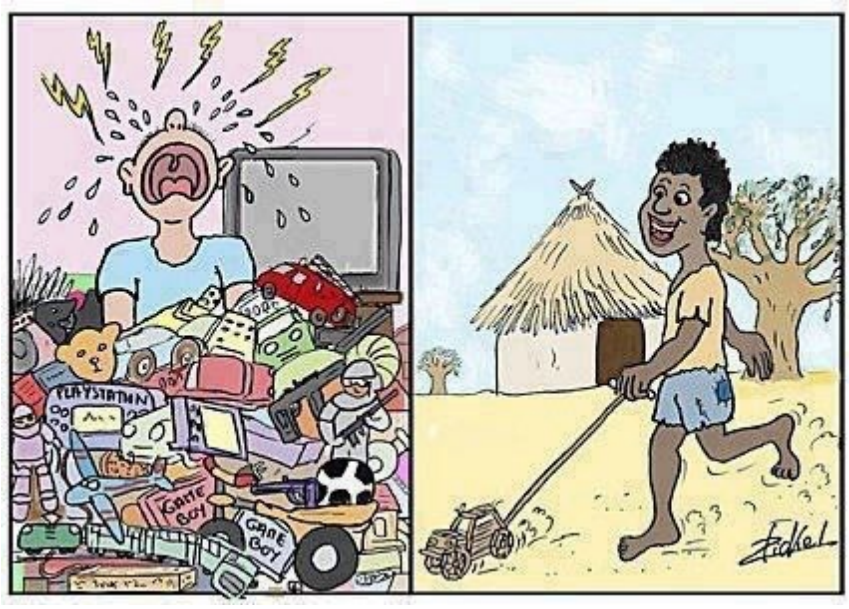
Camille Ragin[1] · Elizabeth Blackman[1] · Robin Roberts[2] · Raleigh Butler[2] · Samuel Gathere[3] · Darron Halliday[2] · Kimlin Ashing[4]

22nd October 2017



"The Prostate Cancer Screening Clinic in the Bahamas: A Model for Low and Middle Income Countries."

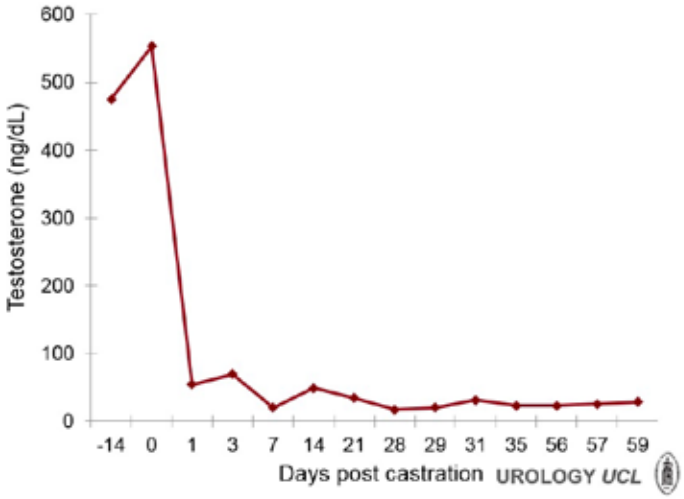
DOI 10.1007/s10552-017-0972-1

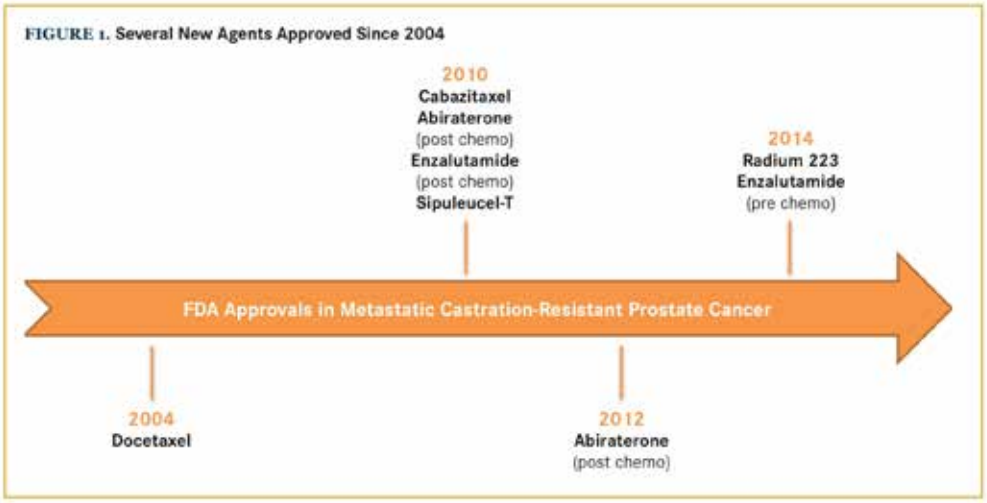


Surgical castration is the gold standard for ADT

Charles HUGGINS
1901–1997
1966 Nobel Prize

The effect of castration on advanced carcinoma of the prostate gland. Arch Surg, 1941





Apalutamide (2019)
Darolutamide (2019)
Pembrolizumab
Olaparid

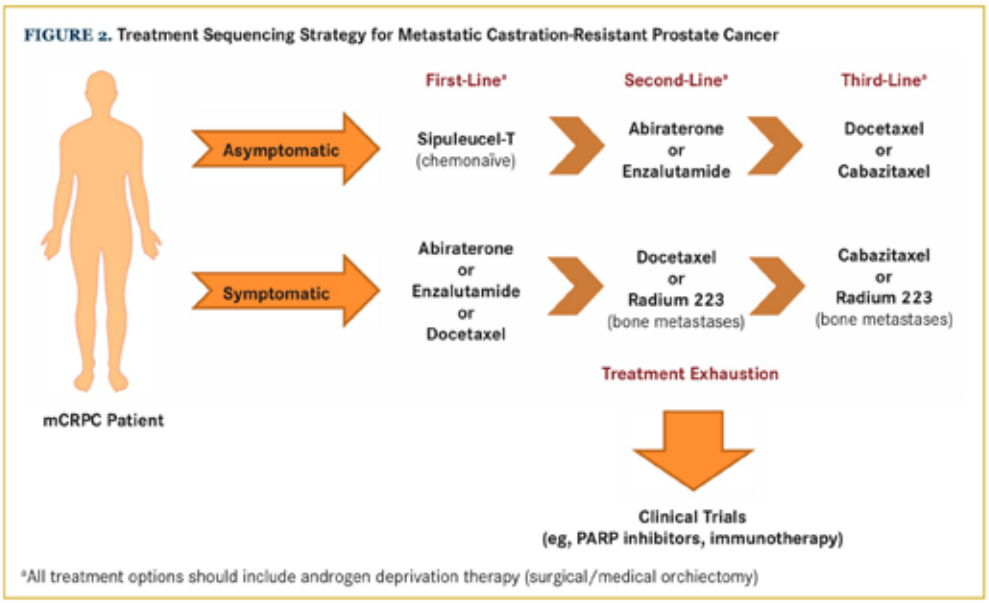


FIGURE 2. Treatment Sequencing Strategy for Metastatic Castration-Resistant Prostate Cancer

*All treatment options should include androgen deprivation therapy (surgical/medical orchiectomy)

ADVANCED DISEASE

- ARBIRATERONE $5,000/MTH
- ENZALUTAMIDE $10,000/MTH
- SIPULEUCIL-T $93,000
- APALUTAMIDE $10,000/MTH
- DAROLUTAMIDE $10,000/MTH
- DOCETAXEL $2,500/6CYCLES
- CABAZITAXEL $48,000
- RADIUM 223 $69,000/6 CYCLES

Implementing the new standards of care for treating metastatic prostate cancer in The Bahamas is Unaffordable

Dr. Robin Roberts

Urology

SOLO PRACTICE – PRIVATE PRACTICE

NEW PCA: JAN-JUNE 2018

- **D'AMICO CLASSIFICATION**
  - **14 HIGH RISK (67%)**
  - **7 INTERMEDIATE RISK (33%)**
  - **ZERO LOW RISK**

PCA – BAHAMAS: TREATMENT

- 8 PTS: PSA > 100, METASTATIC DISEASE
  - HORMONE THERAPY + CHEMOTHERAPY
- 13 PTS: TREAT MULTI-MODAL (No Clinical Mets)
  - RADICAL PROSTATECTOMY/RADIATION
  - CHEMOTHERAPY

PCA – BAHAMAS: TREATMENT

- 8 PTS: PSA > 100, METASTATIC DISEASE
  - HORMONE THERAPY + CHEMOTHERAPY
  - ($700 X4)X8 + ($12,000 X 8)
  - $118,400 FIRST YEAR, Then $22,400/year
  - NB: ABIRATERONE DAILY = $4500/MONTH = $36,000/YR
  - $288,000/YR + $22,400 = $310,400
  - NB: ENZALUTAMIDE DAILY = $8,000/MTH = $96,000/YR
  - $768,000/YR + 22,400 = $790,400

PCA – BAHAMAS: TREATMENT

- 13 PTS: LOCAL + SYSTEMIC TREATMENT
  - RADICAL PROSTATECTOMY/RADIATION THERAPY
  - $15,000 X13 = $195,000
  - DOCETAXAL $12,000 = $156,000

$351,000

  - NB: ABIRATERONE DAILY = $4500/MONTH = $36,000/YR
  - $468,000/YR + $36,400 = $504,400
  - NB: ENZALUTAMIDE DAILY = $8,000/MTH = $96,000/YR
  - $1,248,000/YR + 36,400 = $1,284,400

PCA – BAHAMAS: TREATMENT

- TOTAL 21 PTS
- $469,000

100 PTS / YEAR, 80% ARE INTERMEDIATE + ADVANCED

$1.8 MILLION

PCA – BAHAMAS: TREATMENT

- 13 PTS: LOCAL + SYSTEMIC TREATMENT

- Provange/Sipuleucel-T
- $93,000 – for 1 pt.

The Bahamas cannot afford treating advanced prostate cancer

FREEPORT CLINIC UPDATE TO 2018

2012 - 2015

- 1993 Total Pt. Visits

- Pathology:
- Biopsied 45 Pts
- 40 positive:
- 4 (10%) Low risk
- 16 (40%) Intermediate
- 20 (50%) High Risk

2016 - 2018

- 4169 Total Pt. Visits

- Pathology:
- Additional Biopsied 27 Pts
- 25 positive:
- 4 (16%) Low risk
- 11 (44%) Intermediate
- 10 (40%) (High Risk

CONTACT

Dr. Robin Roberts, MD

UWI School of Clinical Medicine & Research, The Bahamas

robinnassau50@yahoo.com

Unraveling the Ancestral Fabric: Exploring The Role Of Epigenetics In Type 2 Diabetes Health Disparities

Maurice B. Fluitt, PhD
Assistant Professor
Division of Endocrinology and Metabolism | Molecular Endocrinology Laboratory
Department of Medicine
Howard University College of Medicine
Washington, DC

Purpose and Objectives

PURPOSE

The overall goal of this presentation is to systematically examine the role of epigenetics in understanding type 2 diabetes and its complications in minority communities.

OBJECTIVES

- To address health disparities of Caribbean and African populations locally and abroad
- To understand the complex molecular etiologies underlying type 2 diabetes and its common vascular complications
- To identify the role of epigenetics in type 2 diabetes health disparities
- To understand how epigenetics could improve disease outcomes in type 2 diabetics in minority populations

FINANCIAL DISCLOSURE

There are no financial disclosures.

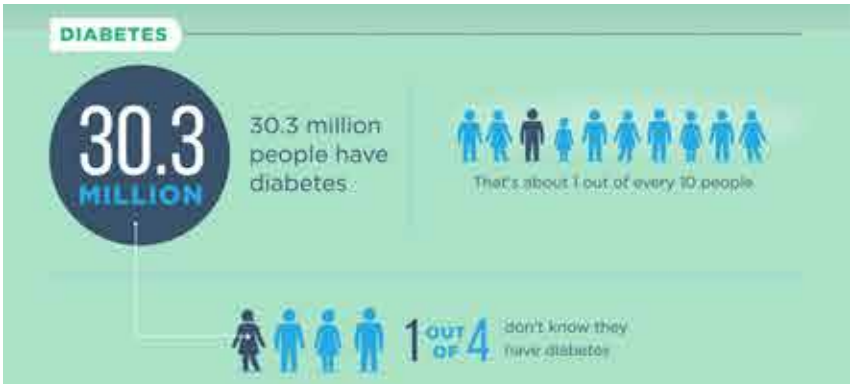
Agenda

- The growing concern for Type 2 Diabetes and its complications
- Understanding epigenetics and its role as a missing link in T2DM and its complications
- MicroRNAs as mediators, markers, and potential therapies for T2DM and its complications
- Implications and summary

Howard University College of Medicine

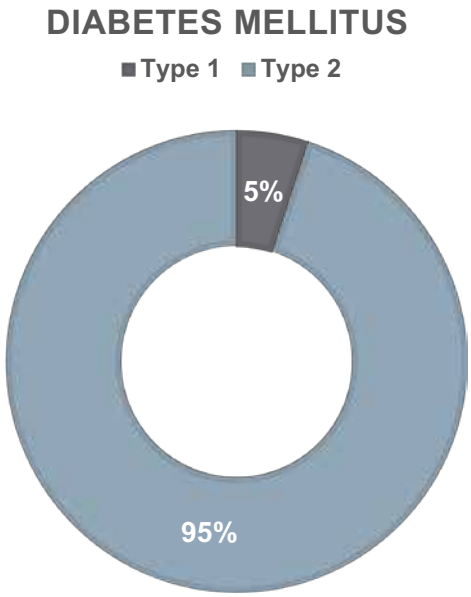
- *The Howard University College of Medicine first opened its doors as a medical department in 1868, just three years after the close of the Civil War.*
- *At that time, newly freed black people were migrating to the nation's capital in large numbers. The founders of the College recognized that the nearly overwhelming health care needs of this population and of other blacks throughout this country would be met best by training students to become highly competent, compassionate physicians who would deliver care in communities having a shortage of health personnel.*

Diabetes: a Growing Health Problem



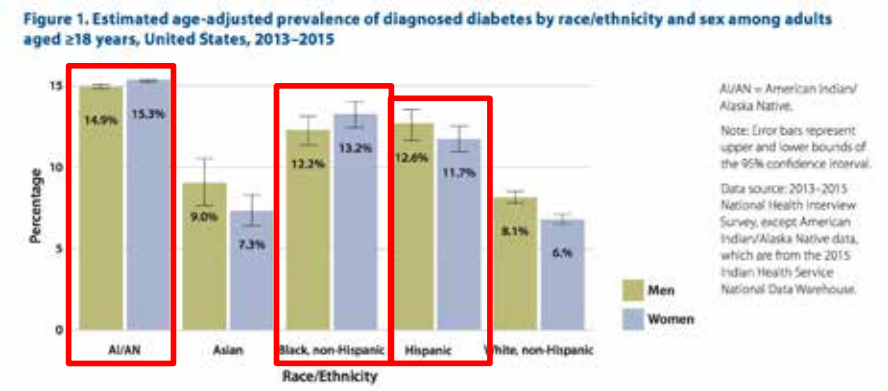
5

Diabetes: a Growing Health Problem

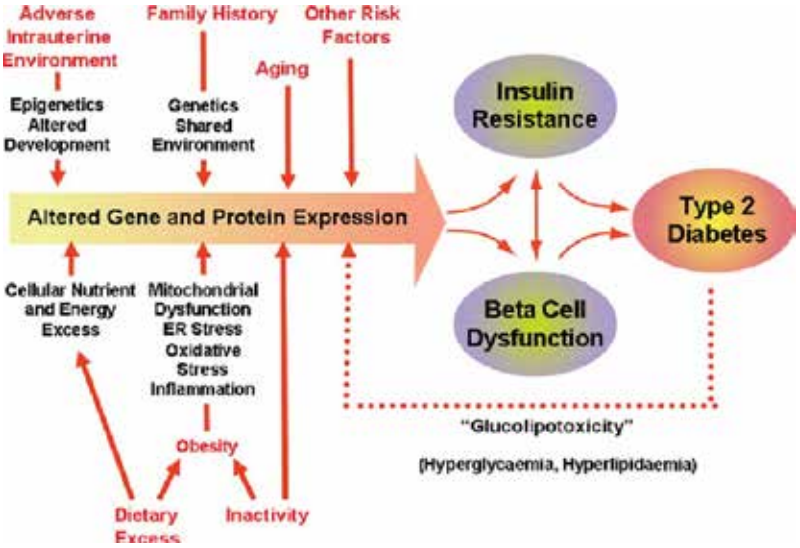


6

Type 2 Diabetes Mellitus: A Matter of Race

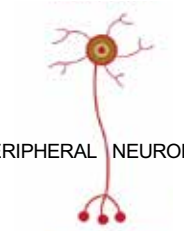


Type 2 Diabetes Mellitus: A Series of Molecular Events



Diabetic Complications

STROKE



PERIPHERAL NEUROPATHY

CARDIOVASCULAR DISEASE

DIABETIC KIDNEY DISEASE (DKD)

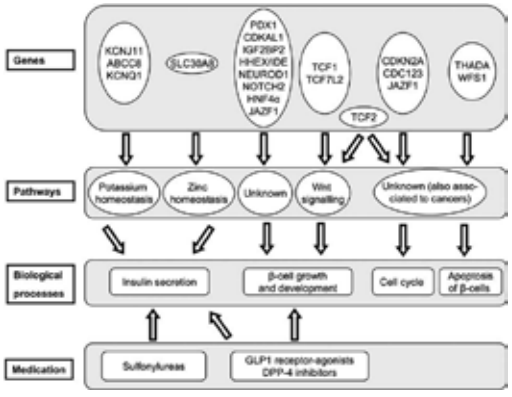
PERIPHERAL ARTERY DISEASE

DIABETIC FOOT

DIABETIC RETINOPATHY

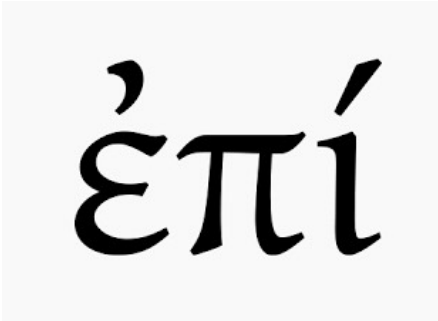
The Search for Type 2 Diabetes Genes and Risk Markers

- Linkage Studies
  - *CAPN10*
  - *TCF7L2* (rs7903146)
- Candidate Genes
  - *PPARG* (P12A)
  - *KCJN11* (E23K)
- Genome Wide Association Studies (GWAS)
  - ~153 variants for T2D mapping to more than 120 loci
- Rare Variants
- Structural Variants
- Protective Variants
- Genetic Architecture of T2DM



The Search for Type 2 Diabetes Genes and Risk Markers

- 'Epi' (Greek) meaning above, over
- Epigenetics
  - Modifications regulating biological process without changing the DNA sequence
  - Influenced by environmental factors
  - Reversible and modifiable!



Epigenetics: the Heart of the Type 2 Diabetes and its complications

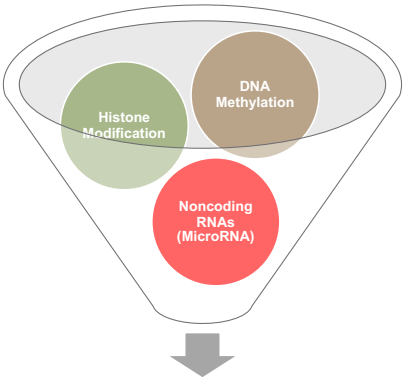
The challenge with current diabetic treatment options and interventions are not sufficient to prevent long-term complications

Early and long-lasting exposure to hyperglycemia can leave an imprint and can alter the expression of genes in various cells

Long-term persistence of epigenetic abnormalities represent key mechanisms underlying "metabolic memory".

Metabolic memory is responsible for the progression of micro- and macro-vascular diabetic complications, even after normalized glycaemia

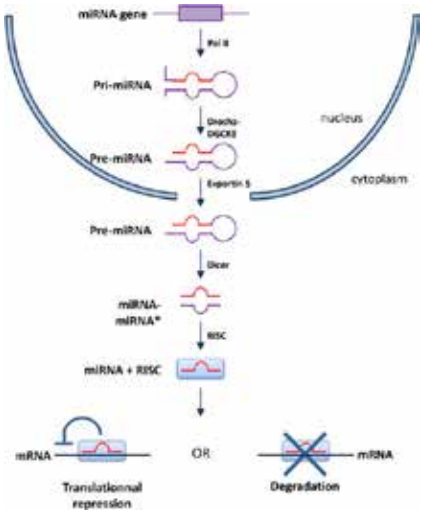
Epigenetics: the Heart of the Diabetic Endothelial Dysfunction



Epigenetic Regulation

MicroRNAs: Tiny molecular regulators with major implications in disease

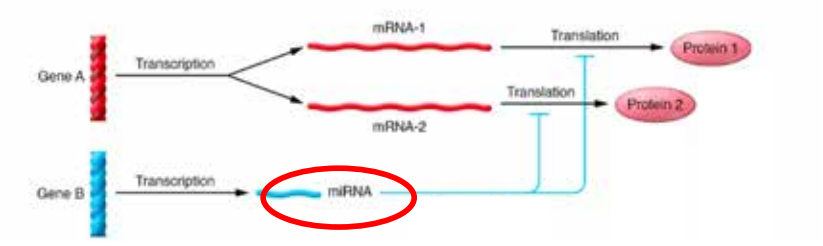
- What are microRNAs?
  - Small non-coding RNAs (19-25 nucleotides in length)
- How do microRNAs function?
  - Translational repression
  - mRNA degradation
- Why are microRNAs important?
  - Target mRNAs to fine-tune gene expression
  - Regulate key biological processes



Noncoding RNAs: From “trash” to treasure

- Genetic complexity is most likely derived from noncoding RNA (ncRNA)
  - Functional RNA molecule that is transcribed from DNA, but not translated into protein
- Majority of the mammalian genome is transcribed into regulatory non-coding RNA
- Non-coding RNA was considered “Junk DNA”
  - microRNAs
  - Long noncoding RNAs
  - Circular RNAs

Noncoding RNAs: From “trash” to treasure



MicroRNAs (miRNAs)

- ~22 nucleotides in length
- Mediates posttranscriptional silencing
- Over 2588 mature miRNAs, modulating more than 30% of protein-coding genes
- Regulate key biological processes

Adams, BD. J Clin Invest. 2017; 127(3):761-711

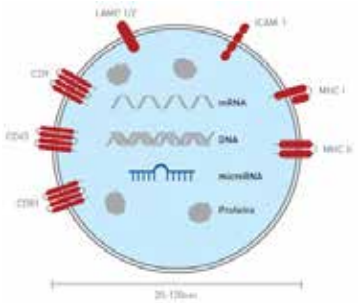
MicroRNAs (miRNA) are exciting molecular regulators and attractive early markers for diabetes and its complications

Tissue

Saliva

Blood

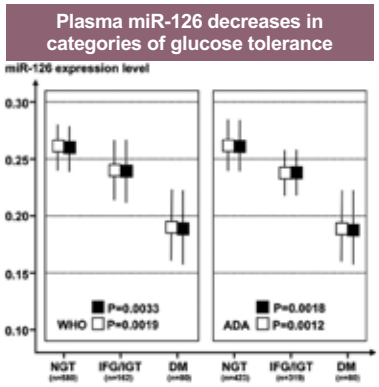
Urine



Exosomes

miRNAs as markers and mediators of ED

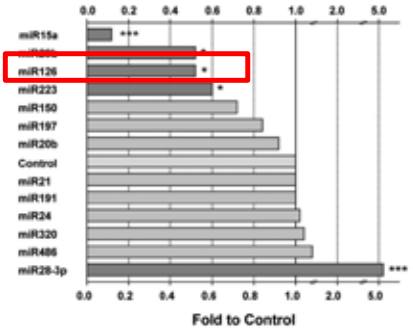
2010



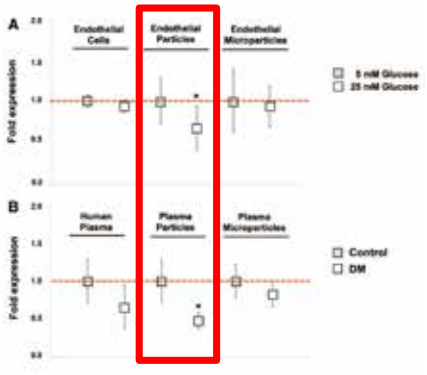
Plasma levels of miR-126 across categories of normal glucose tolerance (NGT), impaired fasting glucose/impaired glucose tolerance (IFG/IGT), and manifest DM. Zampetaki et al. *Circ Res. 2010;107:810-817*

miRNAs as markers and mediators of ED

Plasma miR-126 is altered before manifestation of DM



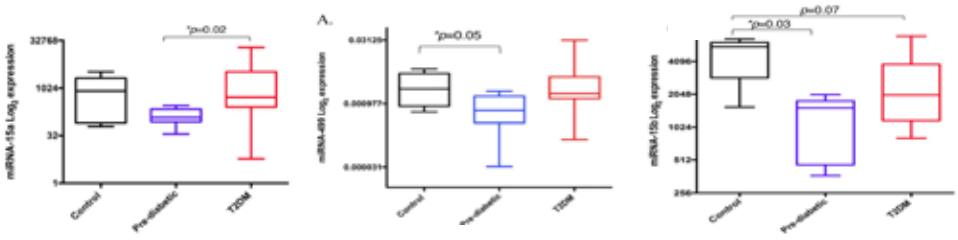
Endothelial miR-126 is reduced in a glucose dependent manner



Zampetaki et al. *Circ Res. 2010;107:810-817*

The History of MicroRNAs: From Cancer and Beyond…

miRNA-15a, -15b, and -499 are reduced in pre-diabetic African-American adults



Fluitt et al. *Jacobs J Diabetes Endocrinol. 2016 December; 2(1)*

Summary

- Epigenetics can provide insight into the T2DM disparity in minority populations
- miRNAs provide an exciting and attractive platform for biomarker discovery and therapeutic intervention for diabetes and its complications
- Our team investigates the translational utility of miRNAs to understand the complex underpinnings of T2DM and its complications

Contact Information

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Metabolic abnormalities in ESRD that explain CV risk

Clinton D. Brown, MD, FASN, FAHA, FNLA
Professor of Medicine
SUNY Downstate Medical Center

Purpose and Objectives

PURPOSE

1) Prevalence of End Stage Renal Disease (ESRD) in patients of African descent
2) Introduce the topic of Post Translation Protein Modification (PTPM)
3) Effect of PTPM on vascular Disease in patients with ESRD

OBJECTIVES

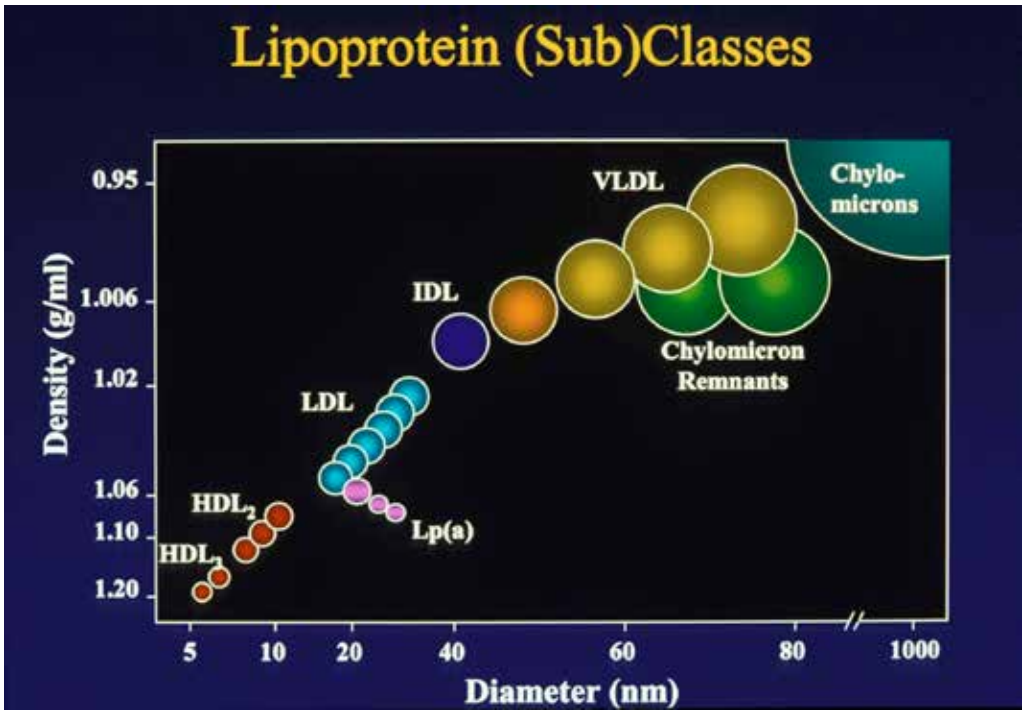
- To explain why patients of African descent with kidney failure are at greater risk for heart disease.
- To describe unique nutritional interventions for patients with kidney disease.
- To describe therapeutic interventions to address kidney failure.

FINANCIAL DISCLOSURE

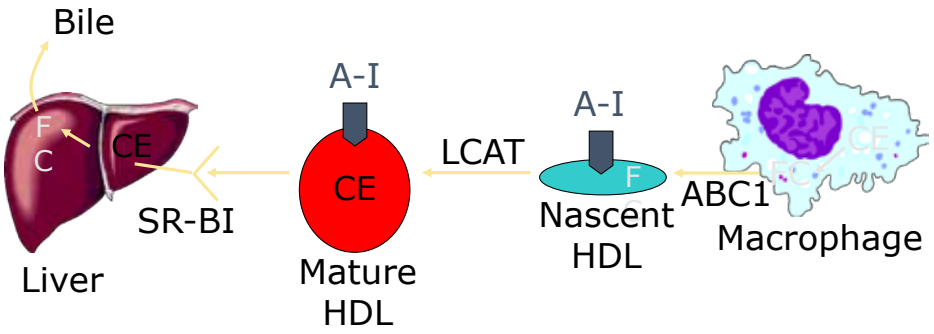
There are no financial disclosures.

Disclosures:

There are no financial disclosures.

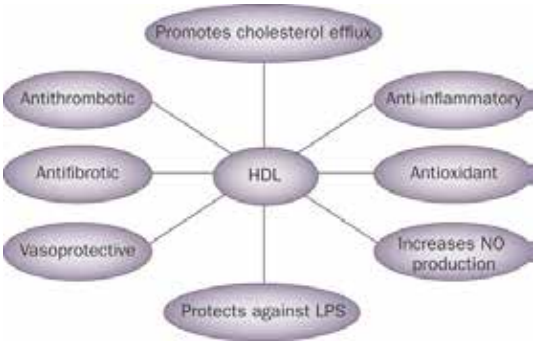


HDL Metabolism and Reverse Cholesterol Transport

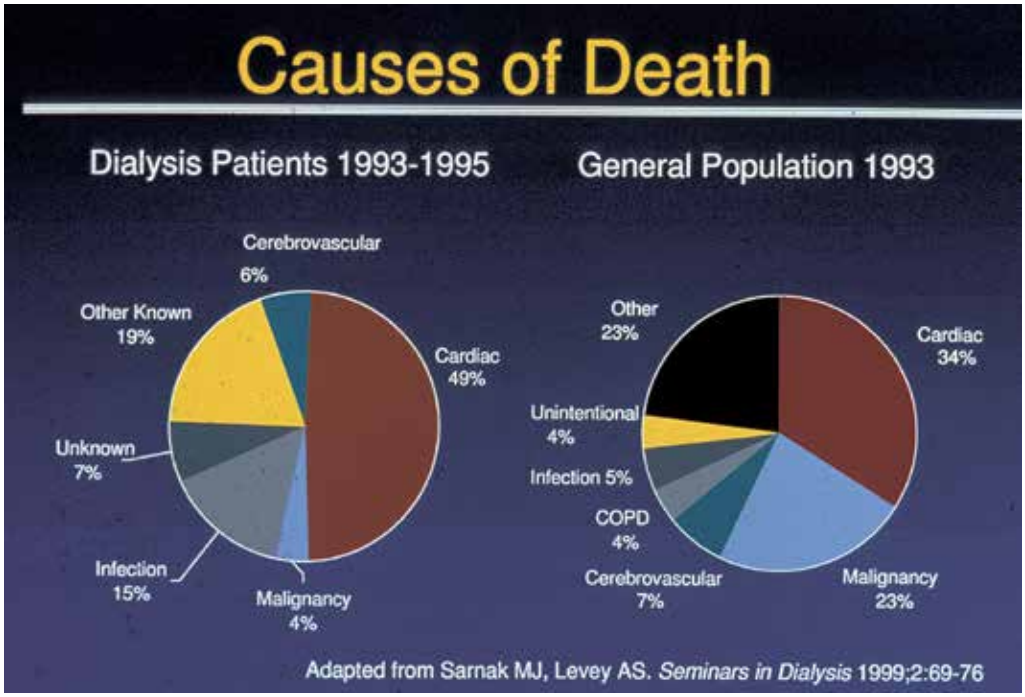


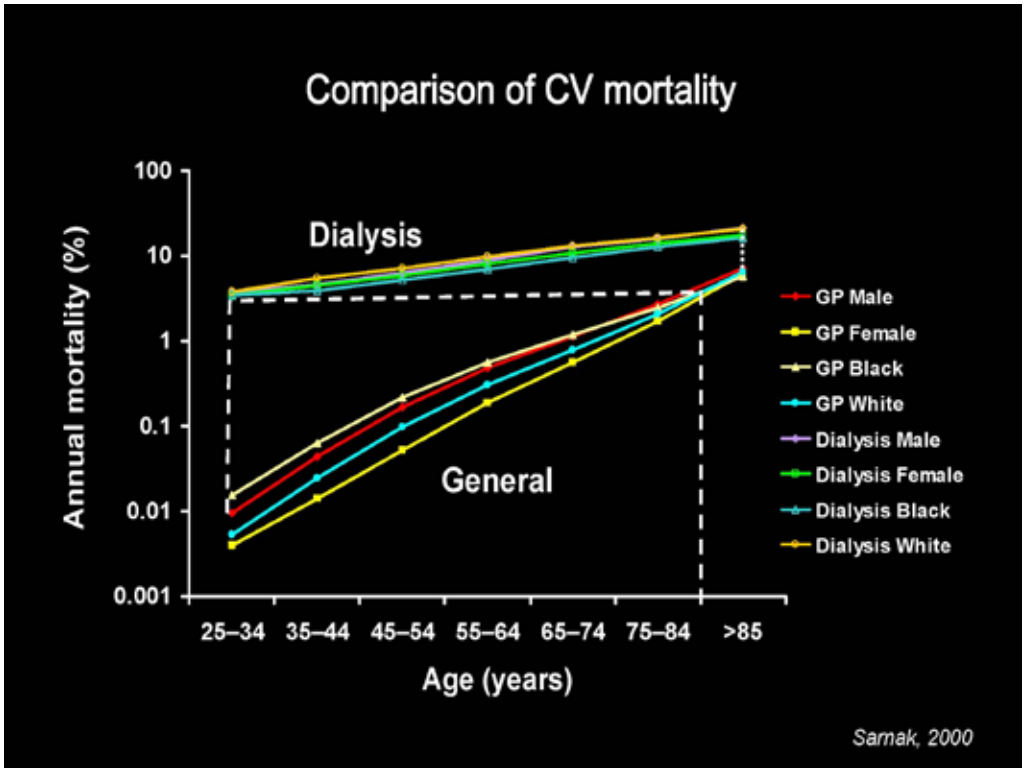
ABC1 = ATP-binding cassette protein 1; A-I = apolipoprotein A-I; CE = cholesteryl ester; FC = free cholesterol; LCAT = lecithin:cholesterol acyltransferase; SR-BI = scavenger receptor class BI

Functions and properties of HDL



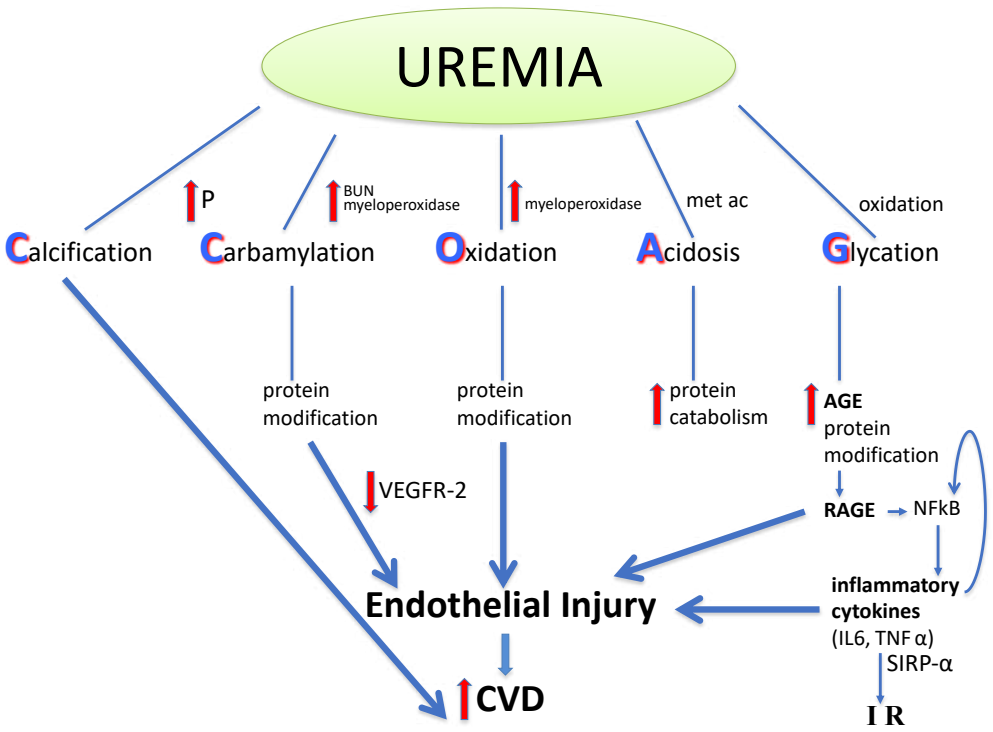
Navab, M. *et al.* (2011) HDL and cardiovascular disease: atherogenic and atheroprotective mechanisms *Nat. Rev. Cardiol.* doi:10.1038/nrcardio.2010.222

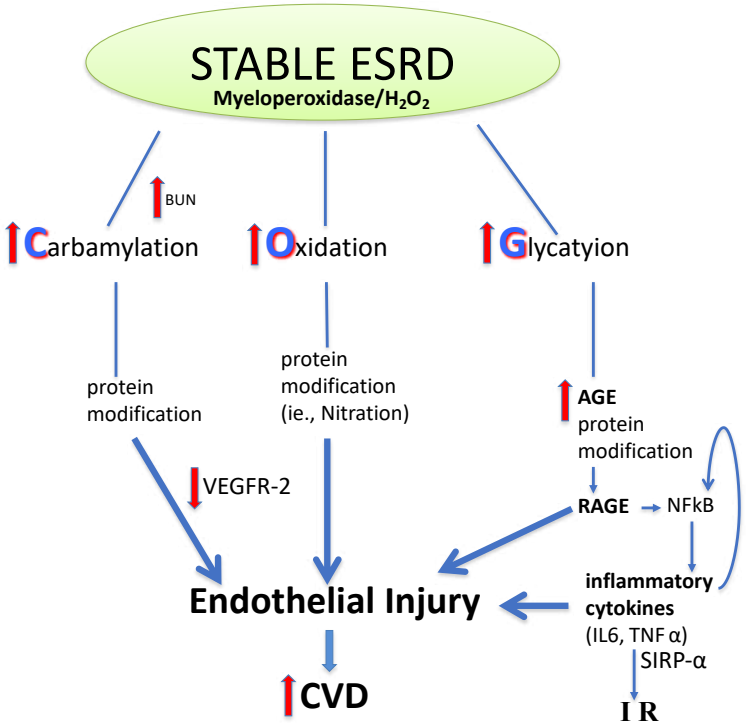

Causes of Death
Dialysis Patients 1993-1995
General Population 1993
Cerebrovascular 6%
Other Known 19%
Cardiac 49%
Unknown 7%
Infection 15%
Malignancy 4%
Other 23%
Cardiac 34%
Unintentional 4%
Infection 5%
COPD 4%
Cerebrovascular 7%
Malignancy 23%
Adapted from Sarnak MJ, Levey AS. Seminars in Dialysis 1999;2:69-76


Comparison of CV mortality
Annual mortality (%)
100
10
1
0.1
0.01
0.001
Dialysis
General
25–34
35–44
45–54
55–64
65–74
75–84
>85
Age (years)
GP Male
GP Female
GP Black
GP White
Dialysis Male
Dialysis Female
Dialysis Black
Dialysis White
Sarnak, 2000

Protein Energy Wasting (P.E.W.)

- Protein and calorie intake insufficient to meet cellular demand for growth, maintenance, and function.
- P.E.W, Inflammation, and CVD are predictors of Mortality in Pts W/ESRD.

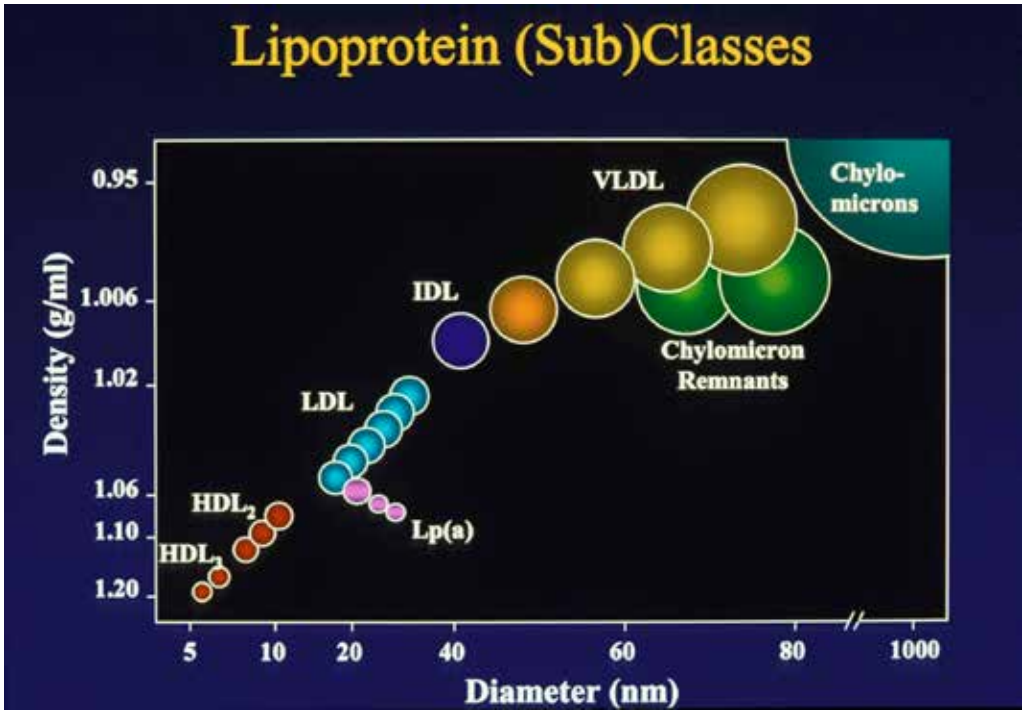



STABLE ESRD
Myeloperoxidase/H_2O_2
↑BUN
↑Carbamylation
↑Oxidation
↑Glycatyion
protein modification
protein modification (ie., Nitration)
↑AGE protein modification
↓VEGFR-2
RAGE → NFkB
Endothelial Injury
inflammatory cytokines (IL6, TNF α)
SIRP-α
↑CVD
I R

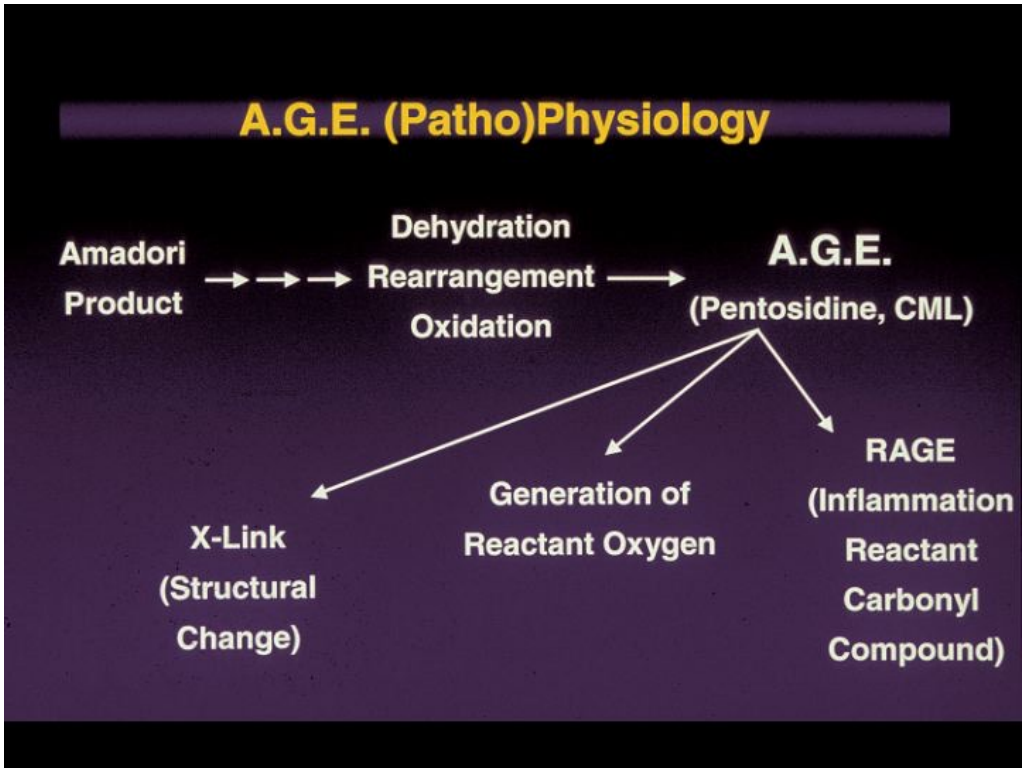

Breakfast
of Champions

POST TRANSLATIONAL PROTEIN MODIFICATION

ESRD CVD Risk
Post Translation Protein Modification
(LDL, HDL)

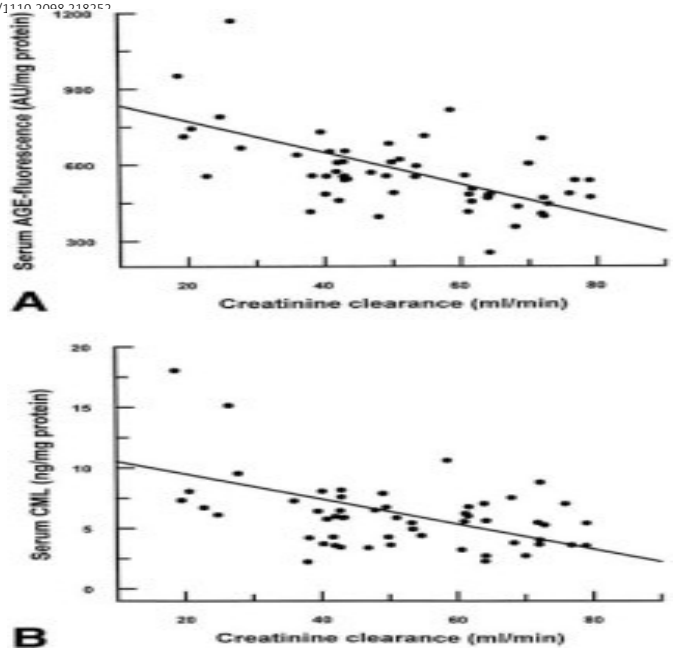

Lipoprotein (Sub)Classes
Density (g/ml)
0.95
1.006
1.02
1.06
1.10
1.20
VLDL
Chylo-
microns
IDL
Chylomicron
Remnants
LDL
HDL2
HDL3
Lp(a)
5
10
20
40
60
80
1000
Diameter (nm)

GLYCATION

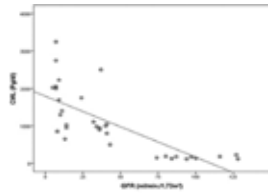


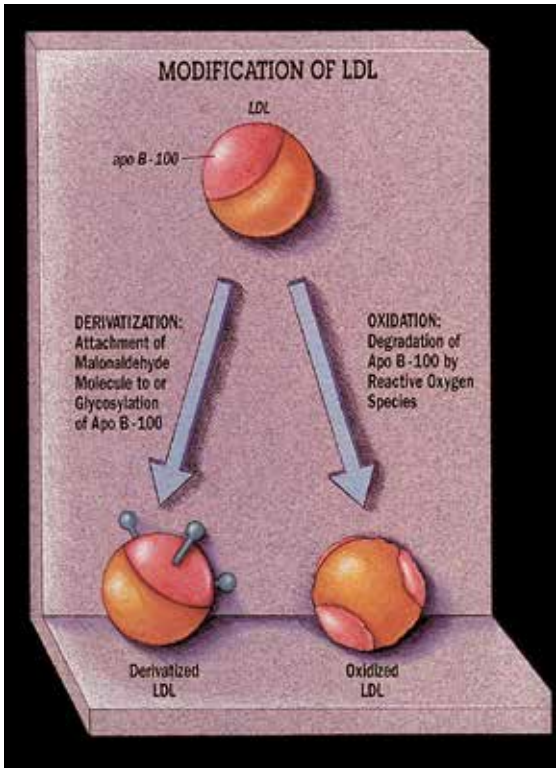
Serum AGEs increase with renal failure Diabetic patients

DOI: 10.4103/1110.2008.218252



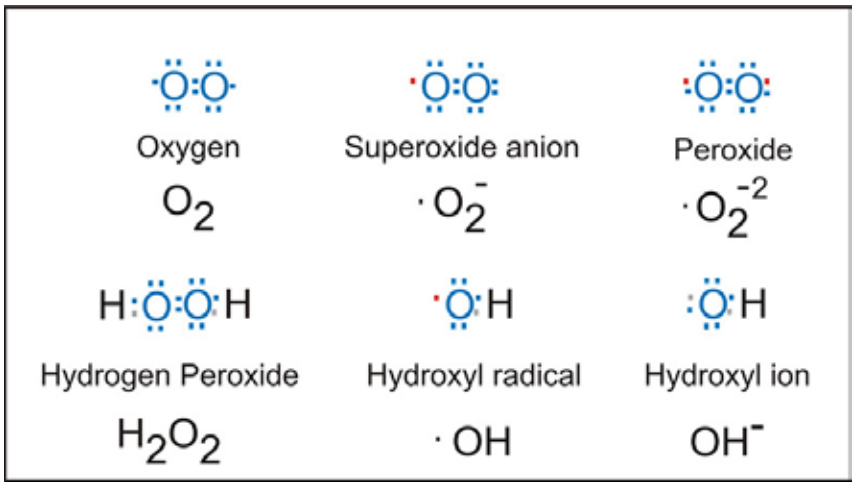
Carboxymethyllysine Levels and GFR Nondiabetic patients



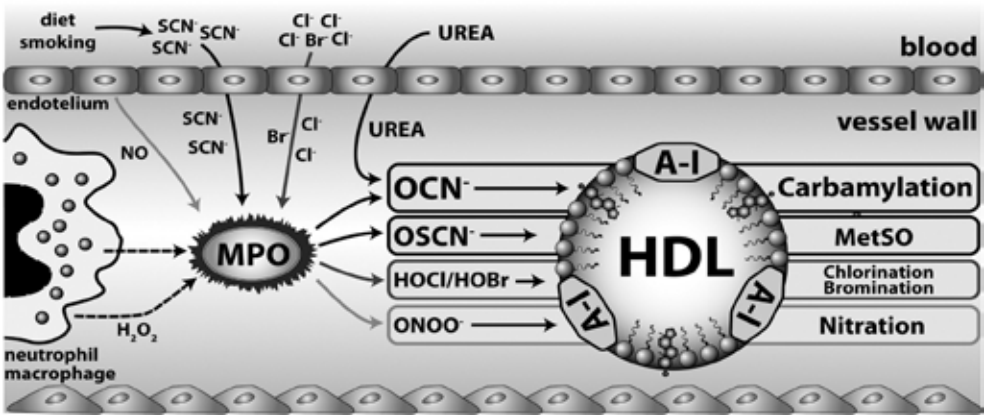


OXIDATION

ROS: Mitochondria dysfunc, AGE, ESRD

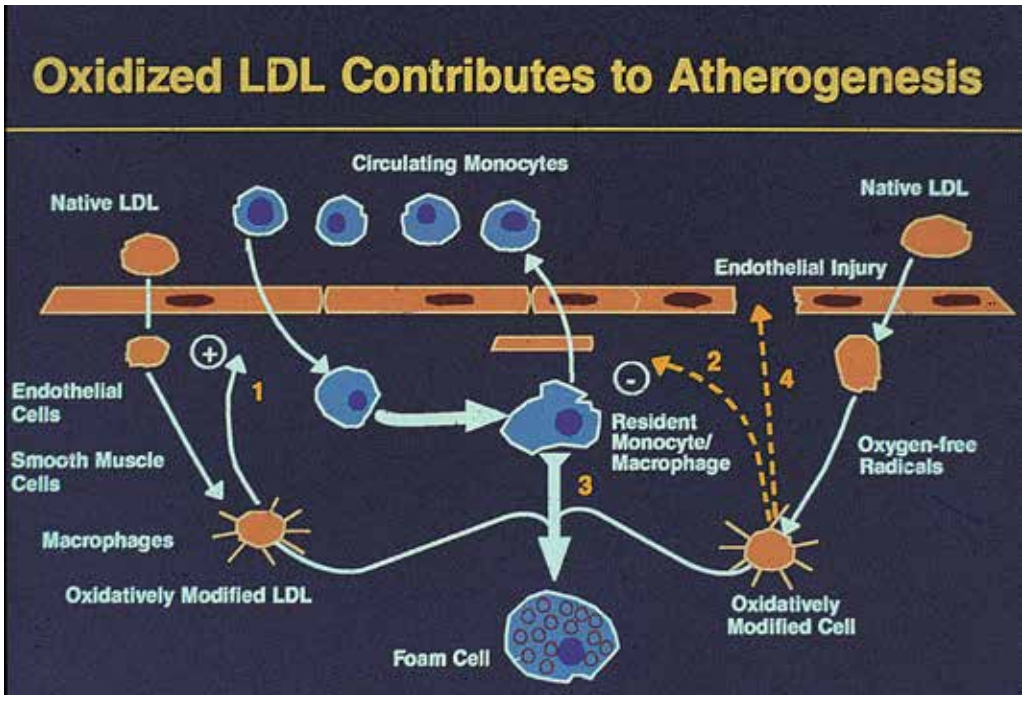


Inflammation alters HDL composition and function



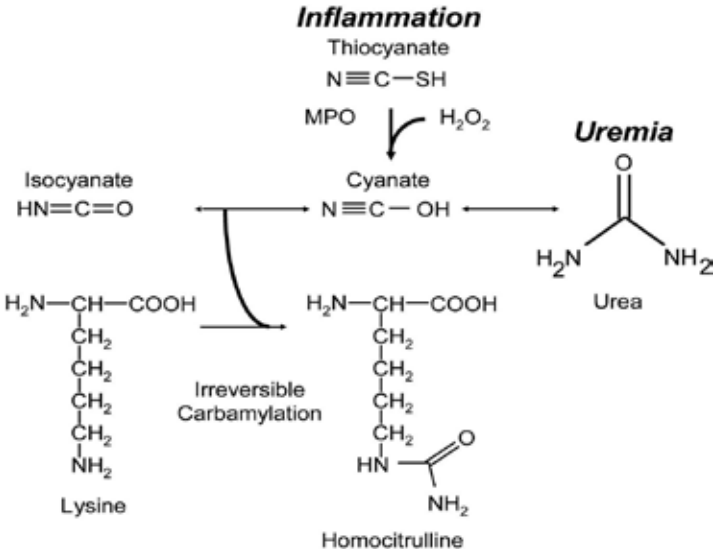
Gunther Marsche , Marcus D. Saemann , Akos Heinemann , Michael Holzer
http://dx.doi.org/10.1016/j.pharmthera.2012.12.001

Kidney International, Vol. 62 (2002), pp. 1524–1538



CARBAMYLATION

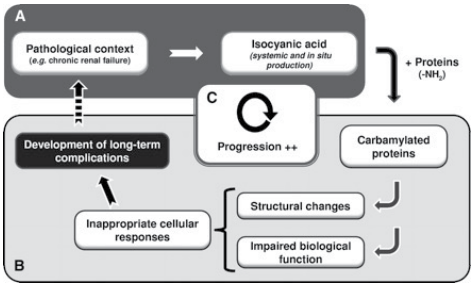
Scheme of protein carbamylation.



Robert A. Koeth et al. JASN 2013;24:853-861

Pathophysiology of Protein Carbamylation

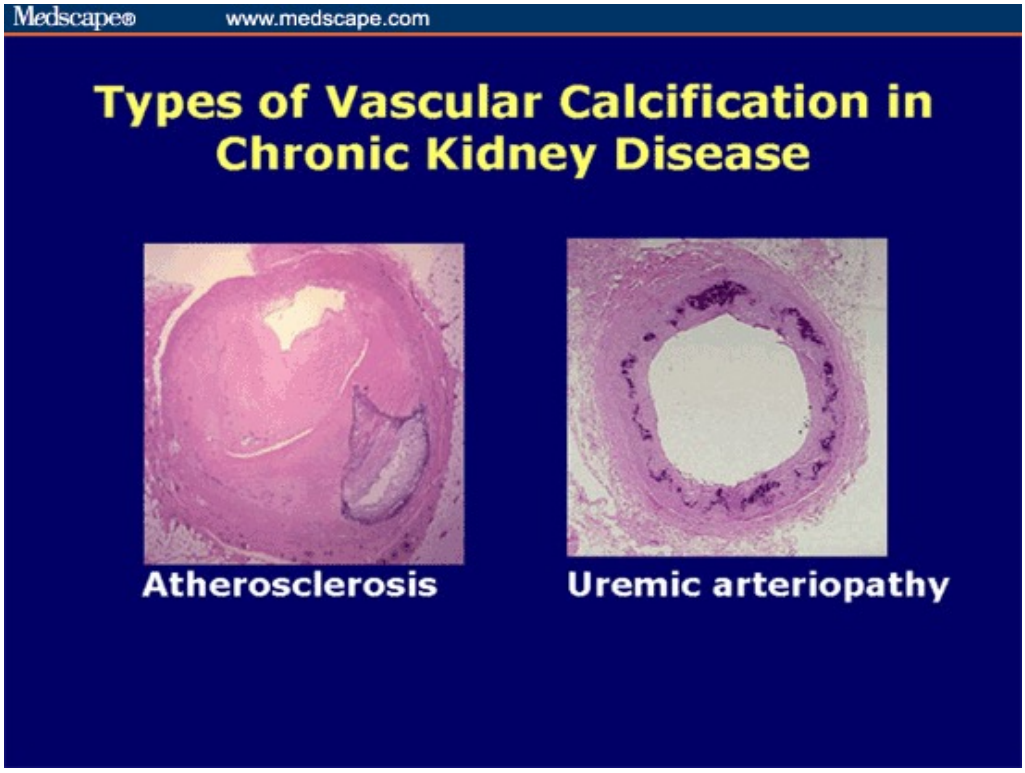
Clinical Chemistry, Volume 57, Issue 11, 1 November 2011, Pages 1499–1505



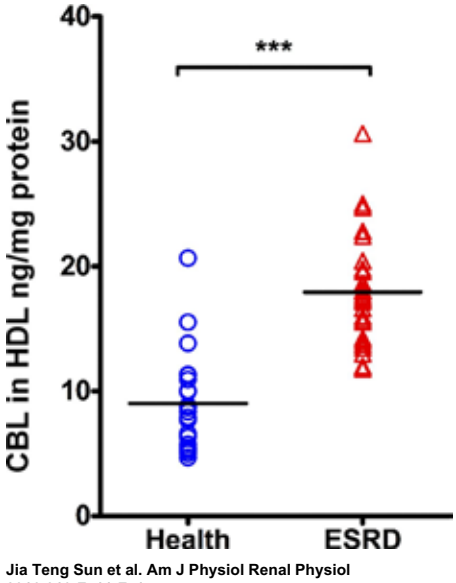
Carbarmylation of Mitochondial Proteins in CKD:

- **Down regulation of mitochon ENPP-1**
- **Suppressed PPi (Pyrophosphate) levels**
- **PPi is a potent inhibitor of ectopic mineralization.**

Mori,D, Matssui, I, et al. Kid Int. 2018, 94: 72-90.



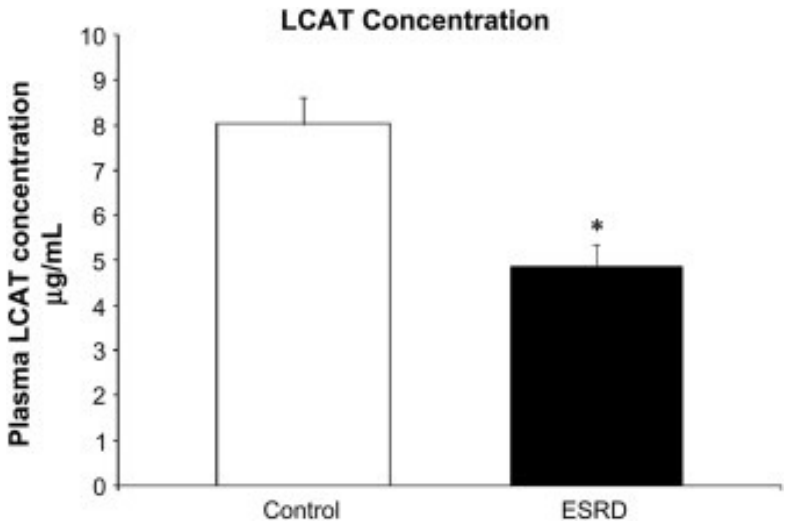
Carbamylation levels of high-density lipoprotein (HDL) in patients with end-stage renal disease (ESRD) and healthy control subjects.



Jia Teng Sun et al. Am J Physiol Renal Physiol 2016;310:F511-F517

AMERICAN JOURNAL OF PHYSIOLOGY
Renal Physiology

Impaired Concentration of LCAT in chronic kidney disease



Hamid Moradi , Madeleine V. Pahl , Reza Elahimehr , Nosratola D. Vaziri

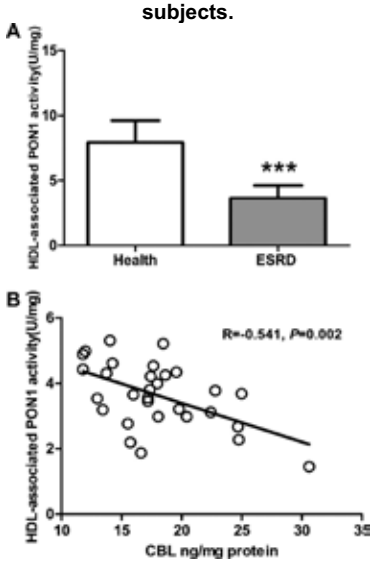
Translational Research Volume 153, Issue 2 2009 77 - 85

http://dx.doi.org/10.1016/j.trsl.2008.11.007

Inhibition of LDL Oxidation by HDL: *Role of Paraoxonase*

- Paraoxonase is transported in plasma as a component of HDL
- Paraoxonase is known to inhibit the oxidative modification of LDL
- Thus, the presence of paraoxonase in HDL may accounts for the antioxidant properties of this lipoprotein

Relationship between the HDL carbamylation level and paraoxonase 1 (PON1) activity in patients with ESRD. A: HDL-associated PON1 activity in ESRD patients and healthy control subjects.

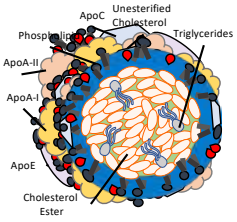


Jia Teng Sun et al. Am J Physiol Renal Physiol 2016;310:F511-F517

AMERICAN JOURNAL OF PHYSIOLOGY Renal Physiology

Proatherogenic High Density Lipoprotein

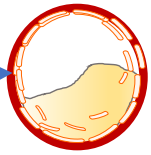
Antioxid Redox Signal 14 (12), 2337-2346 (2011)



Carbamylation

Modified protein structure

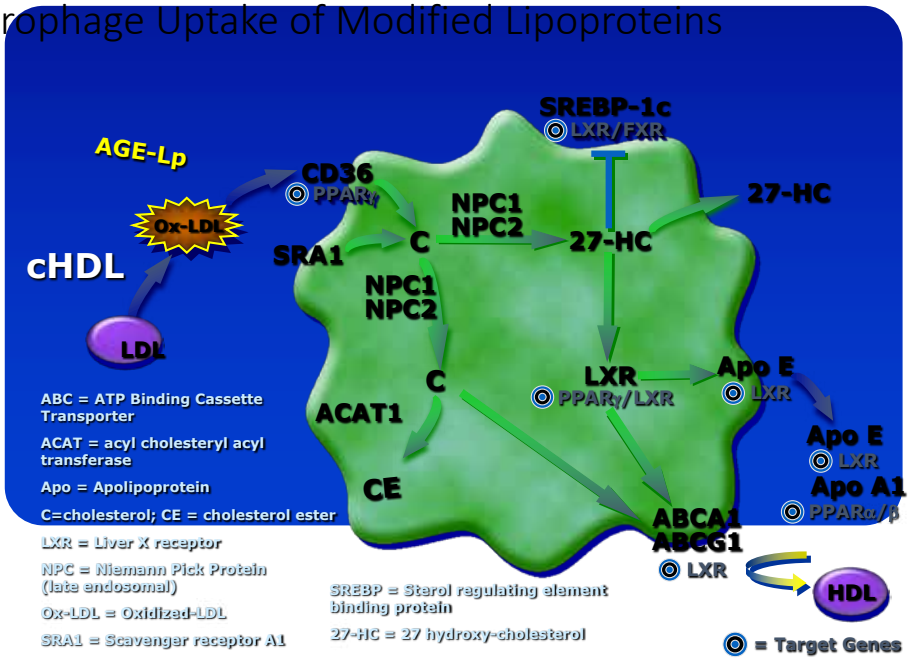
HDL Dysfunction



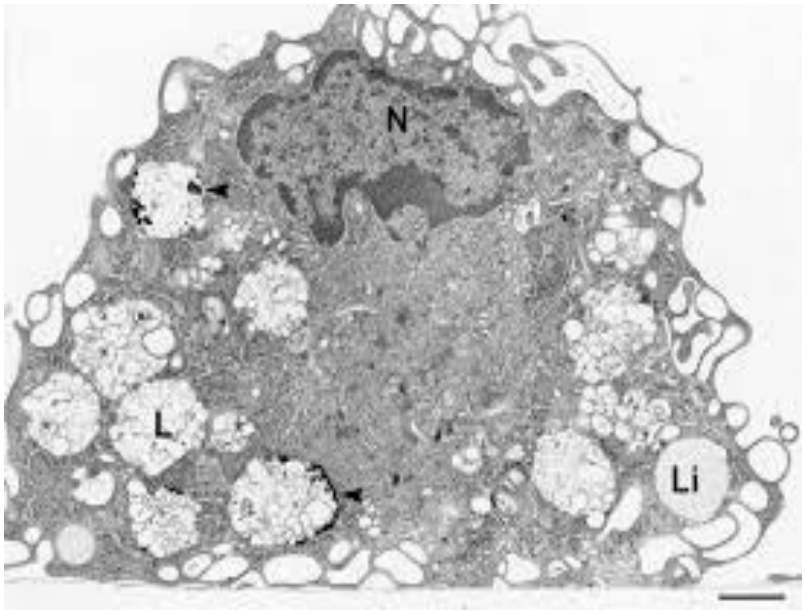
- *Preserve endothelial function*
- *Promote cholesterol efflux*
- *Anti-oxidative, anti-inflammatory, and anti-thrombotic effects*

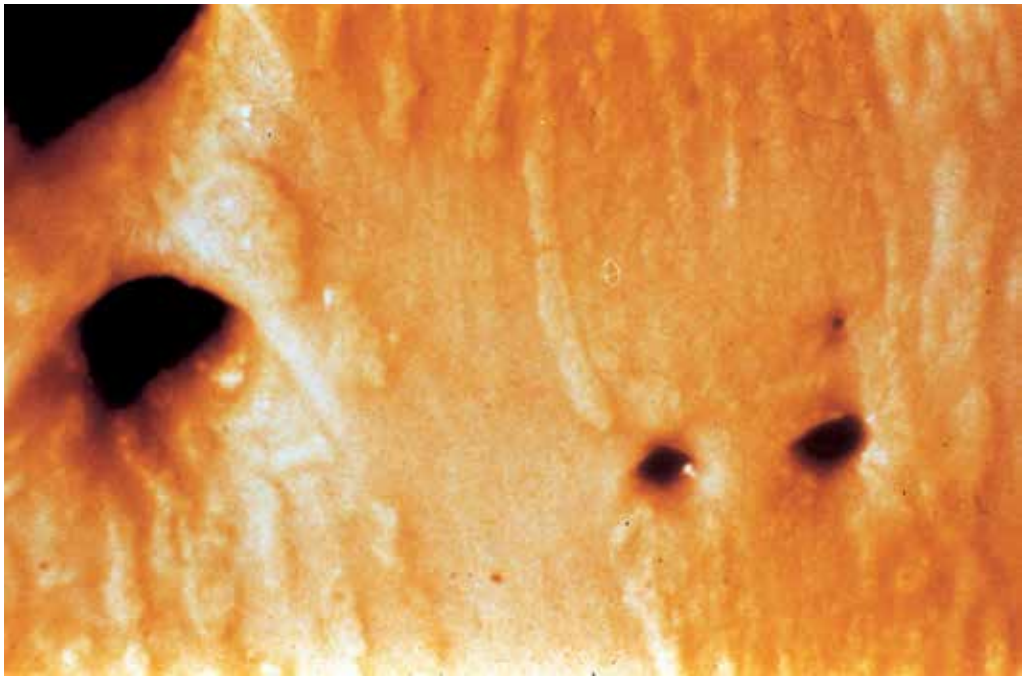
- *Atherosclerosis*
- *Vascular and endothelial cell instability*
- *Increased cardiovascular risk*

ESRD: Macrophage Uptake of Modified Lipoproteins



Ffoam Cell

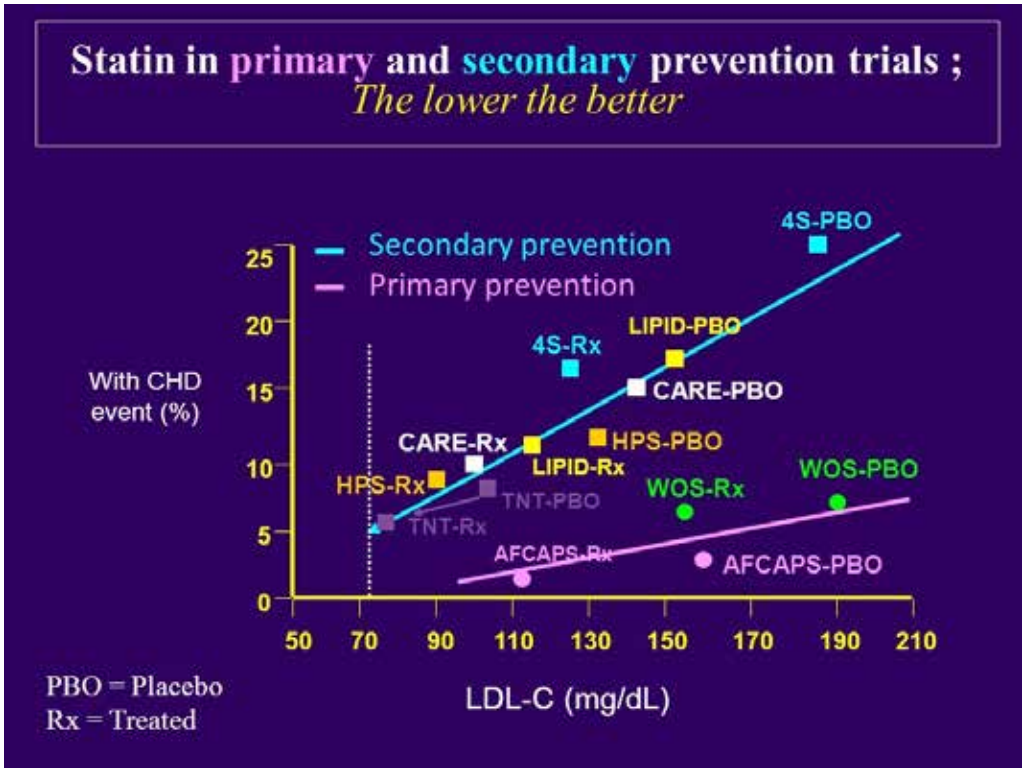




1. Uremia associated CVD is caused by multiple factors

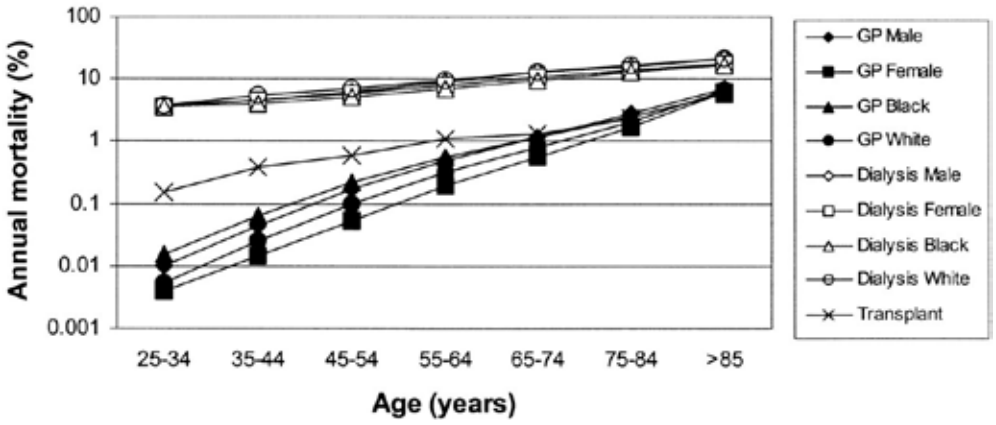
2. Protein modification is a major factor of uremia associated CVD

What are possible Therapeutic Modalities ?

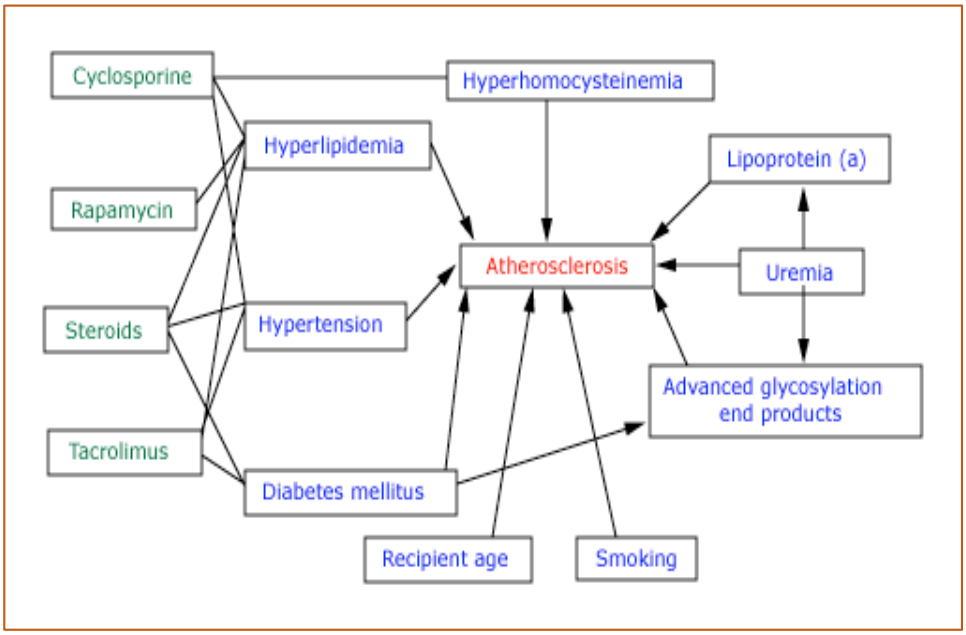


Trial	Statin	Effect (Fatal, nonFatal MI)
Aurora	Rosvasatin	NS
4D	Atorvastatin	NS
SHARP	Simva/Ezet	NS

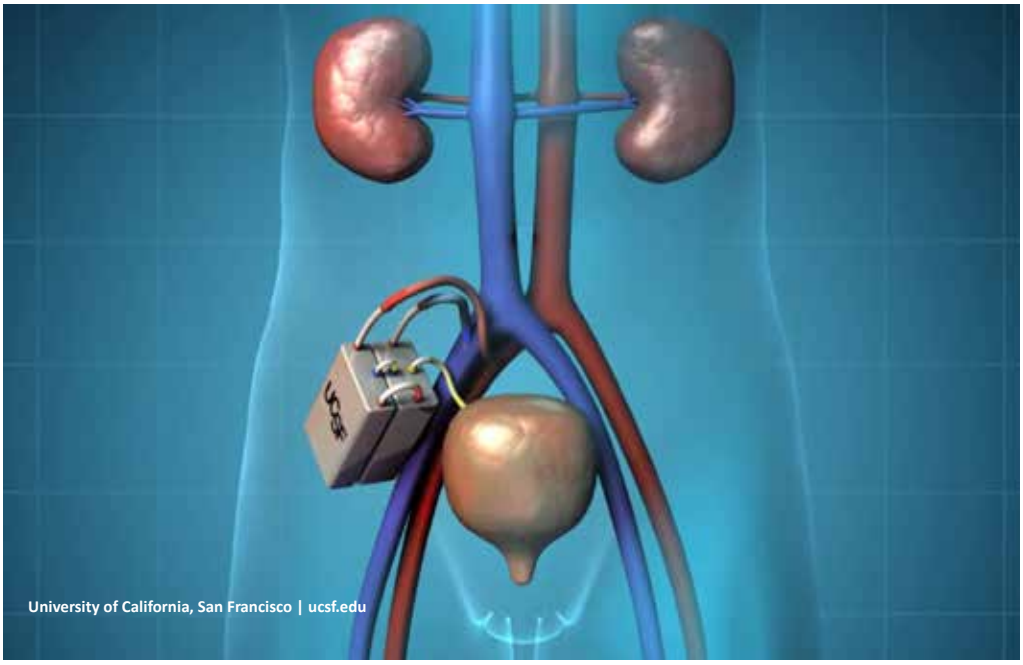
Kidney Transplant



RISK FACTORS FOR ATHEROSCLEROSIS IN TRANSPLANT RECIPIENTS



UCSF Artificial Kidney Project Tapped for Accelerated FDA Program



THANK-YOU

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Improving colon health at home and abroad

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Associate Professor of Medicine
Howard University, Washington DC, USA
June 2021

Purpose and Objectives

PURPOSE

To improve colon health and reduce the burden of preventable diseases.

OBJECTIVES

- Objective 1: To discuss the burden of colonic diseases including colorectal cancer
- Objective 2: To identify factors associated with colonic diseases
- Objective 3: To elucidate strategies to reduce the burden of colonic diseases including colorectal cancer

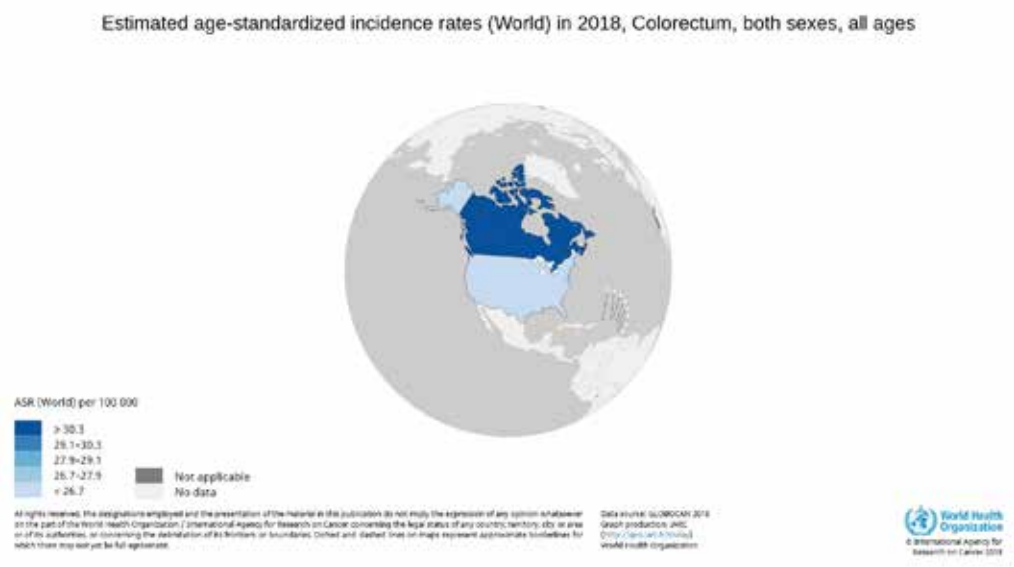
FINANCIAL DISCLOSURE

There are no financial disclosures.

Agenda

- Magnitude of gastrointestinal diseases
- Clinical features
- Challenges
- Prevention strategies

Magnitude of the problem



True or False

- If we don't have data, we don't have the disease?

Playing the ostrich

Inflammatory Bowel Disease

Clinical Gastroenterology and Hepatology 2020;18:304–312

SYSTEMATIC REVIEWS AND META-ANALYSES

Siddharth Singh, Section Editor

Progression of Inflammatory Bowel Diseases Throughout Latin America and the Caribbean: A Systematic Review

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BACKGROUND & AIMS: **The incidence of inflammatory bowel diseases (IBD) is increasing in Latin America. We performed a systematic review to identify clinical and epidemiologic features of IBD in Latin America (including Mexico, Central America, and South America) and the Caribbean.**

Inflammatory Bowel Disease

- The incidence and prevalence of IBD are increasing throughout Latin America and the Caribbean.
- Population-based epidemiology studies are needed to evaluate the increase in IBD in these regions.
- Physicians in Latin America and the Caribbean should be aware that more patients will be presenting with IBD.

Kotze PG et al. Clinical Gastroenterology and Hepatology 2020;18:304–312

Increased awareness needed

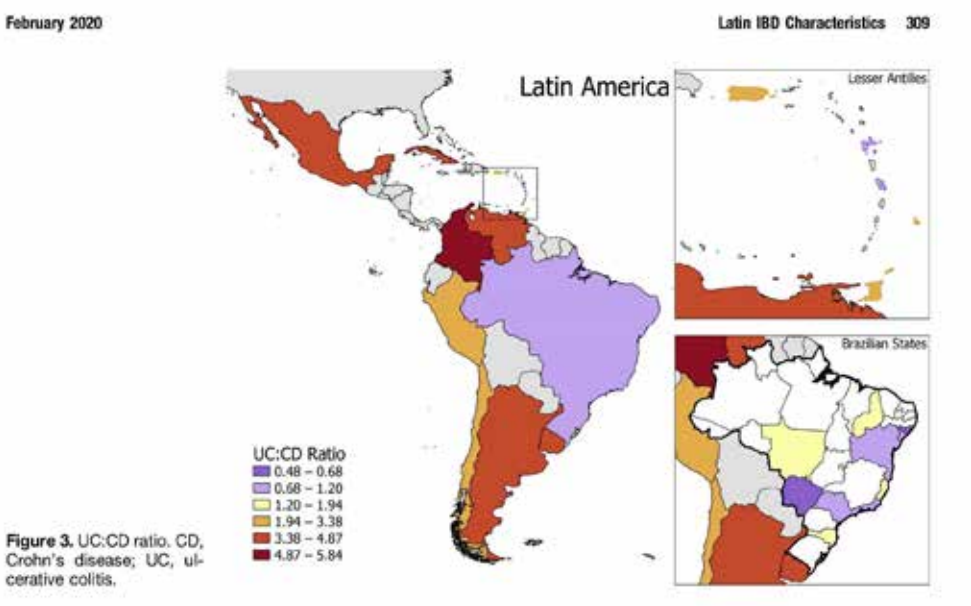


Figure 3. UC:CD ratio. CD, Crohn's disease; UC, ulcerative colitis.

Kotze PG et al. Clinical Gastroenterology and Hepatology 2020;18:304–312

Increased awareness needed

- In a study involving 306 patients
  - The mean time between onset of symptoms and diagnosis was 28 months for Crohn's disease
    - 37 months for patients with ileocolonic location,
    - 26 months for patients with ileum location and
    - 18 months for patients with colon location.
  - 19 months for ulcerative colitis.
    - 52 months for proctitis,
    - 12 months for left-sided colitis and
    - 12 months for extensive colitis

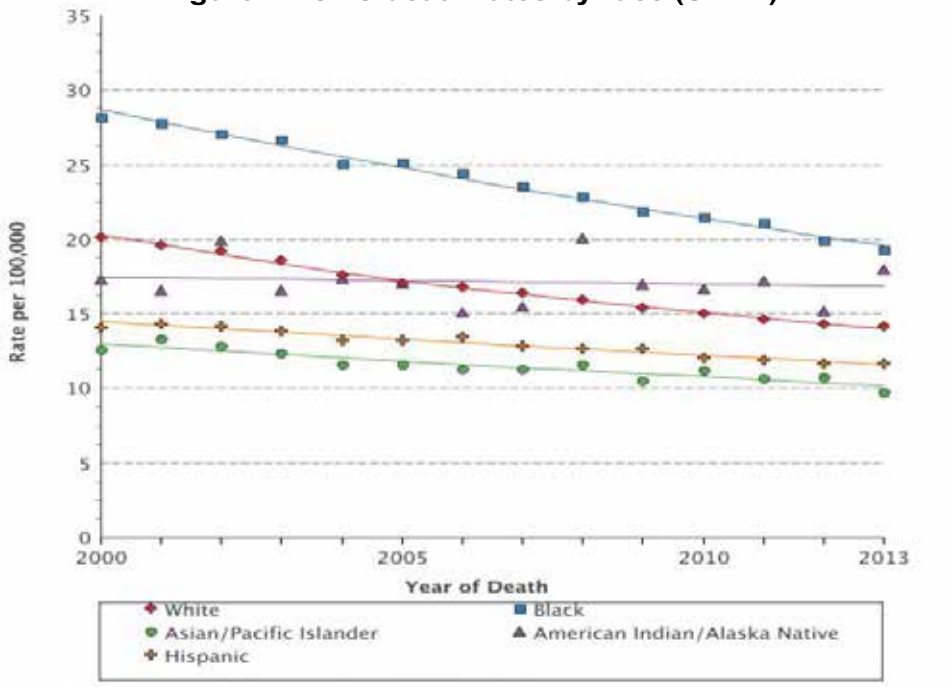
Nobrega VG, et al. *Arq. Gastroenterol.* [online]. 2018, vol.55, n.3, pp.290-295.

Late stage presentation for colorectal cancer too

- Martinique population-based cancer registry between 1993 and 2012
- 2230 cases of incident CRC
- 779 (89.6%)patients with stage information
  - 486/779 (62.4%) had stage III-IV at diagnosis
  - 285 (36.6%) patients with metastases at diagnosis (stage IV).

Joachim C, et al. *Medicine (Baltimore)*. 2019;98(35):e16941.

Figure 1: CRC death rates by race (SEER)



Global migration patterns

- CRC incidence variation across continents
  - Japanese in Hawaii in the 1960's
- Africans in Africa versus African Americans
  - They left malaria for heart disease and cancer ☹
- Changes in lifestyle and dietary patterns
  - "Western diet" in Asia
- Migrants develop similar risk of CRC as natives within the same generation.

Stemmermann GN, et al. Natl Cancer Inst Monogr. 1979 Nov;(53):175-9.

Afro-Caribbeans vs. African-Americans

- Death records for New York City from 1988 through 1992
- Cancer mortality rate
  - Black men > White men (512.6 vs. 385.6 per 100,000 per year)
  - Black women = White women (270.8 vs. 270.6)
  - Southern-born black males > Northeast-born black males > Caribbean-born black males
    - 615.7 versus 419.1 versus 352.4
  - Caribbean-born males have the highest burden from prostate cancer

Fang J, et al Cancer. 1997 Jul 1;80(1):129-35. PMID:9210718

Afro-Caribbeans vs. African-Americans

- 3797 AA and AC patients undergoing first time screening colonoscopy in USA
- Adenoma prevalence
  - 29.5% in AAs and 29.0% in AC
  - (AOR: 1.02; 95% CI: 0.88-1.18, P = 0.751).
- Advanced colorectal neoplasia
  - (11.8% in AAs and 9.0%in AC
  - (AOR: 1.30, 95% CI 1.02-1.66, P = 0.034)

Melendez-Rosado J, et al. [2019 Nov 19]. *Dig Dis Sci*. 2019;10.1007/s10620-019-05956-1.

Clinical features

- Blood in the stool
- Fecal urgency
- Change in bowel habits (Diarrhea, Constipation)
- Unexplained weight loss
- Anemia
- Abdominal mass
- Abdominal pain and
- Asthenia.

Symptoms are warning signs

- All that bleeds is not hemorrhoid

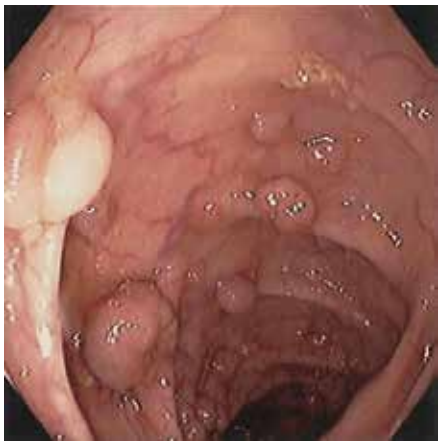
Predisposition to CRC

- Hereditary
  - Familial Adenomatous Polyposis (FAP) ~ 1%
  - Lynch syndrome ~ 5%
- Inflammatory ~ 1%
  - Crohn's disease
  - Ulcerative colitis
- Family History of CRC ~ 20%
- Sporadic CRC ~ 75%

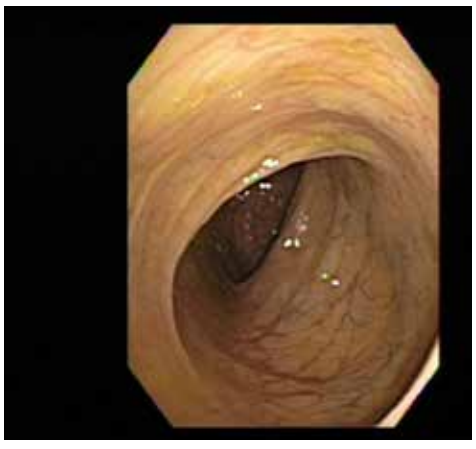
Predisposition to Colorectal Cancer

- Majority of colorectal cancers are sporadic
- Sporadic = occurring in scattered, unpredictable instances
- Sporadic = Idiopathic
- Idiopathic = Makes you look like an idiot

Take your choice



Colon with polyps



Normal colon

No colon should be left behind!

A good question

- Does technological advancement increase or decrease healthcare disparities?

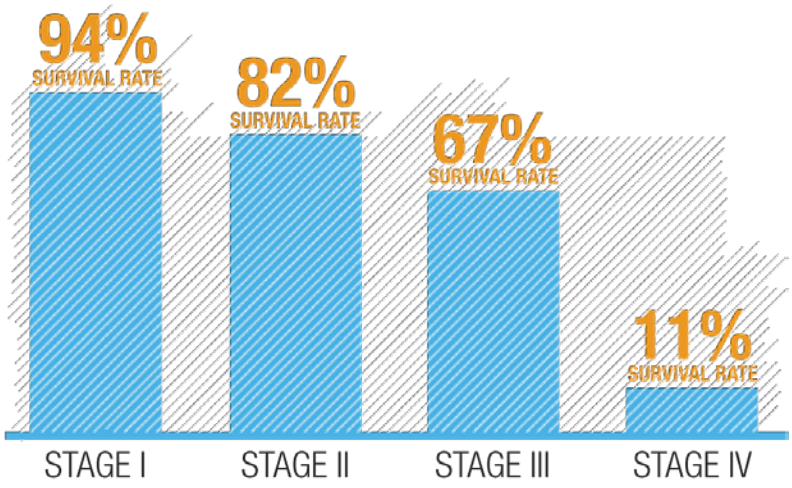
The technological and resources divide

- Surveillance, Epidemiology and End Results program (SEER) data
- *n* = 580,225 invasive cancers
- Non-amenable, partly amenable, and mostly amenable cancers
- As amenability increased, racial/ethnic differences in cancer survival increased for African Americans, American Indians/Native Alaskans, and Hispanics relative to Whites.

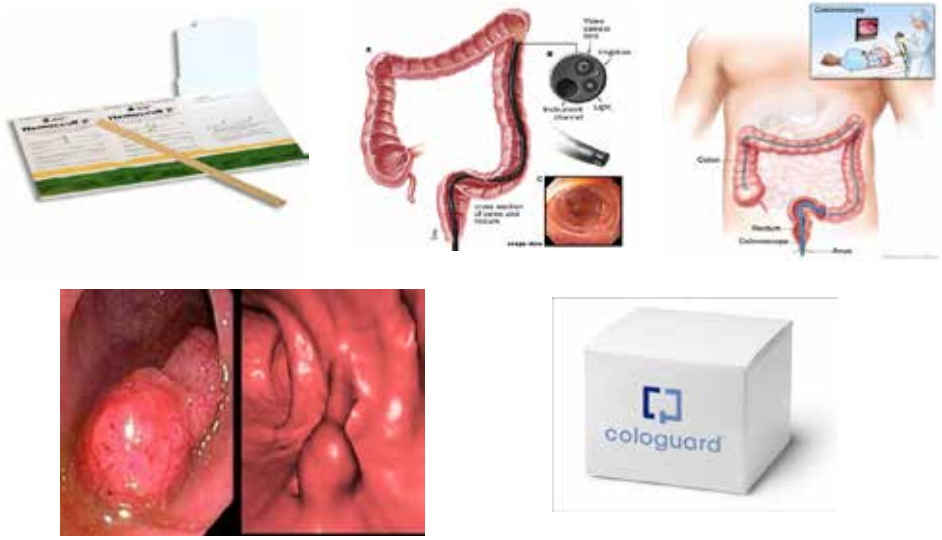
Tehranifar P et al. Cancer Epidemiol Biomarkers Prev. 2009 Oct;18(10):2701-8

Early diagnosis is important!!!!

By early diagnosis and treatment



Screening modalities for CRC



Shamelessly “borrowed” from Google images

What do we have to do?

- Screen baby screen!
- Screen baby screen!!
- Screen baby screen!!!
- Screen baby screen!
- Screen baby screen!!
- Screen baby screen!!!

Interventions

- Patient level
- Provider level
- System level

Patient level

- Providing access is the first step
  - Health insurance (Solution)
  - Health insurance is necessary but not sufficient
  - CRC screening is not an emergency
- Combating fatalistic beliefs and fear
  - Education and integration (Solution)
    - Group education; one on one
    - Churches, community centers etc

Blumenthal DS, et al. Cancer. 2010 Feb 15;116(4):922-9

Patient level

- Compliance to screening schedule
  - Returning FIT / FOBT cards
  - Diagnostic colonoscopy for positive FIT/FOBT/Sig
  - No shows for screening colonoscopy
  - Poor bowel preparation for colonoscopy
- Solutions
  - Patient reminders (phone calls, text messages etc)
  - Patient navigation services
    - Eliminate barriers (appointment, paperwork etc)
    - Reminder phone calls; Arrange transportation
    - Follow up of abnormal screening test

Laiyemo AO, et al. J Natl Cancer Inst. 2010 Apr 21;102(8):538-46. Honeycutt S, et al. Cancer. 2013 Aug 15;119(16):3059-66. Percac-Lima S, et al. J Gen Intern Med. 2009 Feb;24(2):211-7
Lee CS, et al. J R Soc Med. 2003;96(11):547-8. Downer SR, et al. Aust Health Rev. 2006;30(3):389-96

Physician level

- Physician education
  - Increased screening recommendations to patients
- Electronic reminders
  - Reminds physicians to remind their patients
- Additional healthcare providers
  - Nurse practitioners and
  - Physician assistants
  - Reduce time pressure on physicians

Nash D, et al. J Urban Health. 2006;83(2):231–43
Ferreira MR, et al. J Clin Oncol. 2005;23(7):1548–54.

System level

- CME approved didactic sessions
  - Improvement: (OR=2.25; 95% CI:1.67-3.04)
- Multi-modal intervention consisting of checklists, chart reminders, and feedback of screening rates to clinic staff.
  - Improvement: OR=2.56; 95% CI:1.65-4.01
- Financial bonuses as incentives to providers
  - Improvement: 23.4% to 26.4%, P <0.01
  - Yes. Year end bonus is great!!!!

Lane DS, et al Med Care. 2008;46(9 Suppl 1):S109–16
Roetzheim RG, et al. Ann Fam Med. 2004;2(4):294–300
Armour BS et al. Am J Manag Care. 2004;10(9):617–24

- Actions to reduce CRC burden

The key issue

- Family history of CRC information
  - Present versus absent
  - Role of family history in CRC screening recommendations (12 yrs (FAP); 20 yrs (HNPCC); 40 yrs (FDR; 2 x SDR))
  - Lack of information on family health history
    - No family history of CRC = unknown family history

Smoking

- Overall evidence suggest an increased risk of colorectal adenoma and colorectal cancer among smokers: RR ~ 1.20
  - Relatively long lag period ~ 20yrs
  - May be dose dependent

- It is unclear if smoking cessation will reverse the risk of CRC
- Stopping smoking is still better for you ☺

Tsoi KK, et al. Clin Gastroenterol Hepatol. 2009 Jun;7(6):682-688

Aspirin and Non Steroidal Anti-Inflammatory Drugs Use

- NSAIDs trials reduced adenoma recurrence
  - APC (Celecoxib)
  - PreSap (Celecoxib)
  - APPROVe (Rofecoxib)
- But increased cardiovascular events
- USPSTF now recommends
  - Low dose aspirin may be ok if 50-59yrs + 10% CVD risk in 10 years, take for at least 10 years
  - Individualize for those aged 60 to 69 years who have a 10% or greater 10-year CVD risk

Baron JA, et al. Gastroenterology. 2006;131:1674-82.; Bertagnolli MM, et al. N Engl J Med. 2006;355:873-84. Arber N, et al. N Engl J Med. 2006;355:885-95. Rostom A, et al. Ann Intern Med. 2007;146(5):376-89. Bibbins-Domingo K, USPSTF. Ann Intern Med. 2016;164(12):836-845.

Physical activities

- Evidence suggest a reduced risk of CRC and adenoma among those who are physically active and increased risk among sedentary individuals.
  - 27% reduction
  - Both proximal and distal colon

Boyle T, et al. J Natl Cancer Inst.2012 Oct 17;104(20):1548-61

The American Dream!!!

Obesity

- Overall evidence suggest an increased risk of CRC with obesity
- By BMI
  - RR = 1.33; 95% CI: 1.25-1.42
- By waist circumference
  - RR = 1.45; 95% CI: 1.33-1.60.

Ma Y, et al. PLoS One. 2013;8(1):e53916

Alcohol Consumption

- Evidence suggest that consumption of alcohol is associated with increased risk of CRC
- Up to 50% increased risk
- Dose dependent
- Worse with beer
- ? Benefit with red wine

Liver cirrhosis

Pelucchi C, et al. Nutr Cancer. 2011;63(7):983-90.
Blot WJ. Cancer Res. 1992 Apr 1;52(7 Suppl):2119s-2123s

Meat Consumption

- Evidence suggest that consumption of red meat is associated with increased risk of CRC
- 28% to 35% for red meat
- 20% to 49% for processed meat
- Processed meat = class 1 and red meat = class 2A carcinogen by IARC

Zandonai AP, et al. Rev Esc Enferm USP.2012 Feb;46(1):234-9.

Fruits and Vegetables

- Evidence suggest that high consumption of fruits and vegetables is associated with reduced risk of CRC
- RR = 0.80; 95%CI: 0.70-0.90

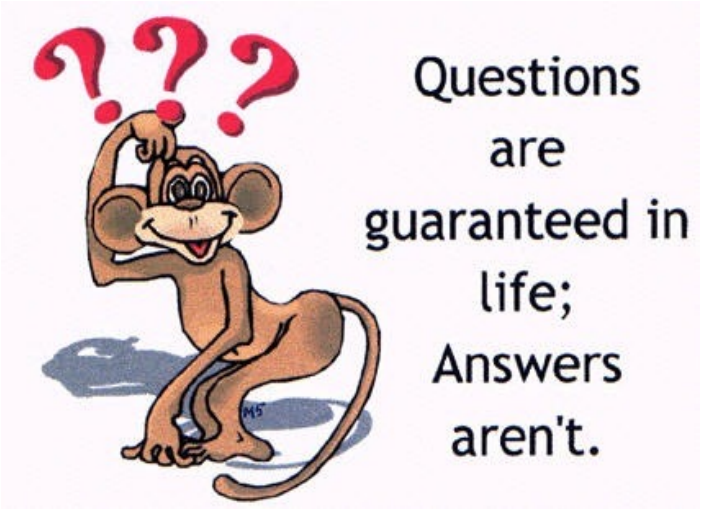
Magalhães B, et al. Eur J Cancer Prev. 2012 Jan;21(1):15-23.

Summary

- We need better awareness of gastroenterological diseases and avoid risk factors
- We have to provide access to the healthcare services we are trying to deliver (screening)
- We have to encourage utilization of the services
- We have to compensate those delivering the services adequately
- Invest in the patient, the provider and the system

Yes! We can cross the finish line

Thank you for your attention



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Emergency Radiology Cases

Berndt P Schmit, MD MBOE

Associate Professor of Radiology
Section Chief Emergency Radiology
University of Arizona

Disclosures

- Founder of Humanitarian Radiology Development Corps (501c3)
- Consultant with Radiology Business Solutions
- Co-founder of SonoArmour
- Advisor for VistaScan

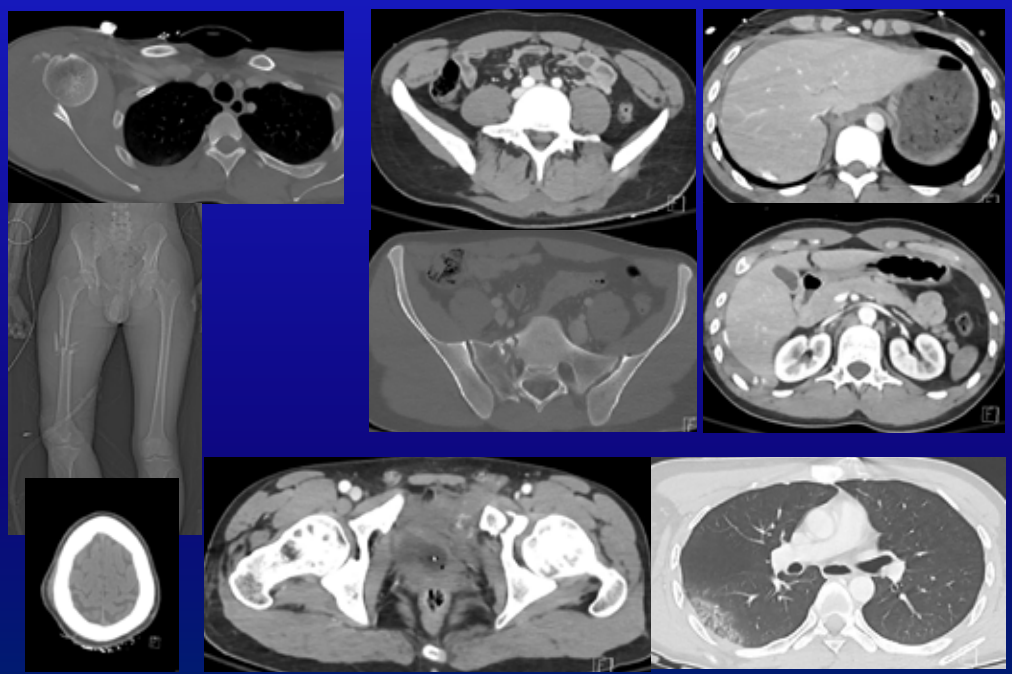
- No financial conflicts

Objectives/Goals

- To raise awareness of use of CT and MRI in Emergency Radiology
- To raise awareness of diagnostic imaging capability for trauma and acutely ill patients.

Case 1: *The CT Pan Scan*

25 M, Hit by car at 60mph. Head struck windshield. Launched 30 feet.



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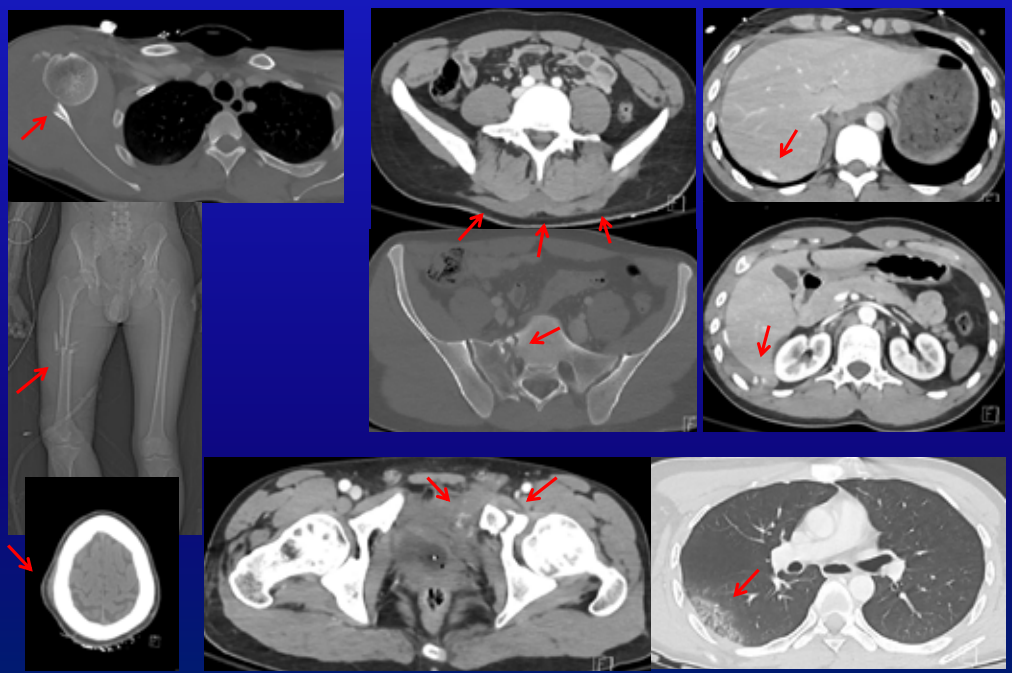
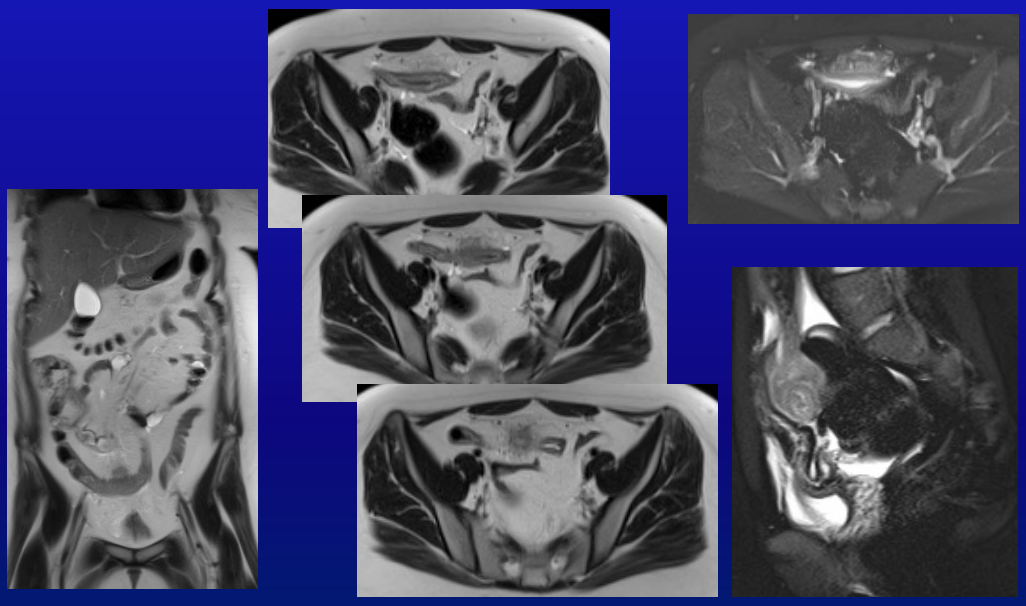


Case 2:

20 F, chronic vague abdominal pain, worse with stress

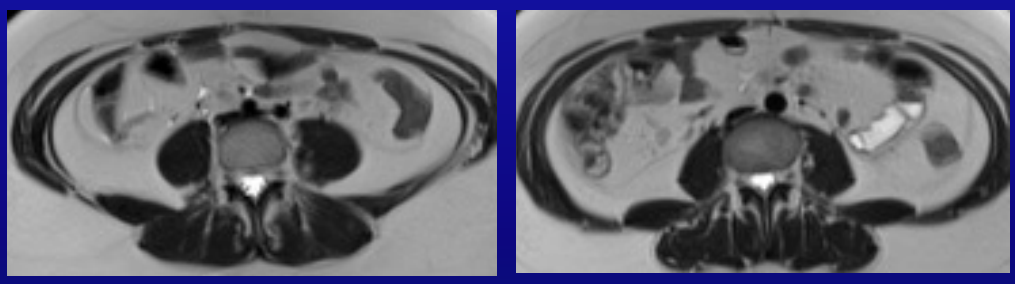
Inflamed Meckle's diverticulum



Case 2:

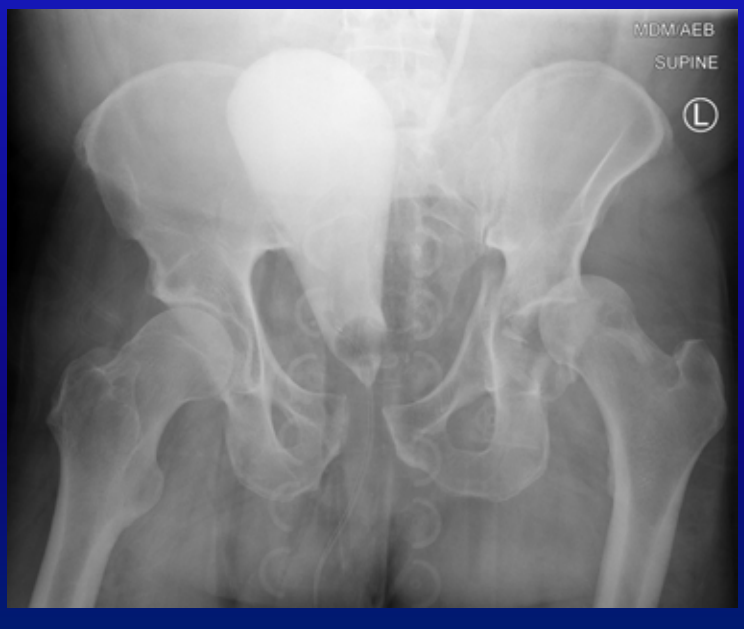
20 F, chronic vague abdominal pain, worse with stress

Normal Appendix & terminal ileum



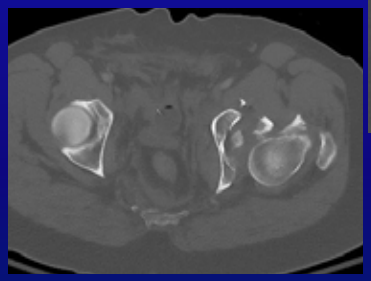
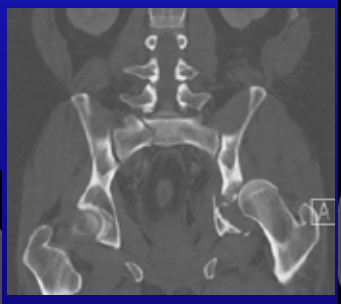
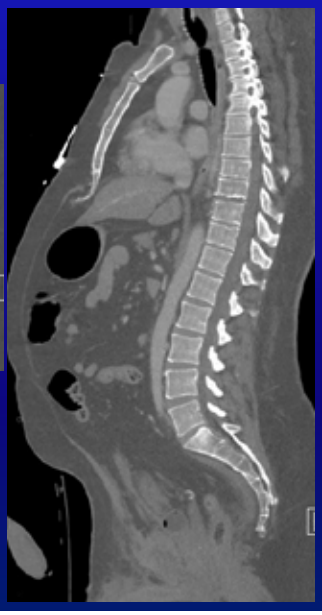
Case 3:

50 y/o Male, Car crash, driver



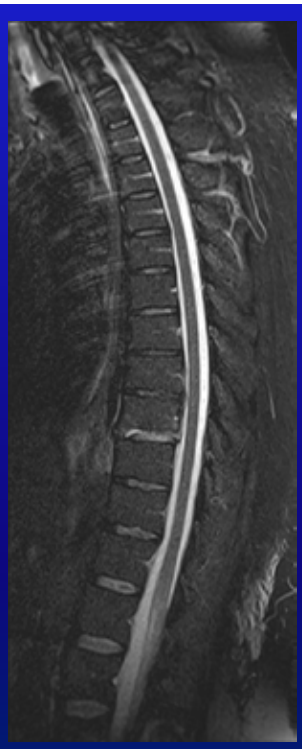
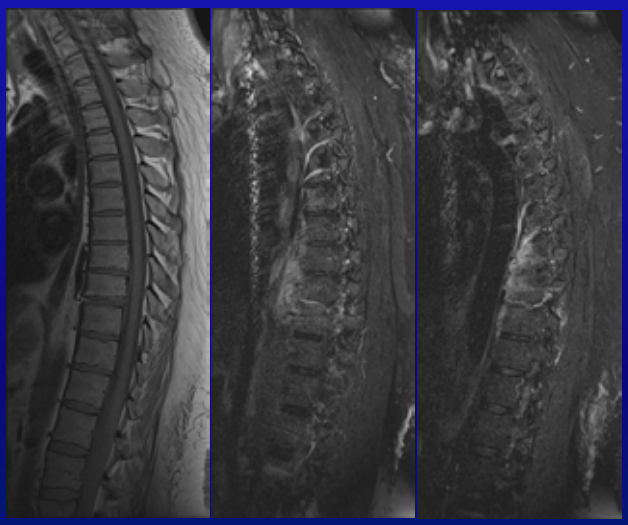
Case 3:
50 M, Car crash, driver

T9-10 slight distraction
Low rectal tone before intubation
Complex acetabular fracture dislocation

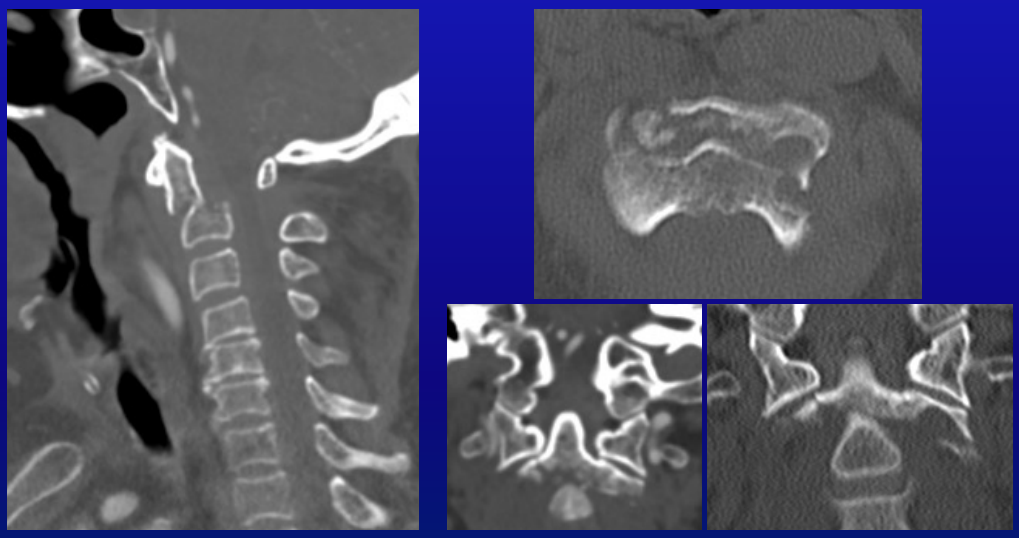
Case 3:
50 M, Car crash, driver

T9-T10 disc and ligament disruption
Normal spinal cord

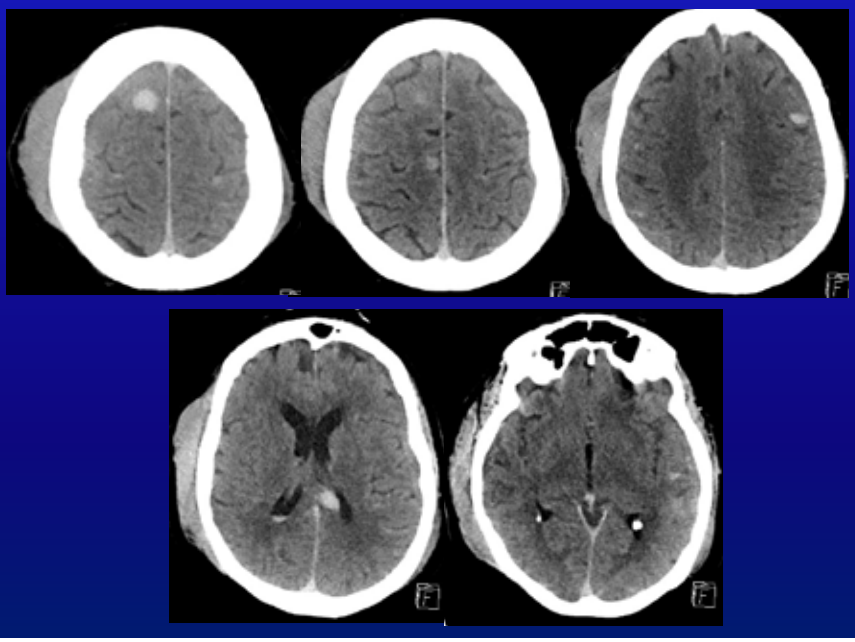
Case 4:
65 F, Rear-ended MVC.

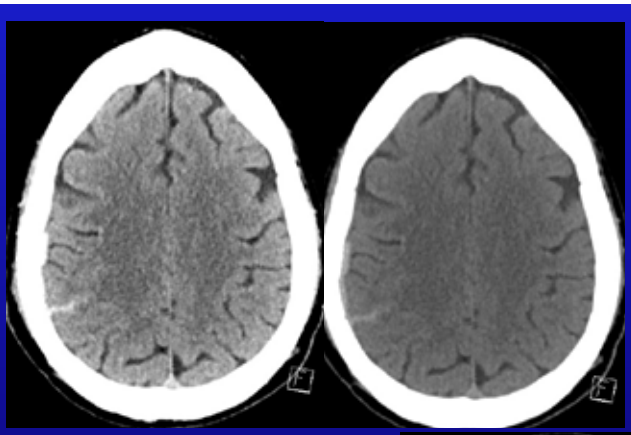
Type 2-3 dens fracture



Case 4:
65 F, Rear-ended MVC.

Diffuse axonal injury



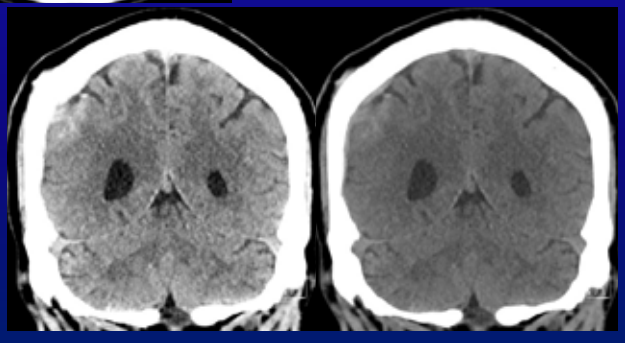


Case 5:

42 M, ETOH Altered mental status. Facial trauma.

Thin right subdural bleed
Focal Subarachnoid right

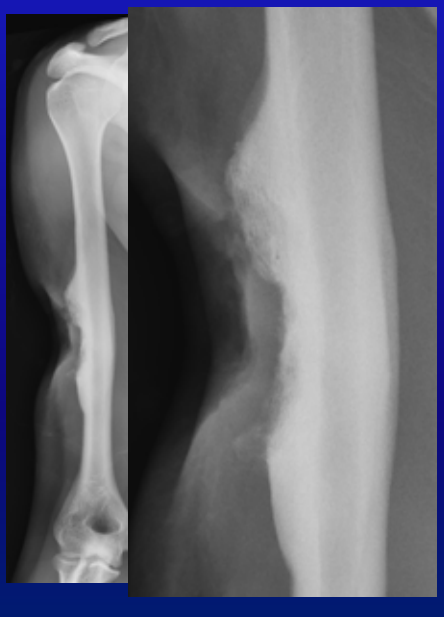
Windowing is Key

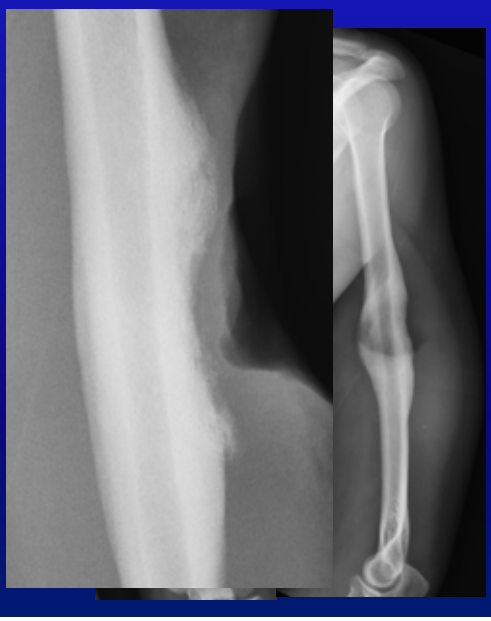


Case 6:

33 F, Chronic bilateral draining wounds.
Injects arms so no track marks.
Childhood history of opioids after foot surgery.

Acute & Chronic Osteomyelitis

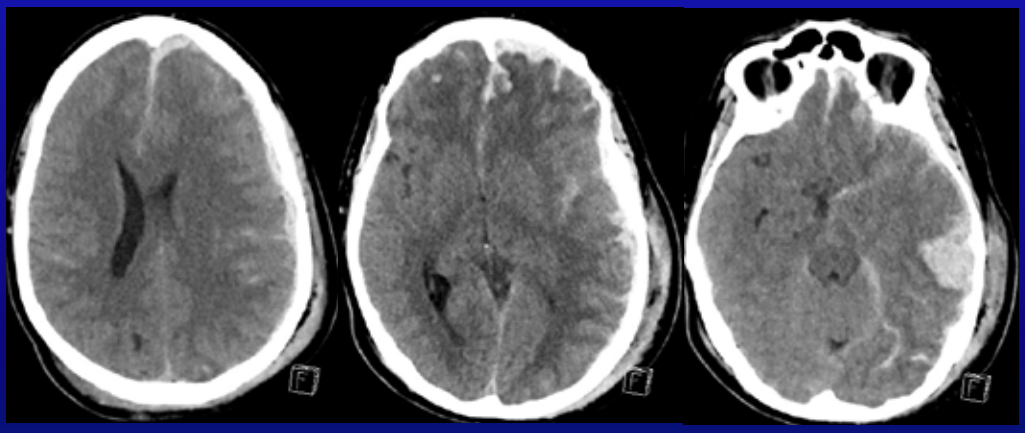




Case 7:

56 M, Found at bottom of 6 stairs.

Acute subarachnoid, subdural, parenchymal bleeds
Severe mass effect

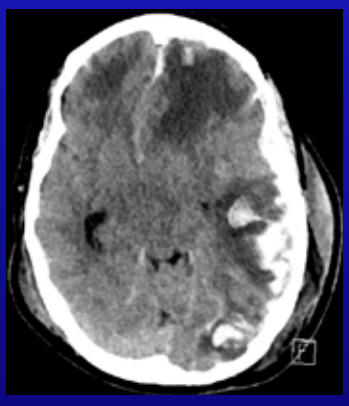


8/17/19

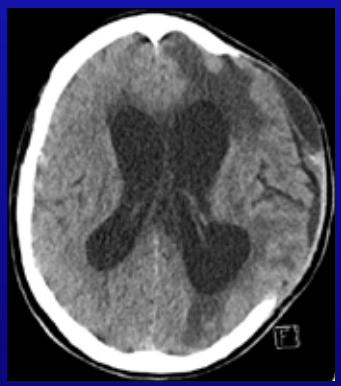
Case 7:

56 M, Found at bottom of 6 stairs.

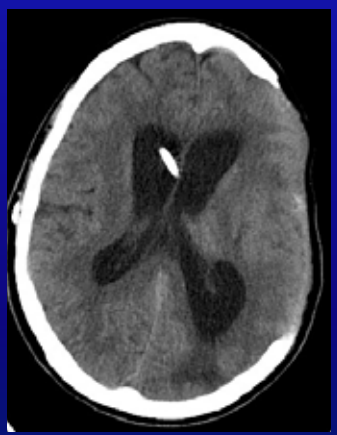
Developing encephalomalacia
Craniotomy to relieve mass effect



8/19/19



9/18/19

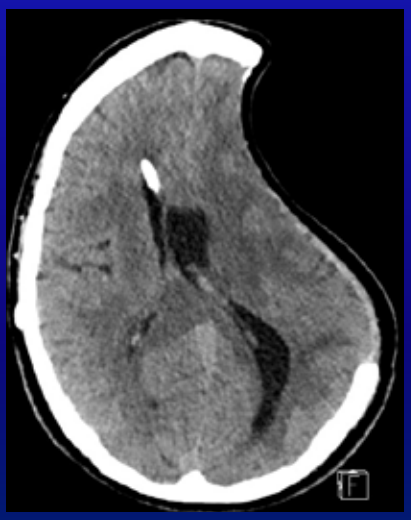


10/17/19

Case 7:

56 M, Found at bottom of 6 stairs,
In chronic rehabilitation facility, non-mobile

Paradoxic brain herniation, (Sinking skin flap syndrome)

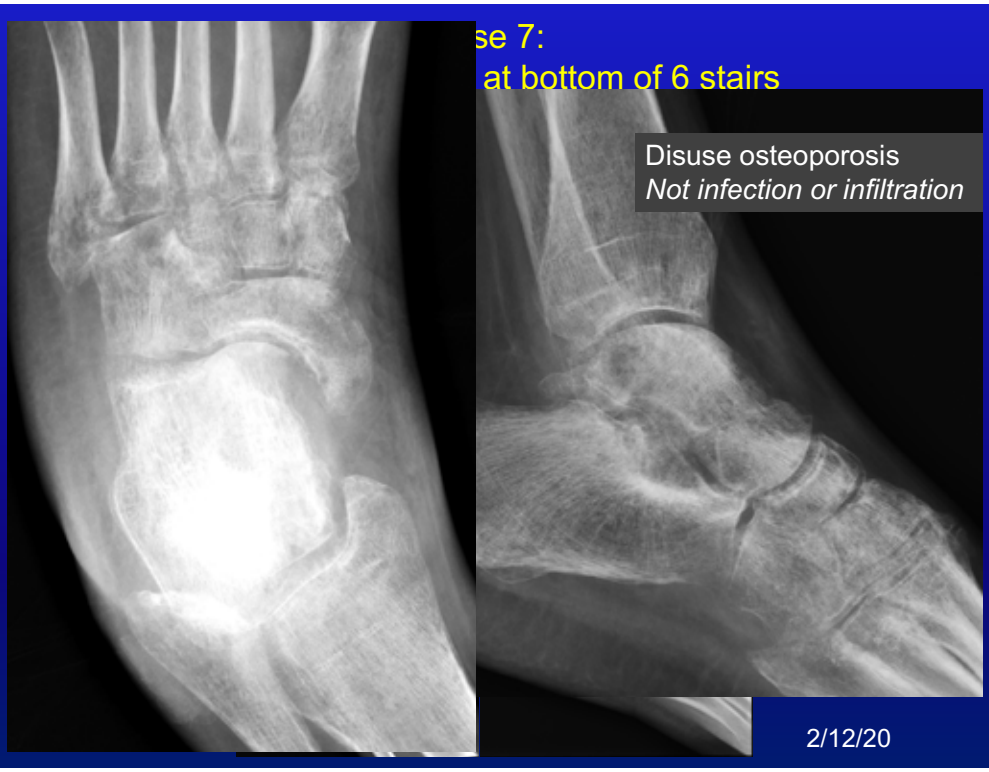


2/12/20

Sinking Skin Flap Syndrome

- Rare neurosurgical complication after craniotomy to relieve pressure after trauma
- Usually chronic complication
  - Due to higher external pressure compared to intracranial pressure
  - Reverse herniation may have grave consequences
  - Immediate treatment includes:
    - Trendelenburg
    - Cessation of CSF drain
    - Blood patch for CSF leak.
  - Definitive treatment is Cranioplasty

se 7:
at bottom of 6 stairs



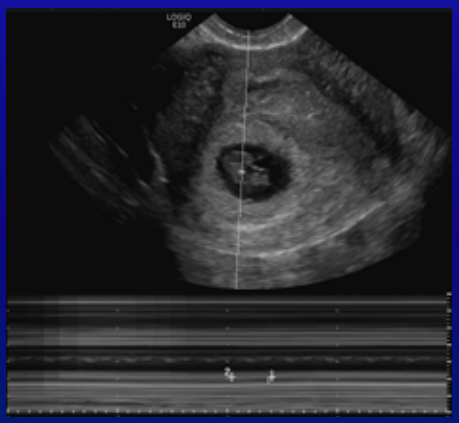
Disuse osteoporosis
Not infection or infiltration

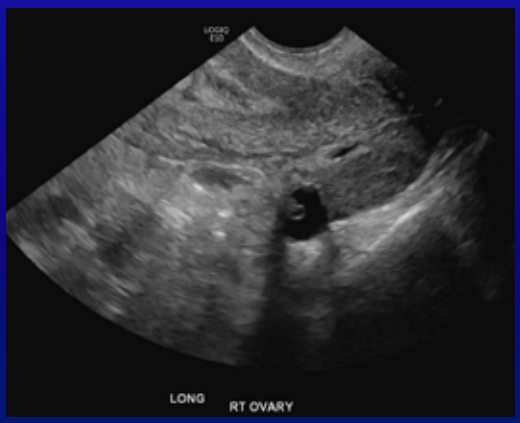
2/12/20

Case 8:
25 F pregnant pelvic pain

Heterotopic pregnancy

IUP at 7W 4d *and* right ovary yolk sac.
MRI showed same findings.
Proven at surgery.





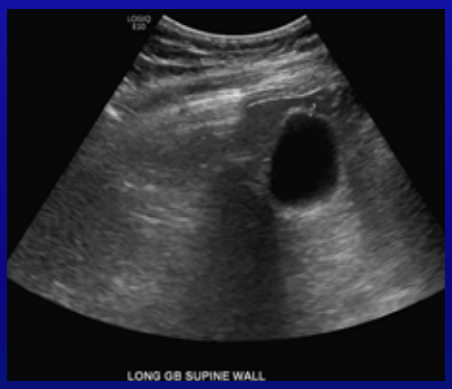
Case 9:

49 M, RUQ pain.

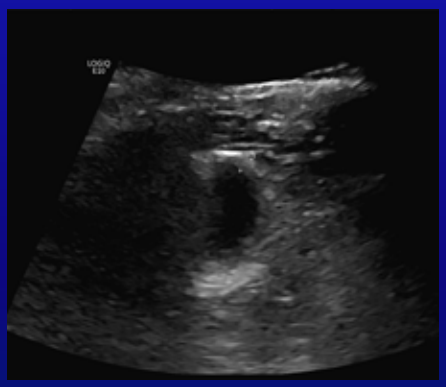
Ultrasound showed Gallbladder wall thickening, negative Murphy sign, common bile duct normal at 4.5mm. No calculi.

Equivocal findings

Management?



Wall 2.5 mm



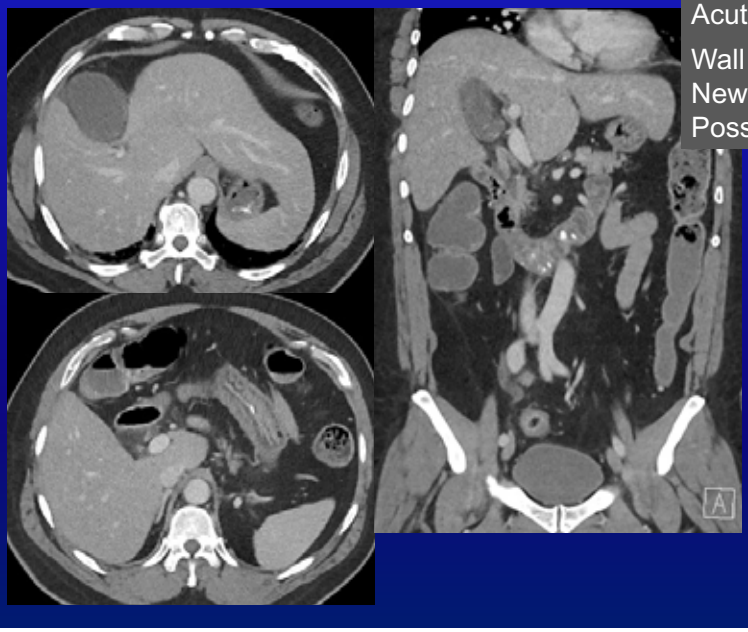
Wall 4.5 mm

Differential for Gall Bladder Wall Thickening

- Gall bladder inflammation
- Systemic illness
  - Low protein state
- Chronic liver disease
- Adjacent inflammation

Case 9:

49 M, RUQ pain. CT scan 1 month later.



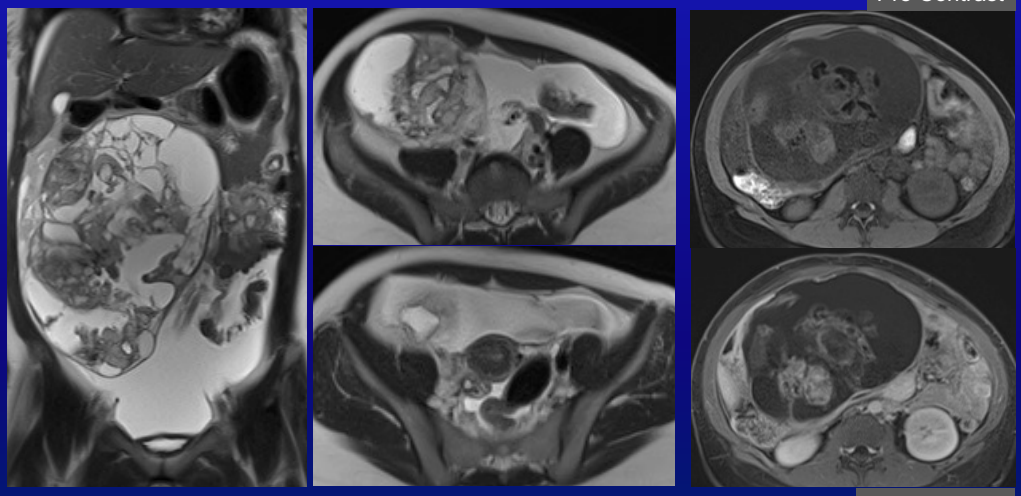
Acute Cholecystitis

Wall thickening & edema
New CBD dilation
Possible stone

Case 10:

20 F, Epigastric pain, nausea, vomiting.

Pedicle from left adnexa
Mature Cystic Teratoma

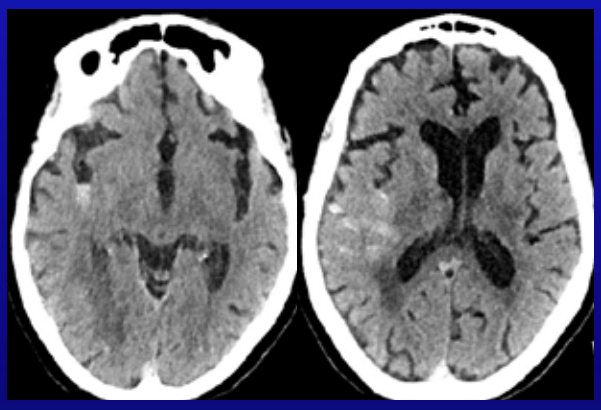


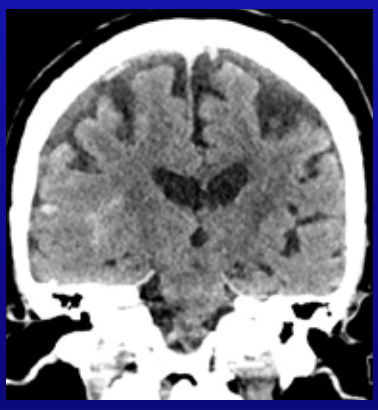
Pre Contrast

Post Contrast

Case 11:

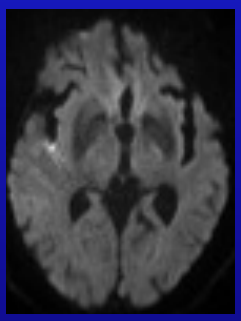
89 M, Ground level fall, altered mental status for 10 days.



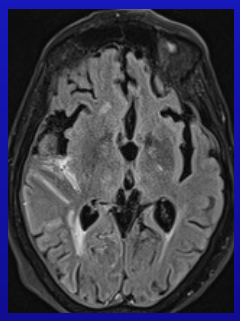


Case 11:

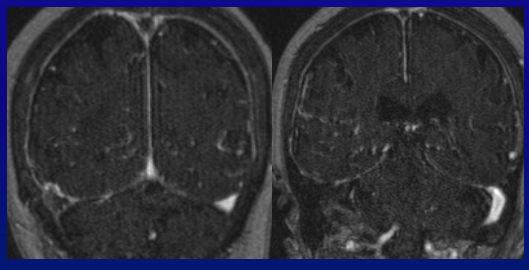
89 y/o Male. Ground level fall, altered mental status for 10 days.



Diffusion



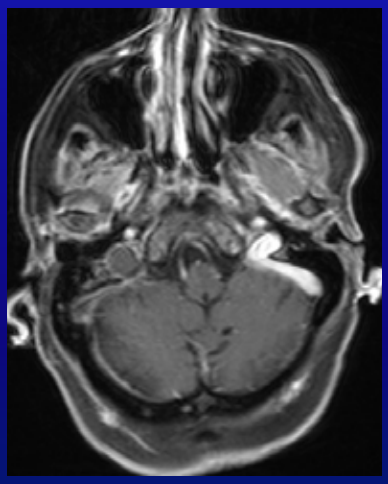
Flair



MRV post Contrast

Dural venous sinus thrombosis

Subarachnoid & parenchymal bleed

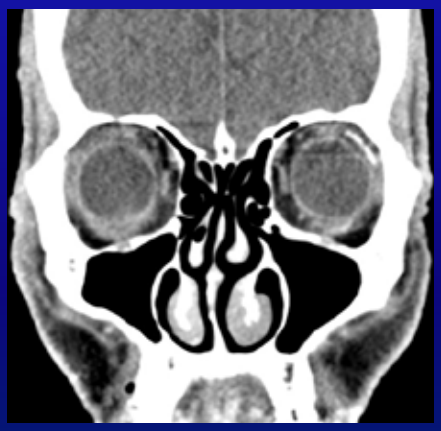


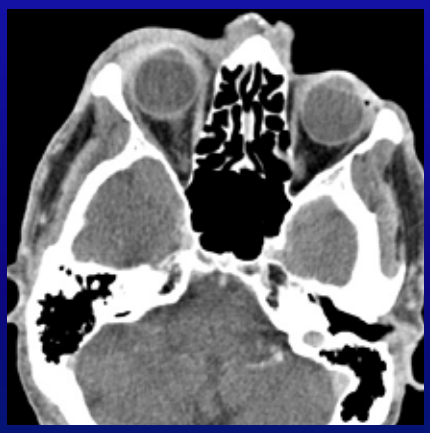
T1 Post Contrast

Case 12:

77 M, Now severe pain, eye infection

9 mo s/p Trabeculoplasty for advanced Open Angle Glaucoma

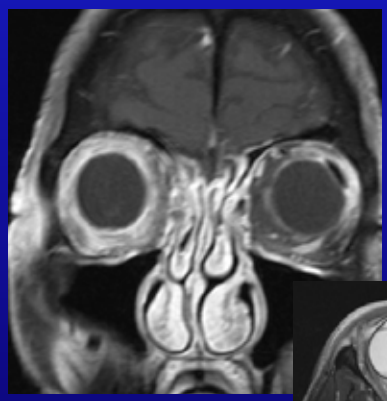




Case 12:

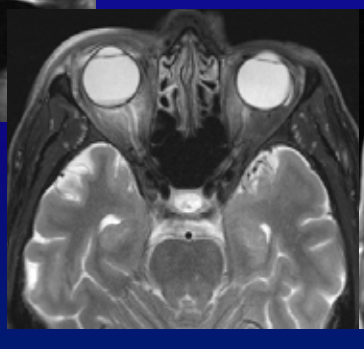
77 M, Now severe pain, eye infection

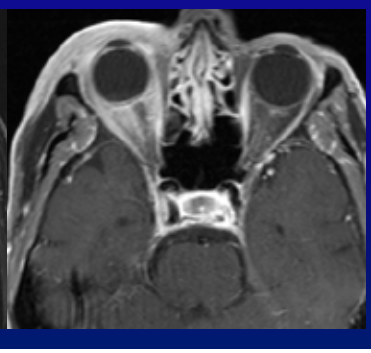
9 mo s/p Trabeculoplasty for advanced Open Angle Glaucoma



Endophthalmitis

Anterior chamber grew out *enterococcus*

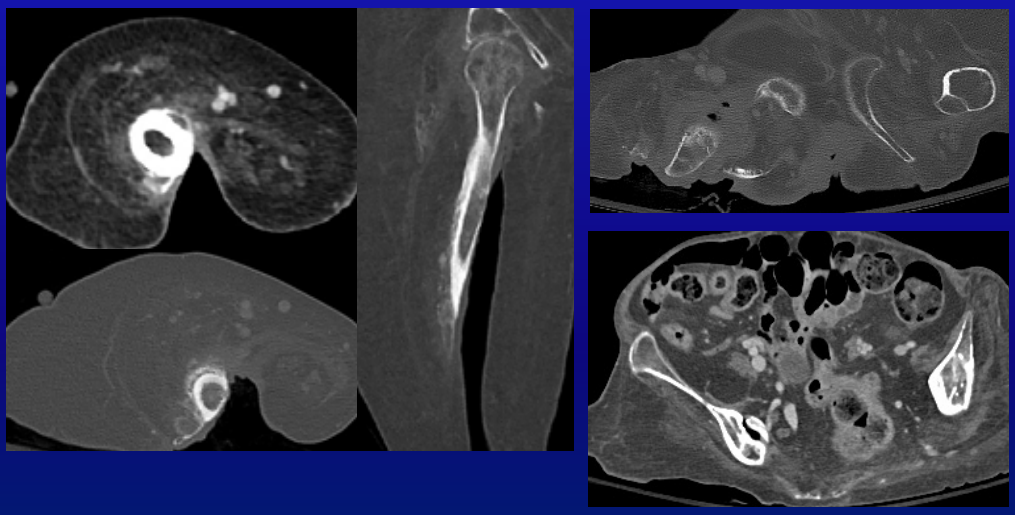




Case 13:

59 F, C6 Paraplegia, Fever, WBC, Decubitus ulcers

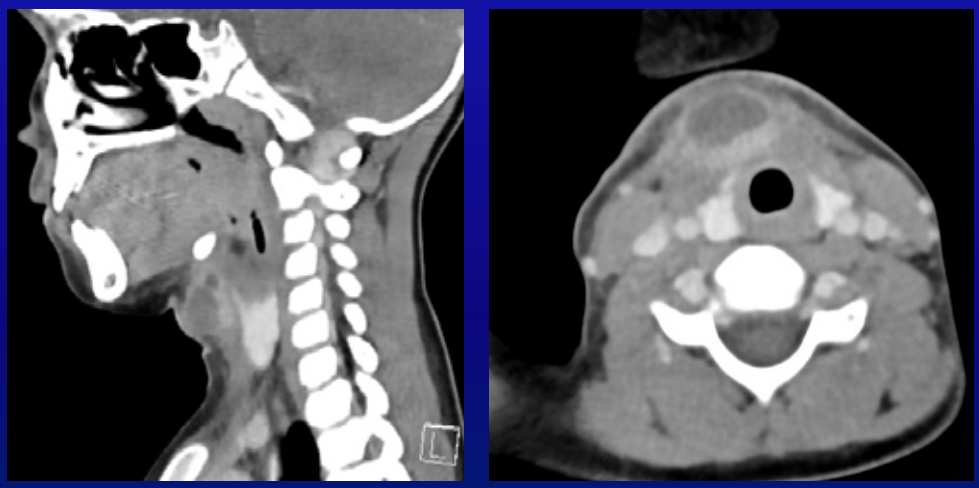
Acute & Chronic Osteomyelitis
Normal appendix



Case 14:

6 F, Intermittent anterior neck mass for 5 months. Responds to antibiotics.

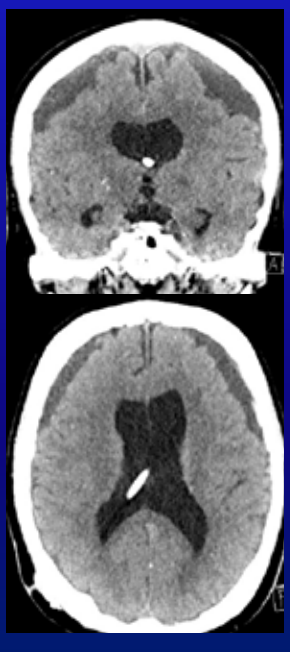
Infected thyroglossal duct cyst

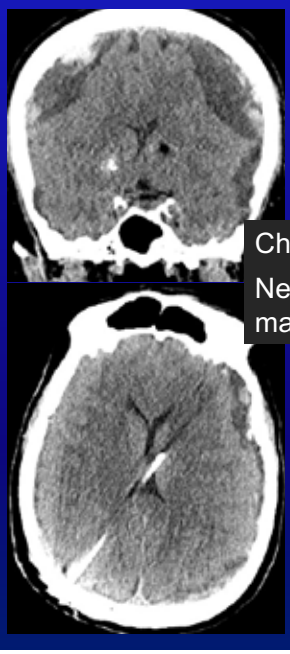


Case 15:

75 M, Acute Mental Status Change

2/1/2020





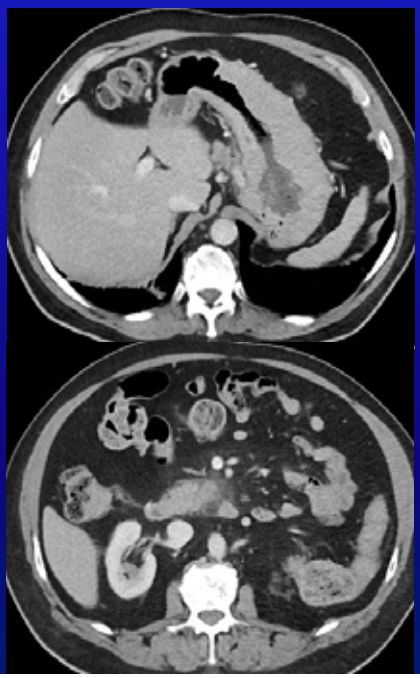
2/14//2020

Chronic subdural bleed

New acute subdural with marked mass effect

Case 16:

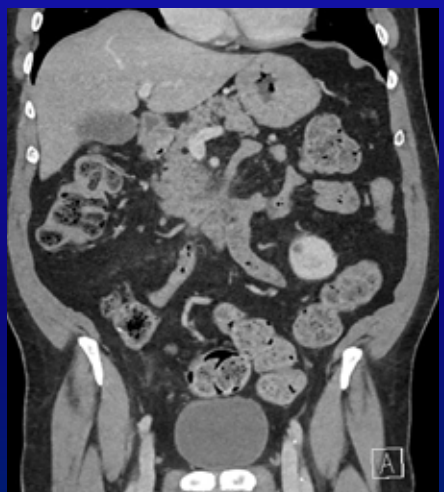
82 M. Epigastric pain, nausea, vomiting. GERD, Smoker.



Gastric adenocarcinoma *linitis plastica*

- Gastric wall up thickening up to 3.8cm
- No ulceration

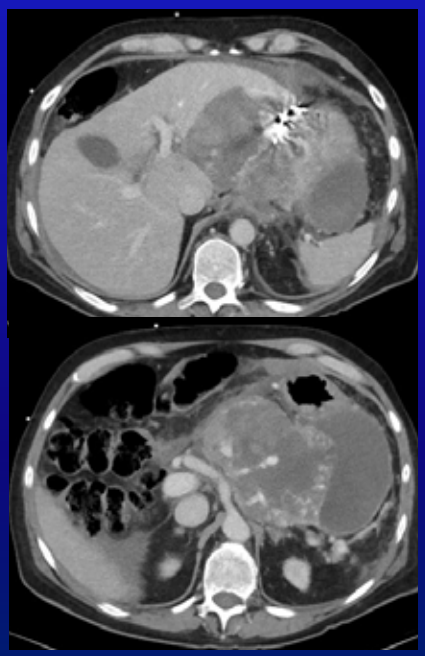
Uncinate process pancreatitis



Case 17:

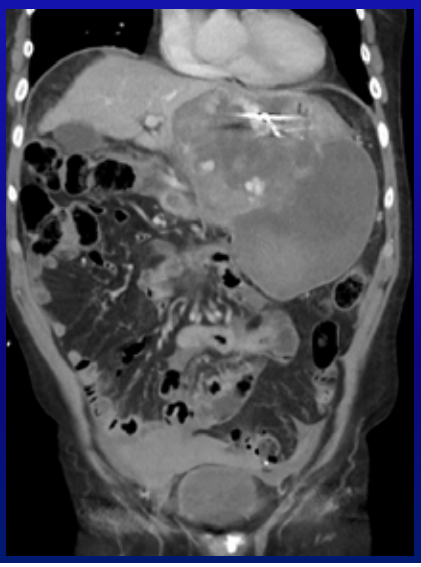
77 M, Mass, abdominal pain, dropping Hematocrit.

Previous left gastric artery aneurysm embolization



Large Hematoma

Possible active bleeding



Thank You!

NOAH-NY

Caracol Clinic, Haiti

Ultrasound Training, March 2019

bpschmit12@gmail.com

Ethnic Concordance between the Physician and the Patient and What it Means for the Future of Healthcare Disparities

Errol L Pierre, MPA
SVP, State Programs
Healthfirst

June 2021

Preliminary work - not to be copied, distributed or cited

Purpose and Objectives

PURPOSE

To understand the relationship between ethnic concordance, physician/patient communication and adherence.

OBJECTIVES

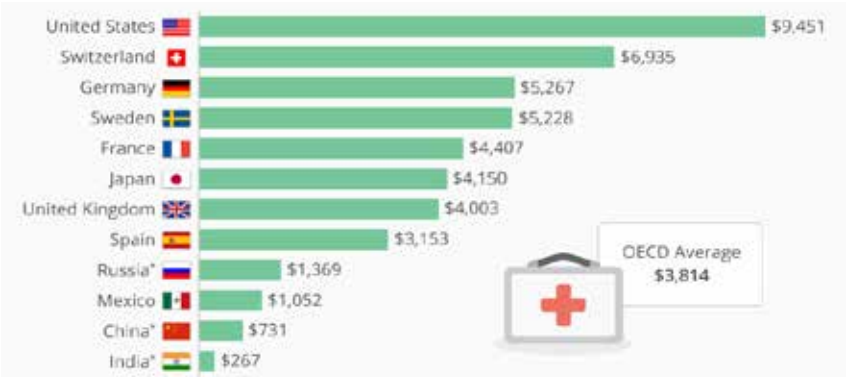
- Showcase the impact of healthcare disparities in the United States.
- Highlight several factors that drive these disparities.
- Review the current literature of Ethnic Concordance as it relates to patient adherence.
- Provide an overview of an experiment seeking to understand this problem more closely.

FINANCIAL DISCLOSURE

There are no financial disclosures.

The American Healthcare Crisis

United States spends close to twice as much as 10 similarly high income countries despite covering a lower proportion of citizens with lower quality levels and poorer health outcomes. Nonetheless, there is a similar number of physicians and patient utilization rates. (Papanicolas et. al, 2018)



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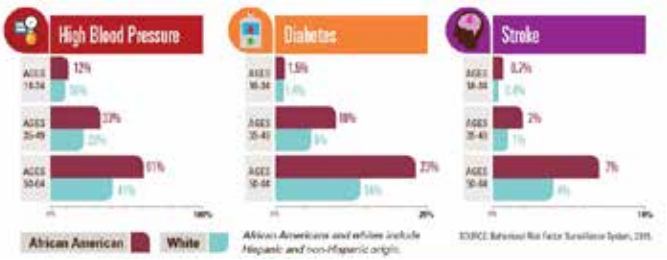
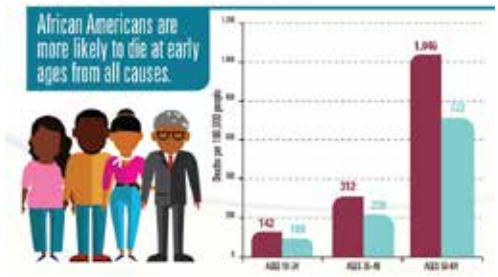
Disparities in Healthcare Outcomes

- $230 Billion – Savings from eliminating health disparities for minorities from 2003-2006.
- $1 Trillion – Savings in indirect costs associated with illness and premature death from 2003-2006

Source: LaVeist, Gaskin & Richard, 2011





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“Racism is a public health crisis” – NYC Department of Health


Statement from Healthfirst on the Social Unrest in Our Country

Jun 02, 2020

The following statement can be attributed to Pat Wang, President and Chief Executive Officer, Healthfirst, in response to the turmoil in our world as outrage over the death of George Floyd grows and intensifies.

I am outraged by what happened in Minnesota, which was a continuation of injustices that are like an open wound in the American soul. I ask all of us, in our own ways, to set an intention to heal that wound by objecting to inequality, fighting racism everywhere, and doing so constructively and peacefully.

At Healthfirst, our work is part of an effort to make a difference in battling disparities and improving outcomes in communities most at risk, including those subject to the injustices that are shocking our consciences now. This work, as well as our continued drive for equitable, quality healthcare for all of our members and their communities, will guide us as we do what we can to be a force against disparities in our society.

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Healthfirst: Areas of focus for Social Determinants of Health (SDoH)

- ***“The conditions in which people are born, grow, live, learn, work, play, worship, and age are the underlying cause of today’s health challenges.” - Healthy People 2020***

= Areas of Focus

Note: Also deployed NowPow, an SDoH needs & Community Services matching and referral platform

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From Crisis to Recovery

Patient/Physician Ethnic Concordance Studies


The New York Times

The Secret to Keeping Black Men Healthy? Maybe Black Doctors

In an intriguing study, black patients were far more likely to agree to certain health tests if they discussed them with a black male doctor.

Does Diversity Matter for Health? Experimental Evidence from Oakland – Alsan, Garrick, Graziani; National Bureau of Economic Research.

- Paired African-American men with both white and African-American physicians.
- Each patient was offered a range of preventive care services in increasing degrees of invasiveness.
- **Findings:** African-American patients with African-American physicians were more likely to agree to the preventive care services offered vs. those offered by white physicians.
- **Additional findings:** African-American physicians had higher levels of "effort" for their African-American patients.

Ethnic Concordance = No Significant Differences


Association between patient-provider racial and ethnic concordance and patient-centered communication in outpatient mental health clinics.

Citation

Abstract

H1: Patient-centered communications leads to high quality care to patients.

Research Question: Does Racial/Ethnic Concordance help?

Sample Size
Racial/Ethnic Concordant (n = 55)
Racial/Ethnic Discordant (n = 36)

Results: Three separate mixed linear regression analyses were conducted.
(a) β = .20, p = .12
(b) β = 0.12, p = .39
(c) β = −0.05, p = .75

Findings: ***No Statistical Significance***

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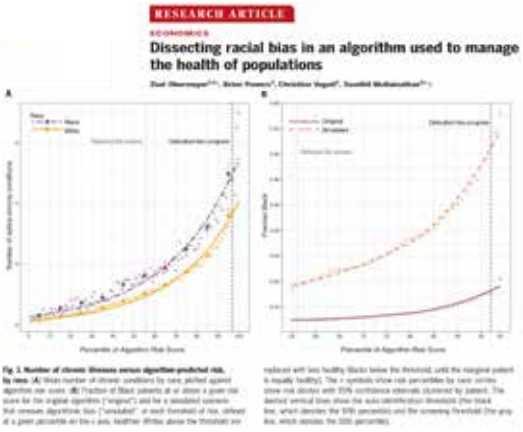
What About Implicit Racial Bias?


THE WALL STREET JOURNAL.

New York Regulator Probes UnitedHealth Algorithm for Racial Bias

"Algorithm flags patients who might need extra care based on how much they will cost the system in the future"


RESEARCH ARTICLE

Dissecting racial bias in an algorithm used to manage the health of populations

"Race was not a variable, however relatively healthy white patients ended up being selected over sicker black patients…" do to spending differences.

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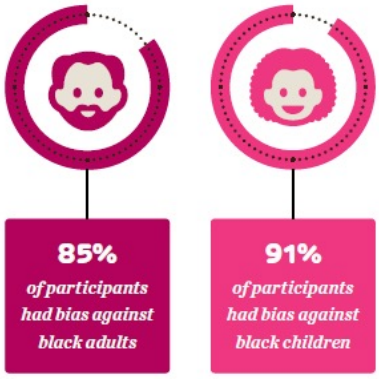
Ethnic Concordance + Bias = Significant Differences

Most resident physicians in our study had pro-white/anti-black bias on both the Adult Race IAT and Child Race IAT, which reflects other research on implicit bias on the general population.



Children's Hospital of Philadelphia administered both Child/Adult Race Implicit Association Tests (IATs) to 91 resident physicians in a large pediatric ED in western Pennsylvania.

Johnson, T., Winger, D., Hickey, R., Switzer, G., Miller, E., Nguyen, M., Saladino, R., Hausmann, L., (2016).

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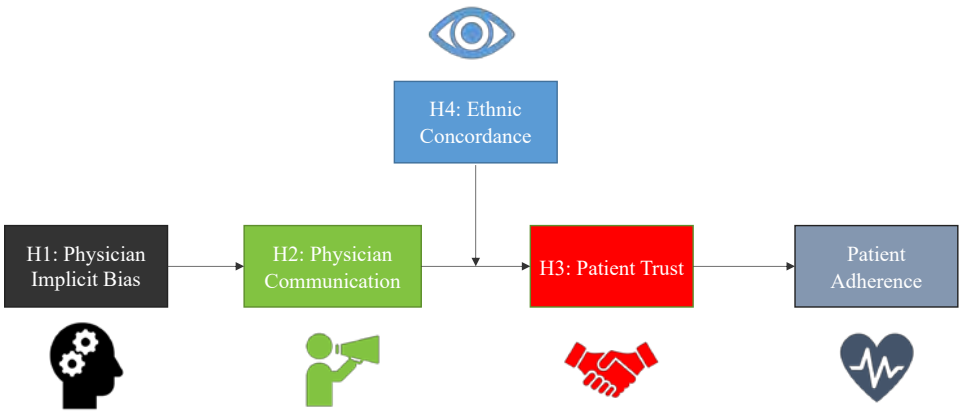
The Model



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Physician Implicit Bias

H1: Implicit bias, consciously or unconsciously, negatively impacts the ability for physicians to effectively communicate with their patients.

- Variations in patient satisfaction scores regarding clinical interactions of black patients were determined by the race of the physician and that physician's perception of the race of their patient. (Penner, Dovidio, Manning, Albrecht, van Ryn, 2018)
- At a Veteran Affair's Medical hospital, minority patients "did less to prompt doctors for information", which led to physicians providing less information and visits being 40% shorter when paired with a white physician. (Gordon et al., 2006).
- Low income black patients seeing white physicians were less likely to adhere to their instructions. Additionally, higher levels of physician implicit bias led to lower patient adherence rates. (Hagiwara, 2013)

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Physician Communication

H2: Effective physician communication including both verbal and nonverbal messaging to patients will lead to an increase in patient trust.

- Effective physician-patient communication is linked empirically to outcomes of care including patient satisfaction, health status, recall of information, and adherence (Engel, 1992).
- This includes verbal and nonverbal communication measured by accessing (1) effective questioning, (2) transmission of information, (3) express ion of empathy and concern, and (4) participation and participatory decision making (Zolnierek, 2009).
- Patient motivations and complexity of treatment that could involve lifestyle changes can be influenced by physician communication (Martin, 2005).
- Its important for physicians to understand the "degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions (US DHHS, 2000).

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Patient Trust

H3: Higher rates of trust between physicians and patients will lead to either improved patient adherence rates or improved rates on the patient's intent to adhere.

- Patient trust is the degree to which patients feel comfortable with their physician (Campbell, 2005).
- Patients must believe that their physician is someone who can understand their unique experience of being a patient, and someone who can provide them with reliable and honest advice (Branch, 2000).
- Research shows that physicians who promote trust in the therapeutic relationship, who have effective communication and "bedside manner", and who express compassion for their patients have adherence rates that are 3 times higher (O'Malley et al, 2002).

Ethnic Concordance

H4: Ethnic concordance between patients and physicians serves as a moderator to patient trust and will positively influence the relationship.

- Ethnic Concordance is defined as the degree of patient and physician similarity or agreement across a given dimension. Differences in gender, race, socioeconomic status, education, expectations, beliefs, and perceptions can impact health care quality. (Thornton 2011).
- Respondents of each racial and ethnic group reported the highest level of satisfaction if they were race concordant. Moreover, all respondents reported greater satisfaction with physicians from their own race. (LaVeist & Nuru-Jeter, 2002).
- Patient perception of similarities with their physician had strong correlation to patient satisfaction and adherence. However, perceived racial similarities were not related to health outcomes (Street, 2008).

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The Experiment: Measures

- **Implicit Bias:** Implicit Association Test (Nosek, Smyth, Hansen, Devos, Lindner, Ranganath, Smith, 2007).
- **Patient Communication:** Medical Communication Competence Scale (Cegala, Coleman, Turner, 1998).
- **Patient Trust:** Trust-in-Physician scale (Anderson & Dedrick, 1990).
- **Ethnic Concordance:** Personal and Ethnic Perceived Similarities Measures (Street, O'Malley, Cooper, Haidet, 2008).
- **Patient Adherence:** Intent to Adhere Questionnaire*

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The Experiment: Expected Results

"Patient adherence will be the highest where ethnic concordance between patient and physicians are the highest and implicit bias with the physician is the lowest; thus more preventive care services will be rendered regardless of the level of invasiveness. This is due to higher levels of patient trust and effective physician communication."

- **Patient Adherence$_i$ = β_0 + β_1 Patient Trust$_i$ + Ɛ**
- **Patient Trust$_i$ = β_0 + β_1 Physician Communication + β_2 Physician Communication * Ethnic Concordance + Ɛ**
- **Physician Communication = β_0 + β_1 Physician Implicit Bias$_i$ + Ɛ**

Expected Contributions

- Extend life expectancy for African American males by increasing their exposure to both ethnically concordant physicians and other physicians with low/no implicit bias.
- Improve deliberate physician recruitment campaigns in areas with dense minority populations to better meet the needs of the patient populations.
- Lower the cost of healthcare in America improving efficiency and quality.
- Build on Dr. Theodis Thompson's **Social Accessibility Hypothesis**, that contends that physicians find it difficult to effectively communicate with their patients, especially when there are cultural differences. ***On that premise, the psychosocial accessibility problem of blacks obtaining healthcare would be greatly alleviated through the existence of an appropriate number of black physicians to meet the black demand for healthcare services*** (Thompson, 1974).

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NHI Bahamas: Transforming Primary Healthcare in The Bahamas on its Journey to Universal Health Coverage

Dr. Monique Thompson CPHQ, NMD, BSc

Manager, Healthcare Quality & Wellness Development

The National Health Insurance Authority

Purpose and Objectives

PURPOSE

To inform the audience of the advancements The Bahamas has made in Primary Healthcare as it implements Universal Healthcare (UHC).

OBJECTIVES

- Explain the National Health Insurance Authority's approach to Universal Health Coverage
- Describe elements of the adopted quality framework and the consequences to the quality of healthcare in The Bahamas resulting from its implementation

FINANCIAL DISCLOSURE

There are no financial disclosures.

Agenda

1	The National Health Insurance Authority (NHIA) Overview: Understanding Universal Health Coverage (UHC) in The Bahamas
2	The Challenges: A Siloed Primary Care System
3	The Call: Pan-American Health Organization/World Health Organization (PAHO/WHO) Quality Framework
4	The Response in Making a Difference
5	The Way Forward
6	Q & A

The National Health Insurance Authority

- National Health Insurance Bahamas ("NHI Bahamas") aims to ensure that all Bahamians and legal residents - no matter income, age, island of residence or current health status - can receive quality health care.
- The National Health Insurance Authority (NHIA) has been established to oversee the implementation of NHI Bahamas.

NHI Bahamas Program Overview

Enrolment Growth
NHI currently has just over **100,000 Bahamians** enrolled in the program representing about **23% of the uninsured population**

Expansive Provider Network
Currently there are **90 Physicians** across ~**56 provider facilities** as well as **12 provider labs across 6 islands**

Reducing The Burden on the Public System
New Providence Clinics Visits are down 10% from 2016-2018 since the NHI program was introduced

Digitally Enabled Care
Launched an Electronic Health Record which is currently active for ~80,000 patients

High Patient Satisfaction
96% of those enrolled in NHI are satisfied with the service they are receiving from the program

Diverse Demographics
NHI currently enrolls Bahamians from more than 17 islands including **4,200 Bahamians under the age of 5** and nearly **10,000 over the age of 65**

Low Cost per Patient
NHI is currently delivering services at a **cost of ~ $217 per patient.**

Transparency and Accountability
NHI annual report accounts for each dollar spent, building **accountability** through **service agreements** and **quality care standards**

The Standard Health Benefit (SHB)

The SHB

Primary Care Coverage

Primary Care Physician
Covers general physician visits,

Diagnostic Imaging (NEW)
Includes x-rays and ultrasounds

Pediatric and Maternity Care
Maternity and pediatric care bundles

Cancer Screening Programs and Early Intervention (EXPANDED)
Includes mammography, PSA, colonoscopy, pap smears

Health Education
Healthy living advice, wellness programming and wellness education

Lab Tests (EXPANDED)
Includes essential diagnostic lab tests

Implementation Plan

- Mandating Primary Care Coverage
- Engaging in Public Private Partnerships
- Developing Universal Fee Schedules
- Implemented in a Phased Approach as existing policies Renew

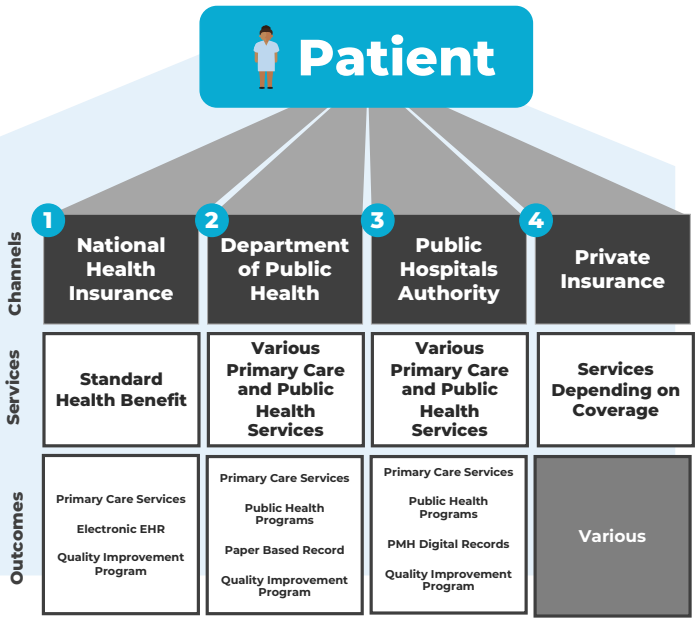
The Challenges

A Siloed Primary Care System

Why is this a Problem?

- Inefficient Resource Allocation
- Disconnected Care Delivery
- No Universal Standard of Service
- Poor Quality Control
- Lack of Innovation

Current State Primary Care Patient Flow



The Current System is Broken

The Call: PAHO/WHO Quality Framework

Explore data sharing opportunities with hospital facilities within the Public Hospital Authority, with a focus on rational use of resources.	1. Universal Primary Care Electronic Record 2. Telemedicine 3. The National Healthcare Communications Forum
Development of a questionnaire to request provider data	Key Performance Indicators developed by an expert panel and built into the EHR.
Strengthen the health care facilities inspection and certification process.	1. Renewed inspection process for Primary Healthcare facilities implemented; 2. Laboratories and DI facilities underway
Development of a survey for NHI beneficiaries	1. 2 Cycles of the Patient Satisfaction Survey 2. Provider Satisfaction Survey 3. People Centered Care Approach to Healthcare

The Response in Making a Difference

Universal Primary Care Electronic System

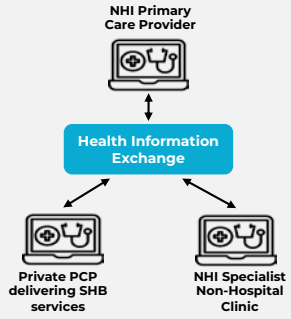
We are Modernizing Care Delivery

Understanding the Power of Real-Time Data and Connectivity

All NHI Primary Care providers will be required to use the NHI EHR solution.

Vision

NHI EHR Solution



Benefits

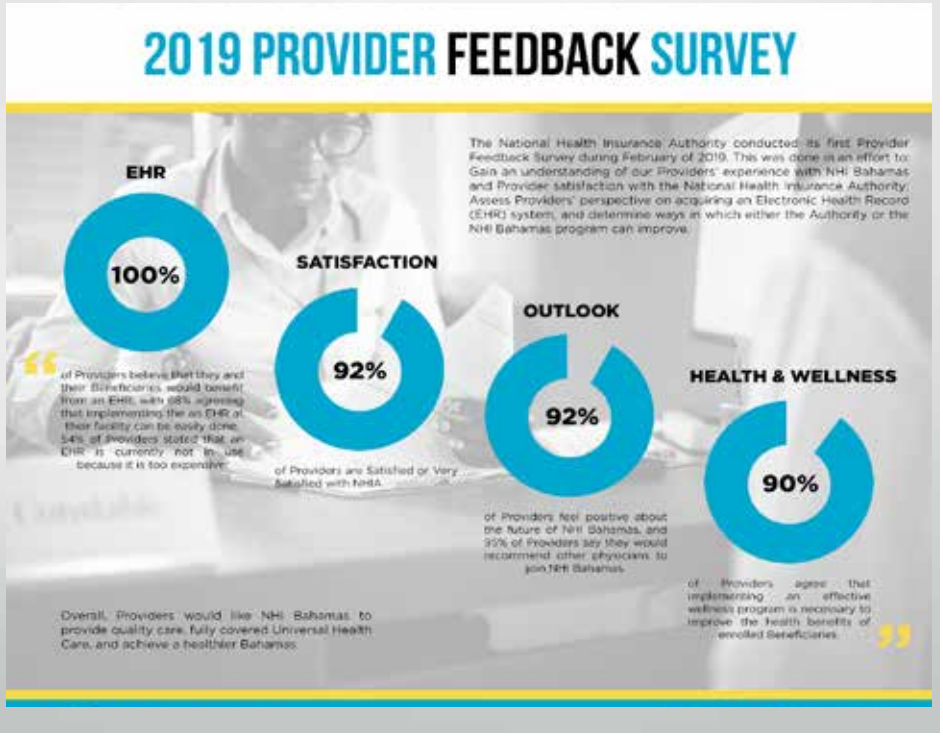
1. **A Singular Inter-connected Electronic Health Record**
2. **Real Time-Data**
3. **Quality Standards & Reporting**
4. **Eliminating Duplication & Reducing Costs**

Opportunity

- **Hospital Information Systems**
- **Lab Information Systems**
- **Other Health Information Management Systems**
- **Telehealth**
  Pilot: March 2020

Patient Satisfaction

Provider Satisfaction



What Does it All Mean for Healthcare in The Bahamas?

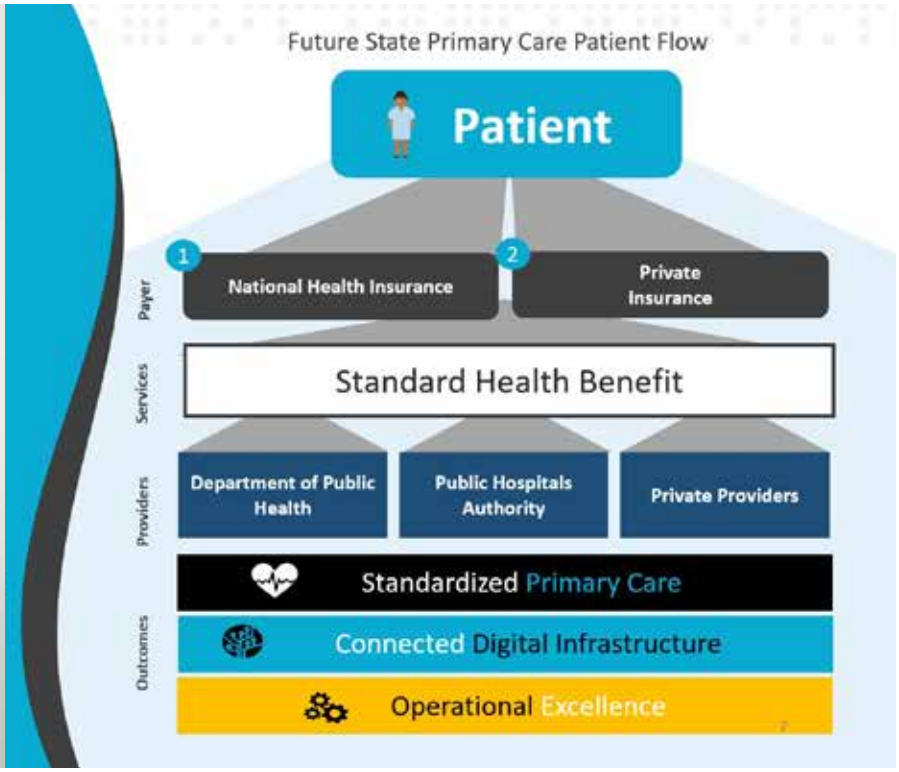
Putting it all together.

It Means the Primary Care System Benefits!

- Every Bahamian will have **Access to a Primary Care Provider without Co-Pays or Deductibles**
- Every Bahamian will have a **Digitally Enabled, Singular Electronic Health Record**
- Improved **Quality Healthcare of Primary Care Delivery**
- **Reduced Burden on Hospitals** and a shift towards **Preventative Care**
- **Saves the Government more than $67.9M** in operational expenditure over 5 years
- **Funding Follows the Patient** And Promotes Competition
- Will be a platform for **increasing revenue collection** in the public sector
- Maintains the path to **Universal Health Coverage**

No Additional Taxation is Required

The Way Forward



Summary

- ✓ **UHC is possible** once it is adapted to a country's fiscal/economic, cultural, social and operational climate – one size does not fit all.
- ✓ **UHC is a journey – not a destination** – that requires consistent governmental will, buy-in, and support.
- ✓ **Prioritized elements** of the adopted quality framework included:
  - Implementation of an EHR with KPIs
  - Rational use of resources to Connect Care Delivery
  - Establishment of a Universal Standard of Service, inclusive of Improved Quality Control
  - Ensuring the Satisfaction of Key Stakeholders
- ✓ **Continue to ensure, monitor and improve quality** Primary Health Care Services and build participants trust and confidence in the program

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Cross Cultural Issues in Behavioral Health Disorders in the Caribbean Population

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Financial Disclosure

- I do not have any financial disclosures to report

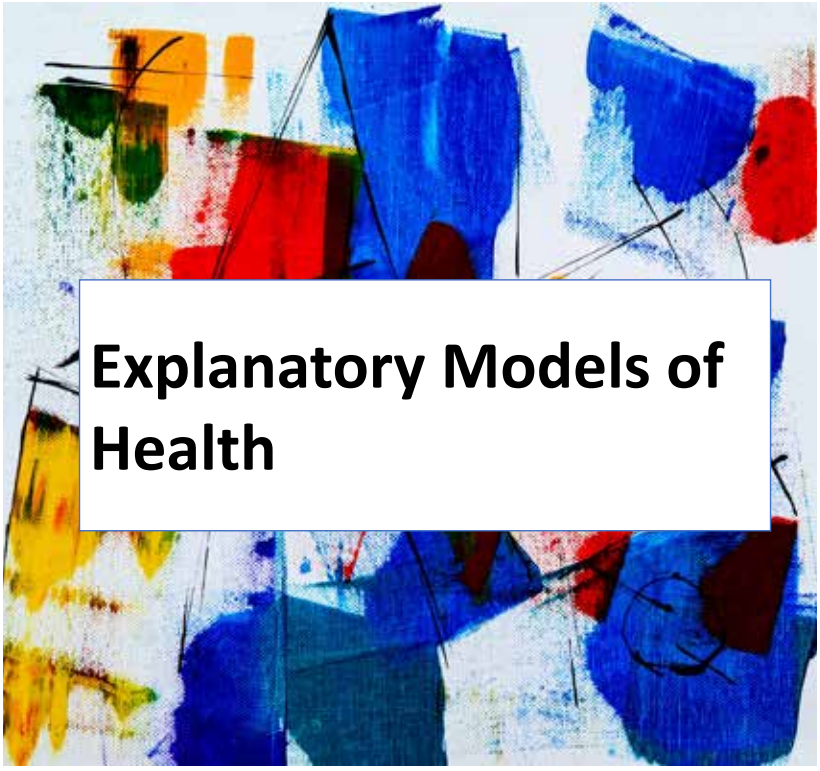
Purpose

- To Understand the Specific Cultural Issues that will Lead to Cultural Competence, Maximize Treatment Outcomes, and Improve Equity and Access to Care

Objectives

- To Identify and Discuss Behavioral Health Disorders in the Caribbean Populations
- To Discuss Different Clinical Symptomatology and Treatment Approaches
- To Familiarize the Audience with Unique Aspects of the Culture of the Caribbean Populations

- Concepts of Health and Illness
- Concepts of Mental Health and Mental Illness
- External vs Internal Causes
- Mystical, Magical, and Animistic Causal Factors



Explanatory Models of Health

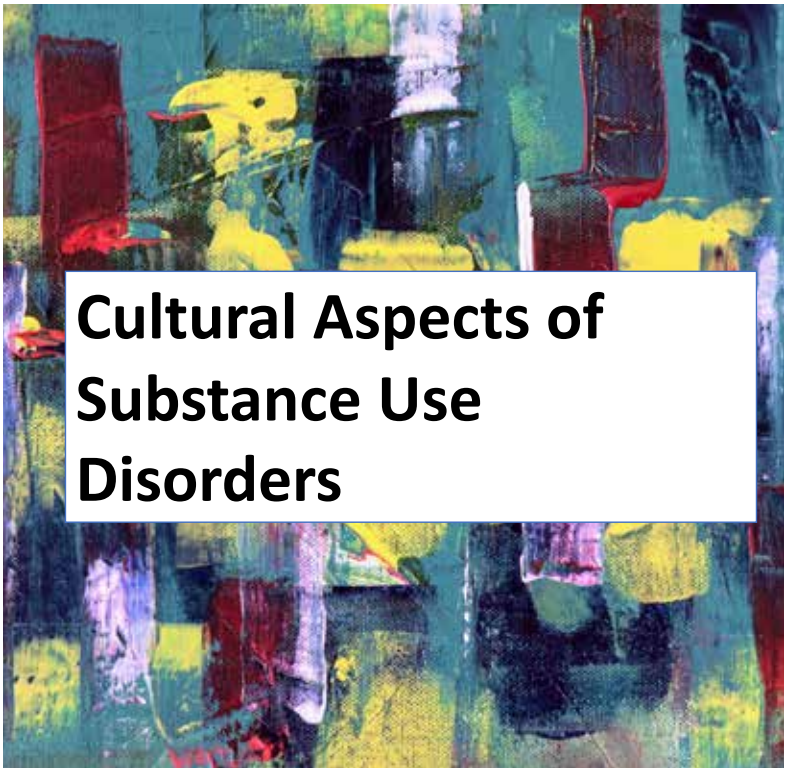
- Psychoses
- Mood Disorders
- Substance Use Disorders
- Cognitive Disorders

Clinical Psychiatric Disorders

- Universality of Schizophrenic Symptoms
- Specific Symptoms in the Caribbean populations
- Suspiciousness vs Paranoid Ideation
- Treatment Issues

- Universal SIG E CAPS
- Specific Symptoms of Depressive Disorders
- Presence of Psychotic Symptoms
- Constancy of Somatic Symptoms
- Other Atypical Presentations
- Treatment Issues

- Caribbean Region as Travel Route
- Types of Substances: Plants vs Chemicals
- Self-Medication
- Clinical Consequences of Substance Use
- Treatment Issues



- Senescence vs Dementia
- Predisposing Factors
- Vascular vs Alzheimer's Dementia
- Access to Specialized Diagnostic & Treatment Centers
- Other Treatment Issues

- Choice of Treatment
- Locus of Treatment
- Availability, Access and Equity
- Long-term Care Issues
- Burden of Care

- Assimilation and Acculturation
- Heterogeneity of Populations
- Language and Communication
- Religion and Spirituality
- Family Structure

- Power of Attorney/Guardianship /Healthcare Proxy
- Disposition of Assets
- Elder Care Laws
- Abuse and Neglect
- End of Life Decisions

- Are You Out of Your Mind?
- Are You Crazy?
- Are You Mad?
- Ou Anraje

Thank You

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COVID-19 vaccine Trial at Howard

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I have no financial disclosures.

Objectives

- Operation WARP speed
- Types of vaccines
- How do vaccines work
- Phases of clinical trial
- Novavax vaccine trial at Howard University

- Most coronaviruses encode only one large surface protein**, the spike protein**, which is responsible for receptor binding and membrane fusion
- SARS-CoV-2 (and SARS-CoV), the spike protein binds to angiotensin-converting enzyme 2 (ACE2) on host cells and is then endocytosed.
- This is followed by fusion of viral and endosomal membranes and release of the viral genome into the cytoplasm.
- Antibodies that bind to the spike protein, especially to its receptor-binding domain (RBD), prevent its attachment to the host cell and neutralize the virus.
- ***Based on this knowledge, and information gained from preclinical studies with SARS-CoV and MERS-CoV13, the spike protein was identified as an antigenic target for the development of a vaccine against SARS-CoV-2 at a very early stage***
- Data from the preclinical development of vaccine candidates for SARS-CoV and MERS-CoV enabled the initial step of exploratory vaccine design to be omitted, saving a considerable amount of time.

Who's working on Operation Warp Speed?

OWS is a partnership among components of

- Department of Health and Human Services (HHS)
- Centers for Disease Control and Prevention (CDC)
- National Institutes of Health (NIH)
- Biomedical Advanced Research and Development Authority (BARDA)
- Department of Defense (DoD). OWS engages with private firms and other federal agencies, including the Department of Agriculture, the Department of Energy, and the Department of Veterans Affairs.
- It will coordinate existing HHS-wide efforts, including the NIH's Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV) partnership, NIH's Rapid Acceleration of Diagnostics (RADx) initiative, and work by BARDA.

How is Operation Warp Speed being funded?

- ❑ Congress has directed almost $10 billion to this effort through supplemental funding, including the CARES Act.
- ❑ Congress has also appropriated other flexible funding.
- ❑ The almost $10 billion specifically directed includes more than $6.5 billion designated for countermeasure development through BARDA and $3 billion for NIH research.

What's the plan and what's happened so far?

Development

- ❑ To accelerate development while maintaining standards for safety and efficacy
- ❑ OWS has been selecting the most promising countermeasure candidates and providing coordinated government support.

Protocols for the demonstration of safety and efficacy are being aligned

- ❑ Allows the trials to proceed more quickly
- ❑ The protocols for the trials will be overseen by the federal government, as opposed to traditional public-private partnerships, in which pharmaceutical companies decide on their own protocols.
- ❑ Rather than eliminating steps from traditional development timelines, steps will proceed simultaneously, such as starting manufacturing of the vaccine at industrial scale well before the demonstration of vaccine efficacy and safety as happens normally.
- ❑ This increases the financial risk, but not the product risk.

Ethical principles-CDC

ACIP is setting ethical principles to guide their decision-making process on who to recommend COVID-19 vaccines for if supply is limited.

Early discussions have focused on the following five principles:

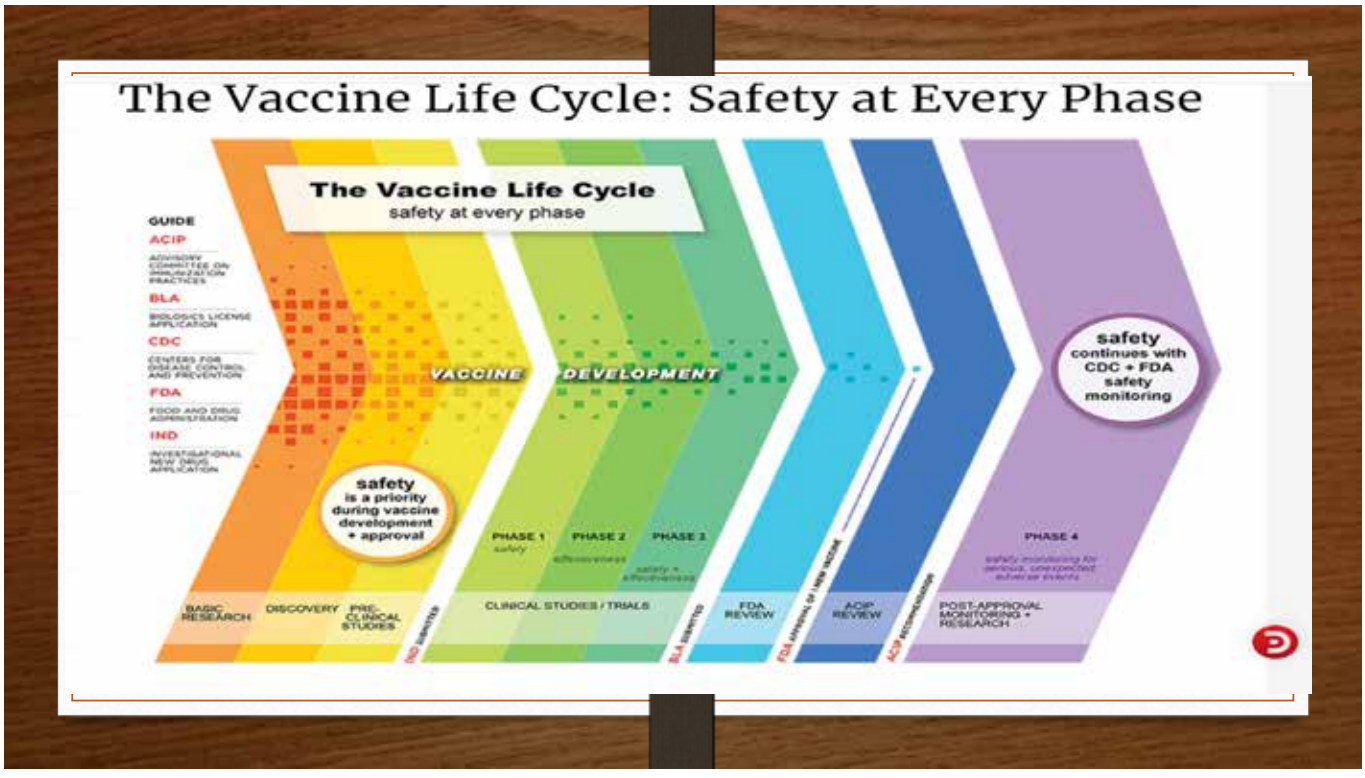
- **Maximize benefits and minimize harms** — Respect and care for people using the best available data to promote public health and minimize death and serious disease.
- **Equity** — Decrease health disparities and make sure everyone has a fair and just opportunity to be as healthy as possible.
- **Justice** — Treat affected groups, populations, and communities fairly. Remove unfair, unjust, and avoidable barriers to good health and well-being.
- **Fairness** — Give everyone in a priority group an equal chance to get COVID-19 vaccination.
- **Transparency** — Make a decision that is clear, understandable, and open for review. Allow and seek public participation in the creation and review of the decision processes.

Groups considered for early vaccination if supply is limited CDC

ACIP is considering four groups to possibly recommend COVID-19 vaccination for if supply is limited:

- Healthcare personnel
- Workers in essential and critical industries
- People at high risk for severe COVID-19 disease due to underlying medical conditions
- People 65 years and older

CDC is making coronavirus disease 2019 (COVID-19) vaccination recommendations for the United States based on input from the Advisory Committee on Immunization Practices (ACIP). ACIP is a federal advisory committee made of up of medical and public health experts who develop recommendations on the use of vaccines in the U.S. public. ACIP holds regular meetings, which are open to the public and provide opportunity for public comment.



Safety

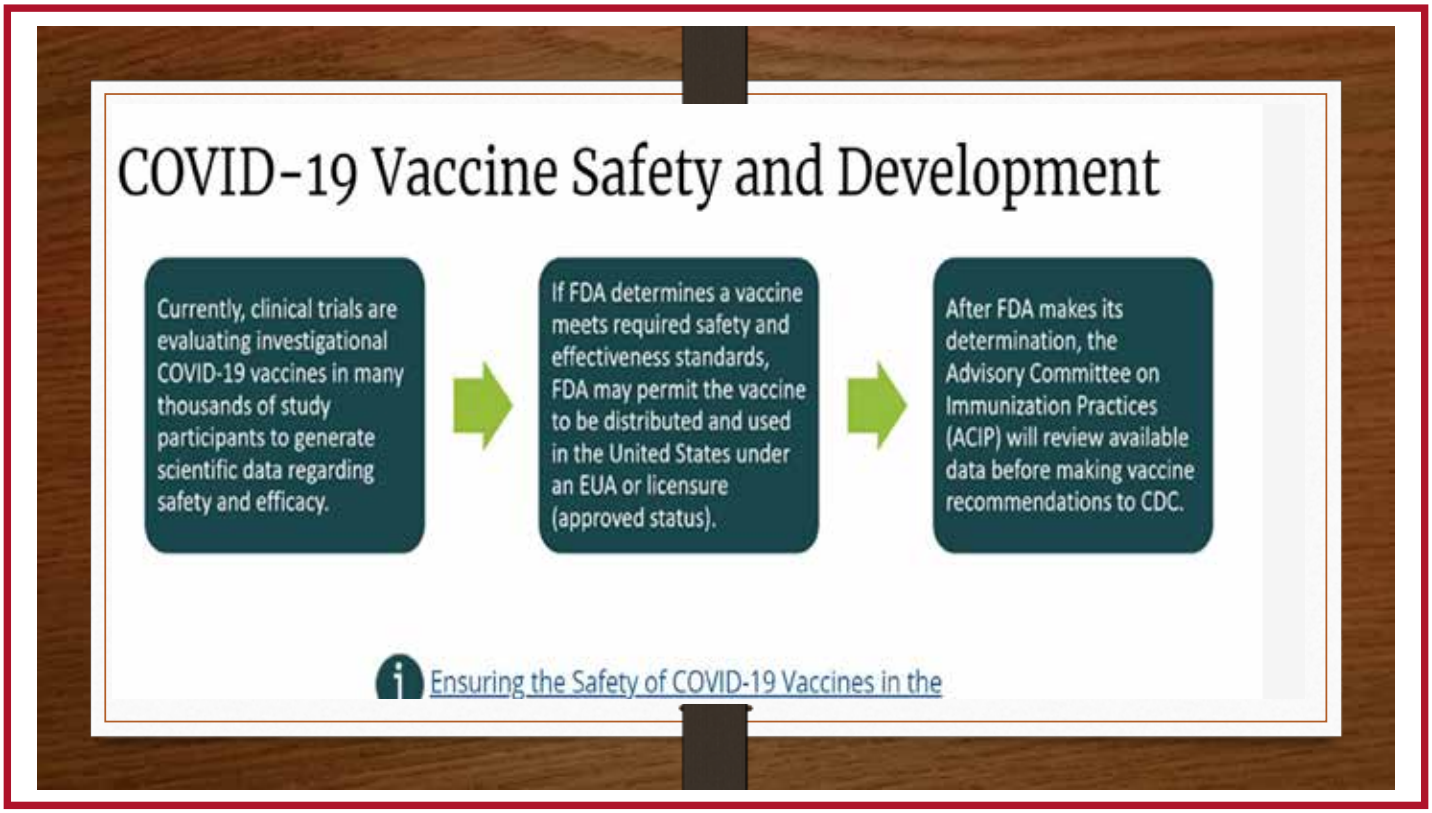
Since the pandemic began, ACIP has been holding special meetings to review U.S. data on COVID-19 and the vaccines in development to help prevent it.

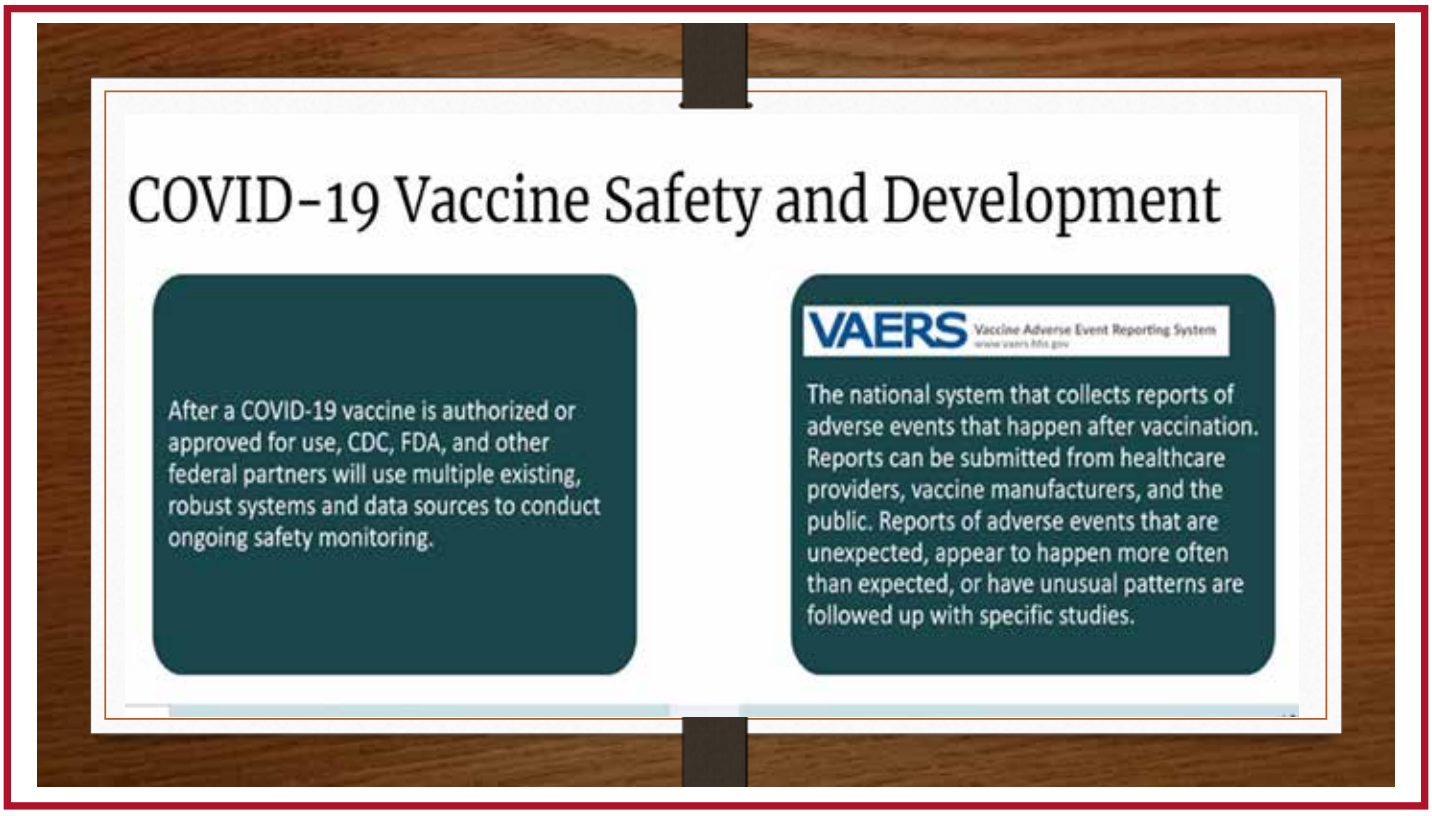
Before making recommendations, ACIP plans to review all available clinical trial information, including descriptions of

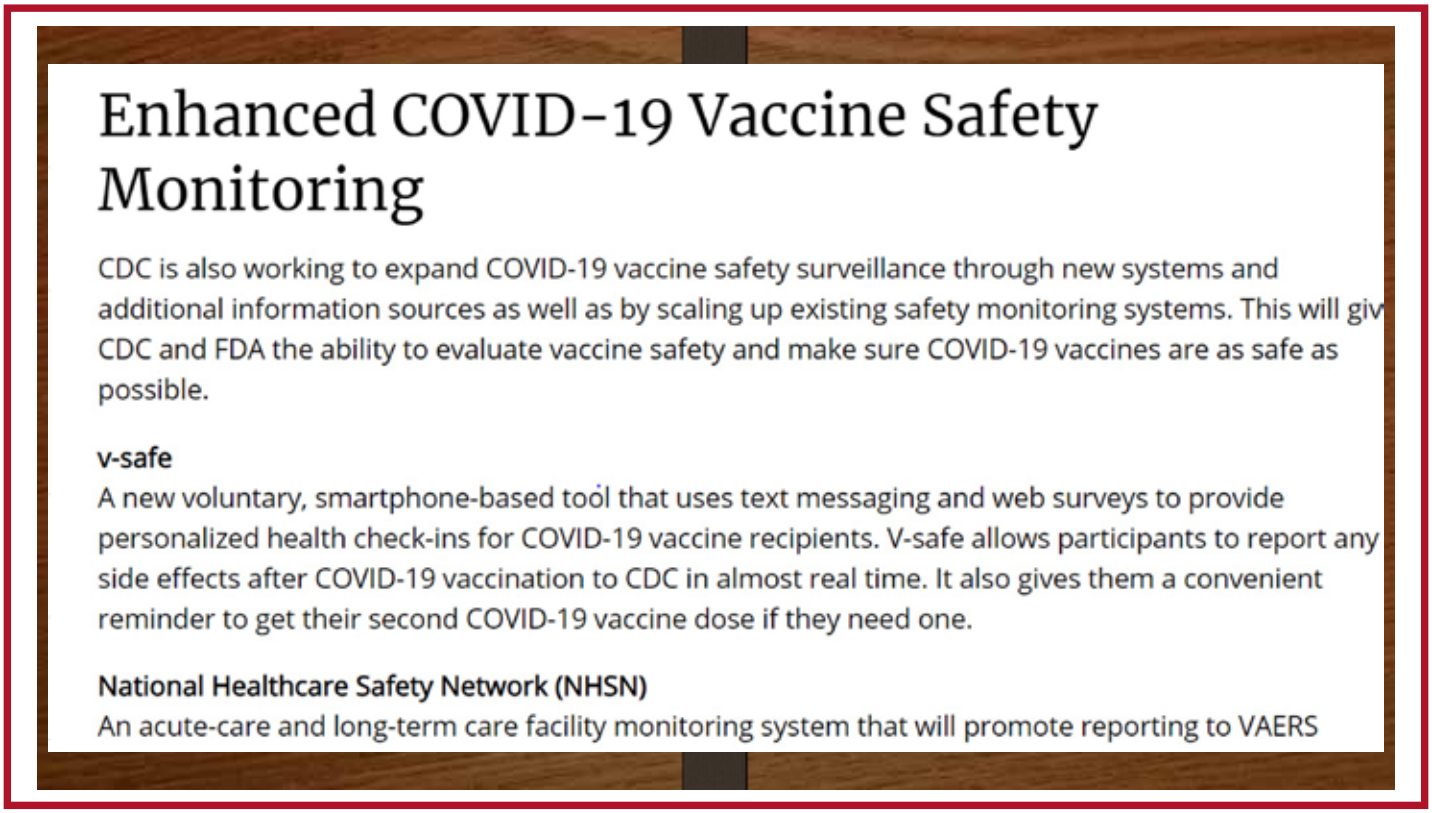
- ❑ Who is receiving each candidate vaccine (age, race, ethnicity, underlying medical conditions)
- ❑ How different groups respond to the vaccine
- ❑ Side effects experienced

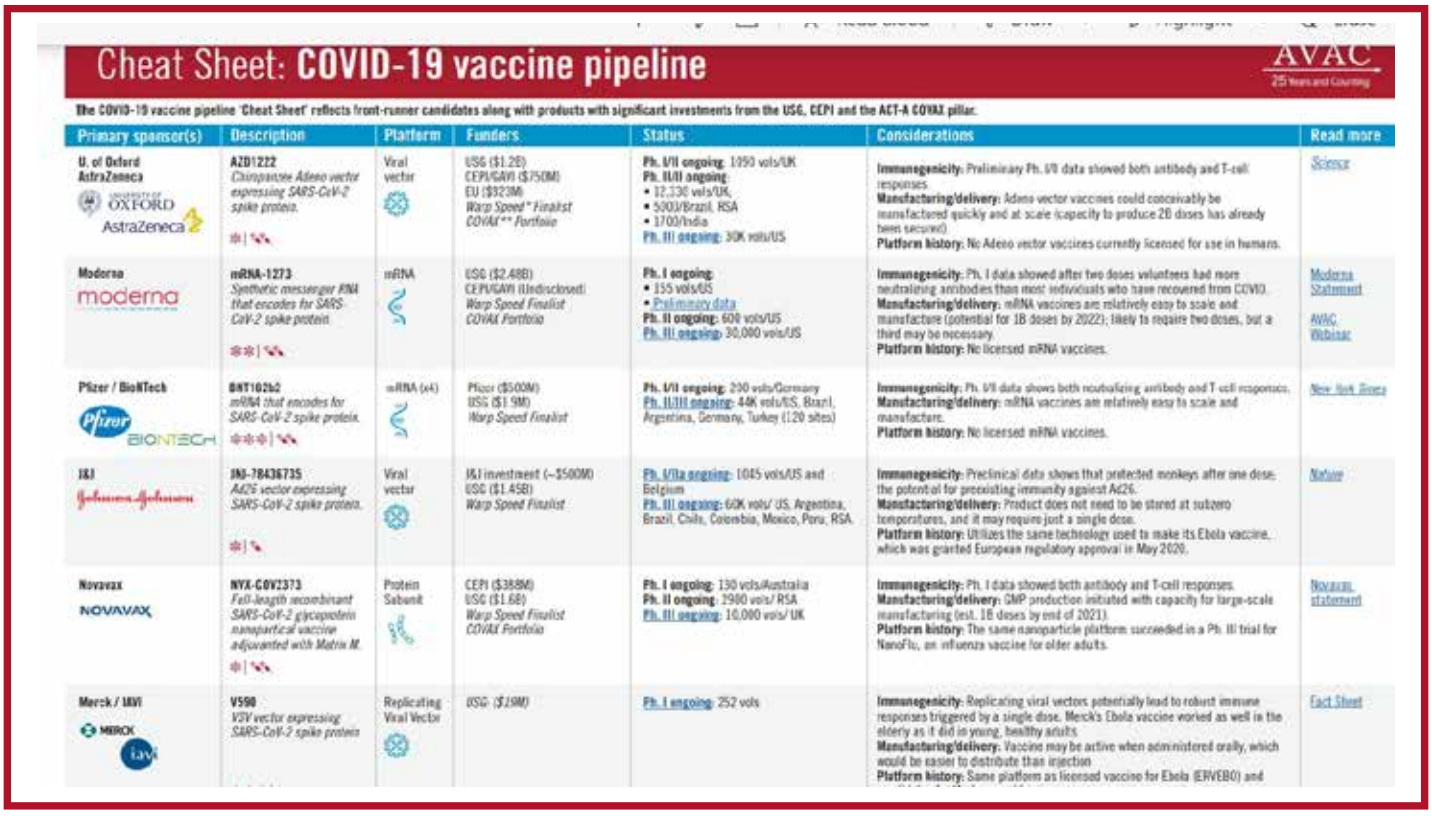
If the Food and Drug Administration (FDA) authorizes or approves a COVID-19 vaccine

- ❑ ACIP will quickly hold a meeting to review all available data about that vaccine.
- ❑ From these data, ACIP will then vote on whether to recommend the vaccine and, if so, who should receive it
- ❑ Included in ACIP's recommendations will be guidance on who should receive COVID-19 vaccines if supply is limited.
- ❑ Recommendations must go to the director of CDC for approval before becoming official CDC policy.




COVID-19 Vaccine Safety and Development
After a COVID-19 vaccine is authorized or approved for use, CDC, FDA, and other federal partners will use multiple existing, robust systems and data sources to conduct ongoing safety monitoring.
VAERS
Vaccine Adverse Event Reporting System
The national system that collects reports of adverse events that happen after vaccination. Reports can be submitted from healthcare providers, vaccine manufacturers, and the public. Reports of adverse events that are unexpected, appear to happen more often than expected, or have unusual patterns are followed up with specific studies.


Enhanced COVID-19 Vaccine Safety Monitoring
CDC is also working to expand COVID-19 vaccine safety surveillance through new systems and additional information sources as well as by scaling up existing safety monitoring systems. This will giv CDC and FDA the ability to evaluate vaccine safety and make sure COVID-19 vaccines are as safe as possible.
v-safe
A new voluntary, smartphone-based tool that uses text messaging and web surveys to provide personalized health check-ins for COVID-19 vaccine recipients. V-safe allows participants to report any side effects after COVID-19 vaccination to CDC in almost real time. It also gives them a convenient reminder to get their second COVID-19 vaccine dose if they need one.
National Healthcare Safety Network (NHSN)
An acute-care and long-term care facility monitoring system that will promote reporting to VAERS



Cheat Sheet: COVID-19 vaccine pipeline

AVAC
25 Years and Counting

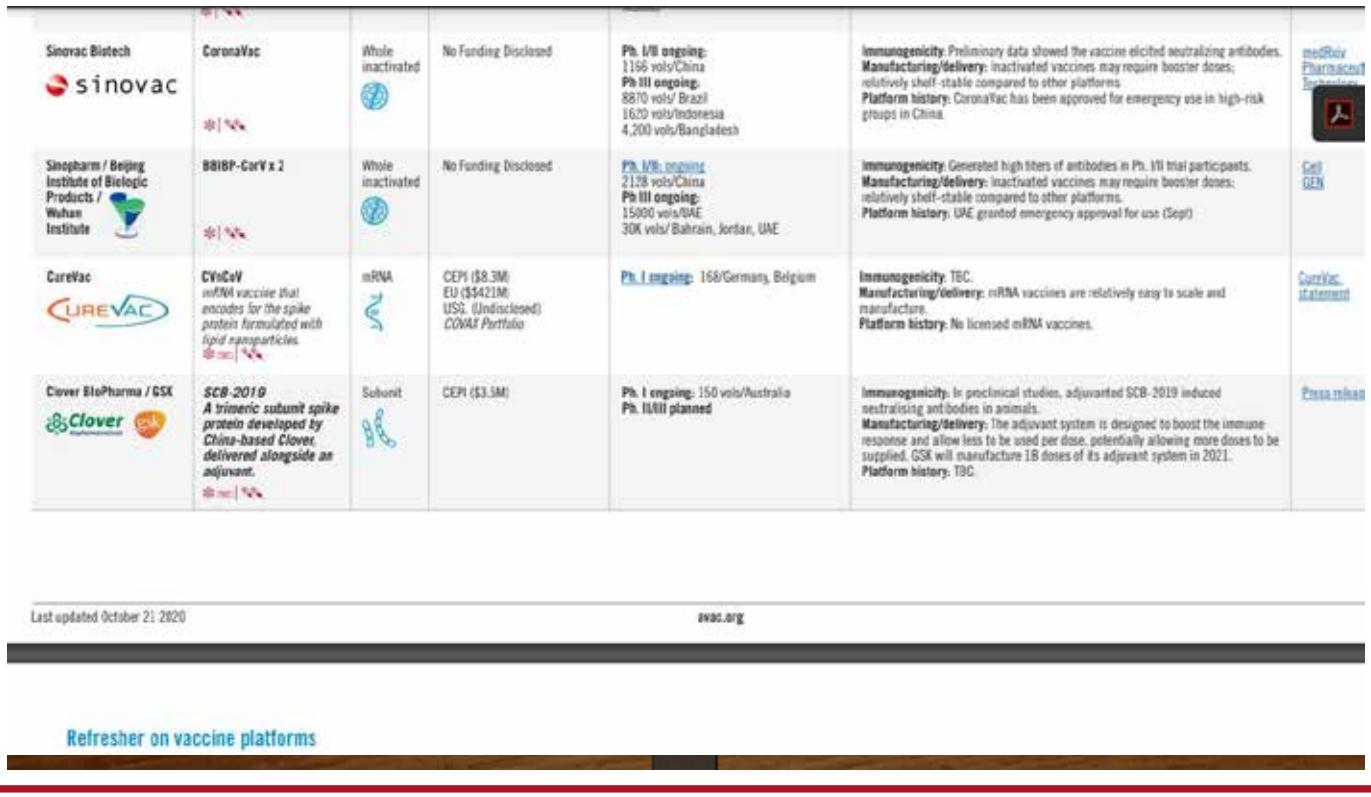
The COVID-19 vaccine pipeline 'Cheat Sheet' reflects front-runner candidates along with products with significant investments from the USG, CEPI and the ACT-A COVAX pillar.

Primary sponsor(s)	Description	Platform	Funders	Status	Considerations	Read more
U. of Oxford AstraZeneca	**AZD1222** *Chimpanzee Adeno vector expressing SARS-CoV-2 spike protein.* ❄ | 🍾	Viral vector	USG ($1.2B) CEPI/GAVI ($750M) EU ($323M) *Warp Speed* Finalist COVAX** Portfolio*	**Ph. I/II ongoing**: 1090 vols/UK **Ph. II/III ongoing**: • 12,130 vols/UK, • 5000/Brazil, RSA • 1700/India **Ph. III ongoing**: 30K vols/US	**Immunogenicity:** Preliminary Ph. I/II data showed both antibody and T-cell responses **Manufacturing/delivery:** Adeno vector vaccines could conceivably be manufactured quickly and at scale (capacity to produce 2B doses has already been secured) **Platform history:** No Adeno vector vaccines currently licensed for use in humans.	Science
Moderna	**mRNA-1273** *Synthetic messenger RNA that encodes for SARS-CoV-2 spike protein* ❄❄ | 🍾	mRNA	USG ($2.48B) CEPI/GAVI (Undisclosed) *Warp Speed Finalist COVAX Portfolio*	**Ph. I ongoing**: • 155 vols/US • Preliminary data **Ph. II ongoing**: 600 vols/US **Ph. III ongoing**: 30,000 vols/US	**Immunogenicity:** Ph. I data showed after two doses volunteers had more neutralizing antibodies than most individuals who have recovered from COVID. **Manufacturing/delivery:** mRNA vaccines are relatively easy to scale and manufacture (potential for 1B doses by 2022); likely to require two doses, but a third may be necessary. **Platform history:** No licensed mRNA vaccines.	Moderna Statement AVAC Webinar
Pfizer / BioNTech	**BNT162b2** *mRNA that encodes for SARS-CoV-2 spike protein.* ❄❄❄ | 🍾	mRNA (x4)	Pfizer ($500M) USG ($1.9B) *Warp Speed Finalist*	**Ph. I/II ongoing**: 200 vols/Germany **Ph. II/III ongoing**: 44K vols/US, Brazil, Argentina, Germany, Turkey (120 sites)	**Immunogenicity:** Ph. I/II data shows both neutralizing antibody and T-cell responses. **Manufacturing/delivery:** mRNA vaccines are relatively easy to scale and manufacture. **Platform history:** No licensed mRNA vaccines.	New York Times
J&J	**JNJ-78436735** *Ad26 vector expressing SARS-CoV-2 spike protein.* ❄ | 🍾	Viral vector	J&J investment (~$500M) USG ($1.45B) *Warp Speed Finalist*	**Ph. I/IIa ongoing**: 1045 vols/US and Belgium **Ph. III ongoing**: 60K vols/ US, Argentina, Brazil, Chile, Colombia, Mexico, Peru, RSA	**Immunogenicity:** Preclinical data shows that protected monkeys after one dose; the potential for preexisting immunity against Ad26. **Manufacturing/delivery:** Product does not need to be stored at subzero temperatures, and it may require just a single dose. **Platform history:** Utilizes the same technology used to make its Ebola vaccine, which was granted European regulatory approval in May 2020.	Nature
Novavax	**NVX-CoV2373** *Full-length recombinant SARS-CoV-2 glycoprotein nanoparticle vaccine adjuvanted with Matrix M.* ❄ | 🍾	Protein Subunit	CEPI ($388M) USG ($1.6B) *Warp Speed Finalist COVAX Portfolio*	**Ph. I ongoing**: 130 vols/Australia **Ph. II ongoing**: 2980 vols/ RSA **Ph. III ongoing**: 10,000 vols/ UK	**Immunogenicity:** Ph. I data showed both antibody and T-cell responses. **Manufacturing/delivery:** GMP production initiated with capacity for large-scale manufacturing (est. 1B doses by end of 2021). **Platform history:** The same nanoparticle platform succeeded in a Ph. III trial for NanoFlu, an influenza vaccine for older adults.	Novavax statement
Merck / IAVI	**V590** *VSV vector expressing SARS-CoV-2 spike protein*	Replicating Viral Vector	*(USG: ($19M)*	**Ph. I ongoing**: 252 vols	**Immunogenicity:** Replicating viral vectors potentially lead to robust immune responses triggered by a single dose. Merck's Ebola vaccine worked as well in the elderly as it did in young, healthy adults. **Manufacturing/delivery:** Vaccine may be active when administered orally, which would be easier to distribute than injection **Platform history:** Same platform as licensed vaccine for Ebola (ERVEBO) and candidates for Marburg and Lassa.	Fact Sheet
Merck / Themis / Pasteur Inst.	**V591** *Uses a weakened measles virus carrying a gene for the coronavirus spike protein.* ❄❄❄ | 🍾	Replicating Viral Vector	*(USG: ($19M)*	**Ph. I/II ongoing**: 260 vols/Belgium, Austria, US	**Immunogenicity:** Replicating viral vectors potentially lead to robust immune responses triggered by a single dose. **Manufacturing/delivery:** TBC **Platform history:** Same platform as vaccine candidates for West Nile, Chikungunya, Ebola, Lassa, Zika, MERS	STAT

Cold Chain Considerations
❄ Refrigeration (2-8o C) ❄❄ Freezer (-20 C) ❄❄❄ Deep Freeze (-70 C)

Doses
🍾🍾 Anticipated number of doses

		Platform				Read more
Sanofi / GSK	*DNA from the surface protein of the SARS-CoV-2 virus is inserted into insect cells, which express antigen that is then purified and combined with GSK's pandemic ASO3 adjuvant.* ❄ | 🍾	Subunit	USG ($2.1B) *Warp Speed Finalist*	**Ph. I/II ongoing**: 440 vols/US **Ph. III planned**: 30K vols/ US+ (Dec. 2020)	**Immunogenicity:** TBC **Manufacturing/delivery:** The adjuvant system is designed to boost the immune response and allow less to be used per dose, potentially allowing more doses to be supplied. GSK will manufacture 1B doses of its adjuvant system in 2021. **Platform history:** Same platform as vaccine candidates for Influenza, SARS-CoV (FDA approved vaccine).	Sanofi Statement
Inovio	**INO-4800** *DNA plasmid vaccine with electroporation.* ❄ | 🍾	DNA	CEPI ($17.2M) BMGF ($5M) USG ($83M) *COVAX Portfolio*	**Ph. I ongoing**: 40 vols/US **Ph. II/III ongoing**: 160 vols/S Korea **Ph. II/III trial planned**: Q2/3 2020	**Immunogenicity:** Preliminary Ph. I data shows antibody and cellular immune responses. **Manufacturing/delivery:** INO-4800 is stable at room temperature for more than a year and is not required to be frozen in transport or storage. **Platform history:** No licensed DNA vaccines for use in humans.	Inovio Ph. 1 Statement
Imperial College	*Synthetic self-amplifying RNA producing SARS-CoV-2 spike protein* ❄❄ incl 🍾	Self-amplifying RNA	UK ($50.7M) Philanthropies ($6.2M)	**Ph. I/II ongoing**: 300 vols/UK **Ph. III planned**: 6000/UK	**Immunogenicity:** TBC. **Manufacturing/delivery:** Imperial College created a special-purpose company to sell the vaccine (IdeE-cuity) at lowest possible cost in UK and LMICs. **Platform history:** No licensed self-amplifying RNA vaccines.	New York Times
CanSino Biologics	**Ad5-nCoV**	Viral	No funding disclosed	**Ph. I complete**: 108 vols/China (published)	**Immunogenicity:** Ph. I participants developed binding antibodies, neutralizing	Lancet



Sinovac Biotech	CoronaVac	Whole inactivated	No Funding Disclosed	**Ph. I/II ongoing:** 1166 vols/China **Ph III ongoing:** 8870 vols/ Brazil 1620 vols/Indonesia 4,200 vols/Bangladesh	**Immunogenicity:** Preliminary data showed the vaccine elicited neutralizing antibodies. **Manufacturing/delivery:** Inactivated vaccines may require booster doses; relatively shelf-stable compared to other platforms **Platform history:** CoronaVac has been approved for emergency use in high-risk groups in China.	medRxiv Pharmaceut Technology
Sinopharm / Beijing Institute of Biologic Products / Wuhan Institute	BBIBP-CorV x 2	Whole inactivated	No Funding Disclosed	Ph. I/II: ongoing 2128 vols/China **Ph III ongoing:** 15000 vols/UAE 30K vols/ Bahrain, Jordan, UAE	**Immunogenicity:** Generated high titers of antibodies in Ph. I/II trial participants. **Manufacturing/delivery:** Inactivated vaccines may require booster doses; relatively shelf-stable compared to other platforms. **Platform history:** UAE granted emergency approval for use (Sept)	Cell GEN
CureVac	CVnCoV *mRNA vaccine that encodes for the spike protein formulated with lipid nanoparticles.*	mRNA	CEPI ($8.3M) EU ($$421M) USG. (Undisclosed) *COVAX Portfolio*	Ph. I ongoing: 168/Germany, Belgium	**Immunogenicity:** TBC. **Manufacturing/delivery:** mRNA vaccines are relatively easy to scale and manufacture. **Platform history:** No licensed mRNA vaccines.	CureVac statement
Clover BioPharma / GSK	***SCB-2019*** ***A trimeric subunit spike protein developed by China-based Clover, delivered alongside an adjuvant.***	Subunit	CEPI ($3.5M)	**Ph. I ongoing:** 150 vols/Australia **Ph. II/III planned**	**Immunogenicity:** In preclinical studies, adjuvanted SCB-2019 induced neutralising antibodies in animals. **Manufacturing/delivery:** The adjuvant system is designed to boost the immune response and allow less to be used per dose, potentially allowing more doses to be supplied. GSK will manufacture 1B doses of its adjuvant system in 2021. **Platform history:** TBC.	Press release

Last updated October 21 2020 avac.org

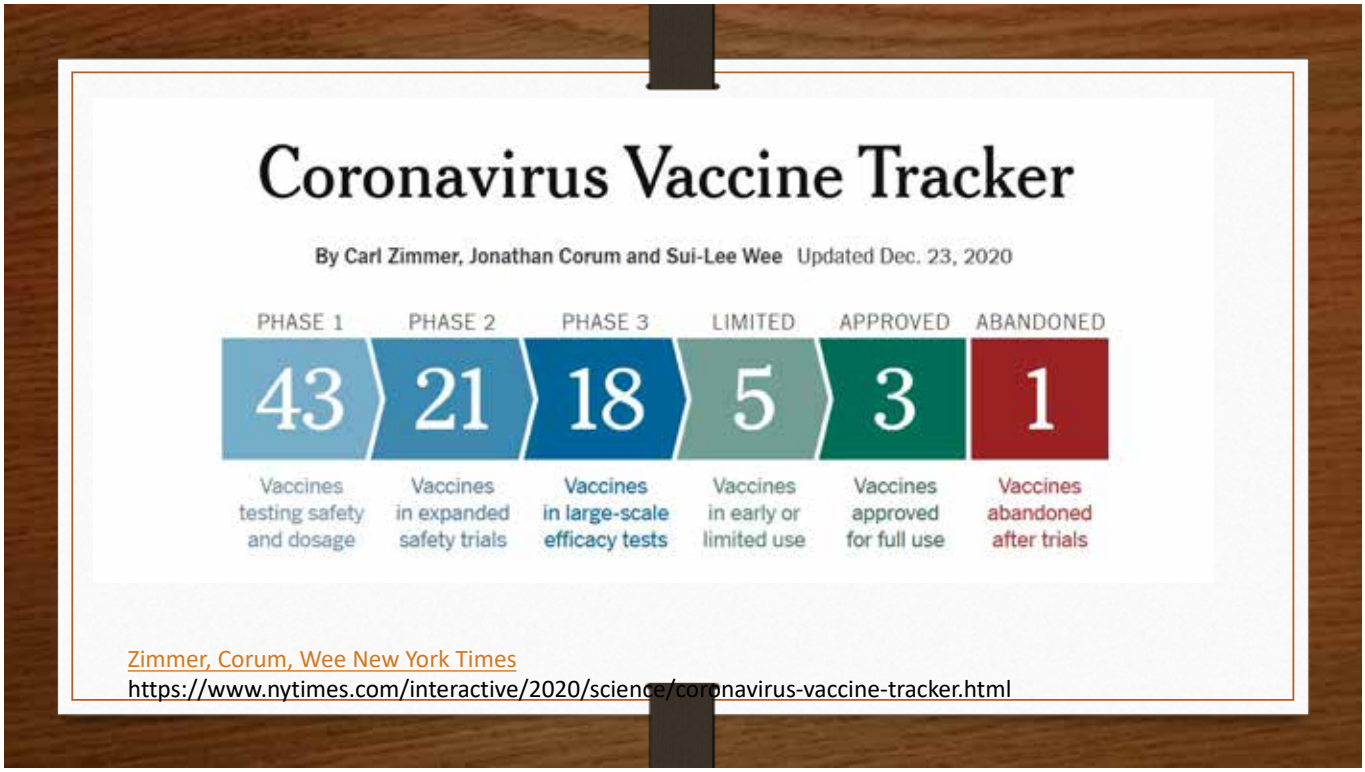
Refresher on vaccine platforms

Global vaccine development

Leading vaccines

Developer	Type	Phase	Status
Pfizer-BioNTech	mRNA	2 3	Approved in Canada and other Emergency use in U.S. and otl
Moderna	mRNA	3	Approved in Canada. Emergen
CanSino	Adenovirus	3	Limited use in China.
Gamaleya	Adenovirus	3	Early use in Russia.
Johnson & Johnson	Adenovirus	3	
Oxford-AstraZeneca	Adenovirus	2 3	
Vector Institute	Protein	3	Early use in Russia.
Novavax	Protein	3	
Sinopharm-Beijing	Inactivated	3	Approved in U.A.E., Bahrain. Limited use in China.
Sinopharm-Wuhan	Inactivated	3	Limited use in China, U.A.E.
Sinovac	Inactivated	3	Limited use in China.

Zimmer, Corum, Wee New York Times
https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html



Zimmer, Corum, Wee New York Times
https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html

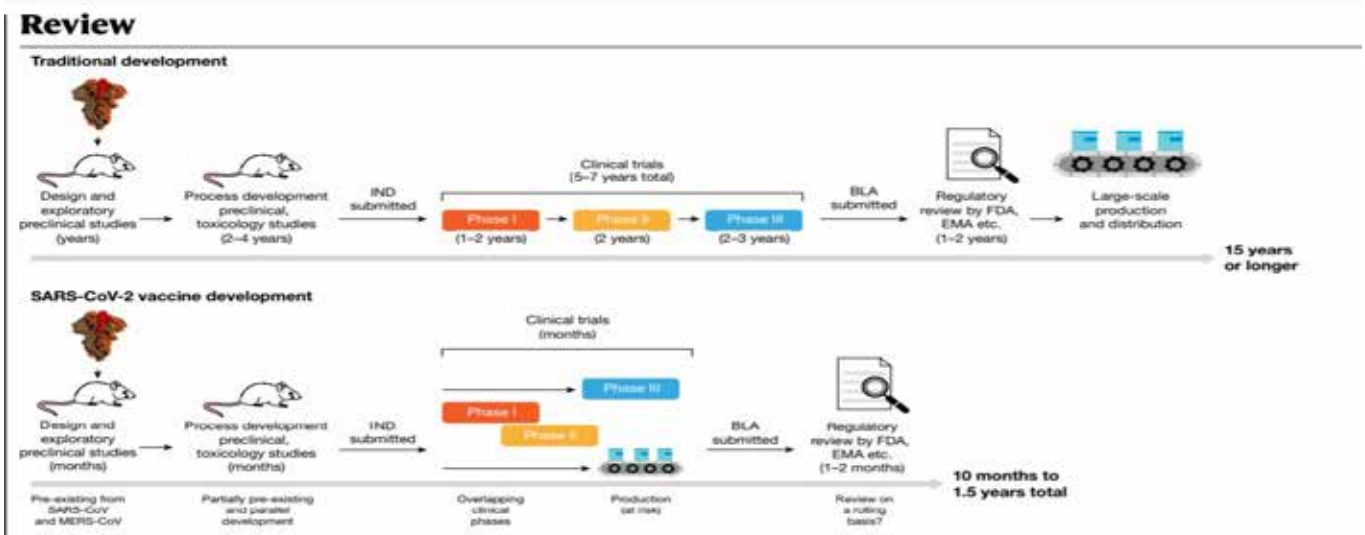


Fig. 1 | Traditional and accelerated vaccine-development pipelines. Traditional vaccine development can take 15 years or more, starting with a lengthy discovery phase in which vaccines are designed and exploratory preclinical experiments are conducted. This is usually followed by a phase in which more formal preclinical experiments and toxicology studies are performed and in which production processes are developed. During this process an investigational new drug (IND) application is filed and the vaccine candidate then enters phase I, II and III trials. If, when phase III trials are completed, the predetermined end points have been met, a biologics licence application (BLA) is filed, reviewed by regulatory agencies and finally the vaccine is licensed. After that point, large-scale production begins. Vaccine development for SARS-CoV-2 is following an accelerated timeline. Because of knowledge gained from the initial development of vaccines for SARS-CoV and MERS-CoV, the discovery phase was omitted. Existing processes were adopted, and phase I/II trials were started. Phase III trials were initiated after the interim analysis of phase I/II results, with several clinical trial stages running in parallel. In the meantime, vaccine producers have started the large-scale production of several vaccine candidates, at risk. The exact pathway by which these vaccine candidates will be licensed—for example, through an initial emergency use authorization—is not yet clear.

Refresher on vaccine platforms

Platform	About	Licensed products	Learn more
Inactivated	Inactivated vaccines consist of the whole virus, which has been killed with heat or chemicals so that it can't cause illness. In general, inactivated virus vaccines do not provide as strong of an immune response as live attenuated vaccines, so additional doses may be needed.	Polio	Inactivated viral vaccines
Live attenuated	Live attenuated vaccines are made up of whole viruses that have been weakened in a lab (usually through culturing). They tend to elicit a stronger immune response than inactivated vaccines.	MMR Varicella TB	Live attenuated vaccines: historical successes and current challenges
Subunit	Subunit vaccines introduce a fragment or portion of the virus into the body. This fragment is enough to be recognized by the immune response and stimulate immunity.	Pertussis HPV Hep. B	Subunit Vaccines
Viral vector	Viral vector vaccines insert a gene for a viral protein into another harmless virus (replicating or non-replicating). This harmless virus then delivers the viral protein to the vaccine recipient, which triggers an immune response. • **Replicating viral vectors** are able to produce copies of the viral protein, potentially triggering an enhanced immune response.	Ebola Veterinary vaccines	What are viral vector vaccines?
mRNA	RNA vaccines work by introducing an mRNA sequence (the molecule that tells cells what to build) coded for a disease-specific antigen. Once this antigen is reproduced within the body, it is recognized and triggers an immune response.	None	An introduction to RNA vaccines
DNA	DNA-based vaccines work by inserting synthetic DNA of viral gene(s) into small DNA molecules called plasmids. Cells take in the DNA plasmids and follow their instructions to build viral proteins, which are recognized by the immune system, and prepare it to respond to disease exposure.	None	WHO: About DNA vaccines

*Operation Warp Speed: US government body responsible for strategic approach, coordination and resource allocation for COVID-19 vaccines

**COVAX: The vaccine pillar of ACT-A, the global collaboration to accelerate development, production and equitable access to new diagnostics, therapeutics and vaccines. COVAX is led by GAVI, CEPI and WHO.

Types of Vaccines

mRNA

- contain material from the virus that causes instructions for how to make a harmless protein that is unique to the virus.
- After our cells make copies of the protein, they destroy the genetic material from the vaccine.
- Our bodies recognize that the protein should not be there and build T-lymphocytes and B-lymphocytes that will remember how to fight the virus that causes COVID-19 if we are infected in the future.

Protein Subunit vaccine

- harmless pieces (proteins) of the virus that cause COVID-19 instead of the entire germ.
- Once vaccinated, our immune system recognizes that the proteins don't belong in the body and begins making T-lymphocytes and antibodies.
- If we are ever infected in the future, memory cells will recognize and fight the virus.

Vector vaccines

- ❑ contain a weakened version of a live virus—a different virus than the one that causes COVID-19—that has genetic material from the virus that causes COVID-19 inserted in it (this is called a viral vector).
- ❑ Once the viral vector is inside our cells, the genetic material gives cells instructions to make a protein that is unique to the virus that causes COVID-19. Using these instructions, our cells make copies of the protein.
- ❑ This prompts our bodies to build T-lymphocytes and B-lymphocytes that will remember how to fight that virus if we are infected in the future.

How do COVID-19 Vaccines Work

- ❑ Different types of vaccines work in different ways to offer protection
- ❑ All types of vaccines, the body is left with a supply of "memory" T-lymphocytes as well as B-lymphocytes that will remember how to fight that virus in the future.
- ❑ It takes a few weeks for the body to produce T-lymphocytes and B-lymphocytes after vaccination.
- ❑ It is possible that a person could be infected with the virus that causes COVID-19 just before or just after vaccination ; the person get sick because the vaccine did not have enough time to provide protection.
- ❑ Sometimes after vaccination while building immunity the vaccine can cause symptoms, such as fever.
- ❑ These symptoms are normal and are a sign that the body is building immunity.

Immune System

Our immune system uses several tools to fight infection.

Different types of white blood cells fight infection in different ways:

Macrophages

- white blood cells that swallow up , digest germs and dead or dying cells.
- The macrophages leave behind parts of the invading germs called antigens.
- The body identifies antigens as dangerous and stimulates antibodies to attack them.

B-lymphocytes

- are defensive white blood cells.
- They produce antibodies that attack the pieces of the virus left behind by the macrophages.

T-lymphocytes

- are another type of defensive white blood cell.
- They attack cells in the body that have already been infected.

After the infection

- the person's immune system remembers what it learned about how to protect the body against that disease.
- The body keeps a few T-lymphocytes, **called memory cells**, that go into action quickly if the body encounters the same virus again.
- When the familiar antigens are detected, B-lymphocytes produce antibodies to attack them.

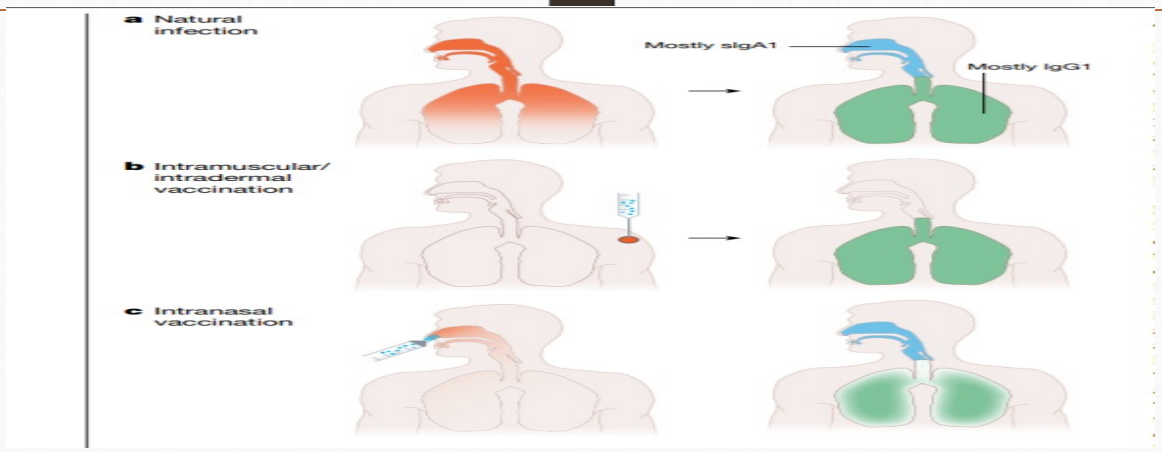


Fig. 2 | Mucosal and systemic immune responses to natural infection with respiratory viruses and to vaccination- *Nature review*

Mucosal and Systemic Immune responses

The lower human respiratory tract is protected by **IgG mostly IgG1**

The upper respiratory tract is protected by secretory **IgA1 (sIgA1).**

Natural infection with respiratory viruses

- induces both a systemic immune response with IgG1 production and a mucosal immune response in the upper respiratory tract producing sIgA1.
- This leads to sterilizing immunity for many respiratory viruses.

Intramuscular or intradermal vaccination

- leads to a strong induction of serum IgG but not to mucosal IgA.
- lack of sIgA an individual is vulnerable to infection of the upper respiratory tract

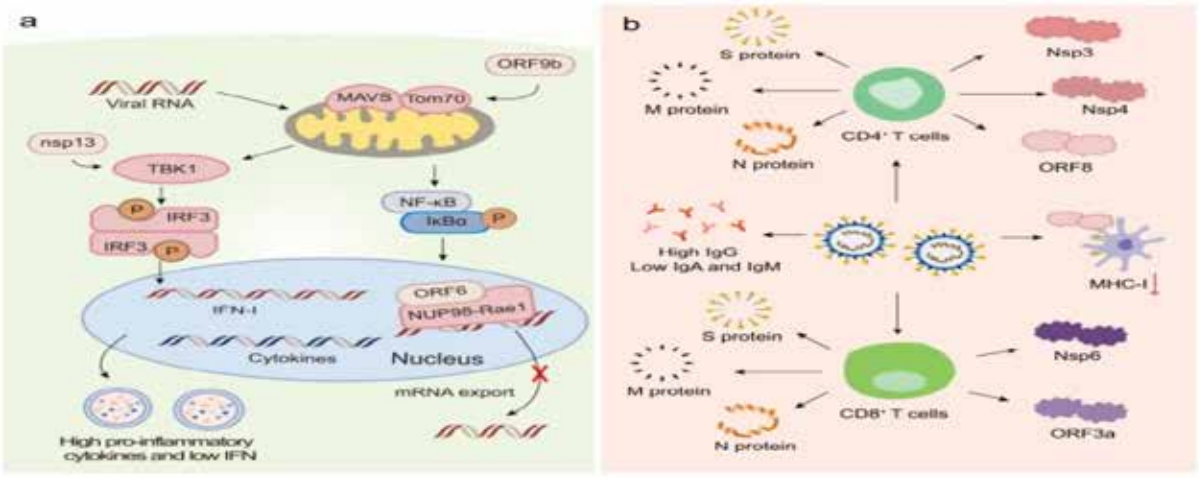
Intranasal vaccination

- can induce mucosal antibody responses provides sterilizing immunity in the upper respiratory tract.
- systemic immune responses produced but lower
- Currently, all SARS-CoV-2 vaccine candidates in clinical development are administered intramuscularly, and very are designed to induce mucosal immunity.

mucosal immunity

- might not be required to protect from severe or symptomatic disease,
- ***required to achieve optimal protection from infection and onward transmission of SARS-CoV-2.***

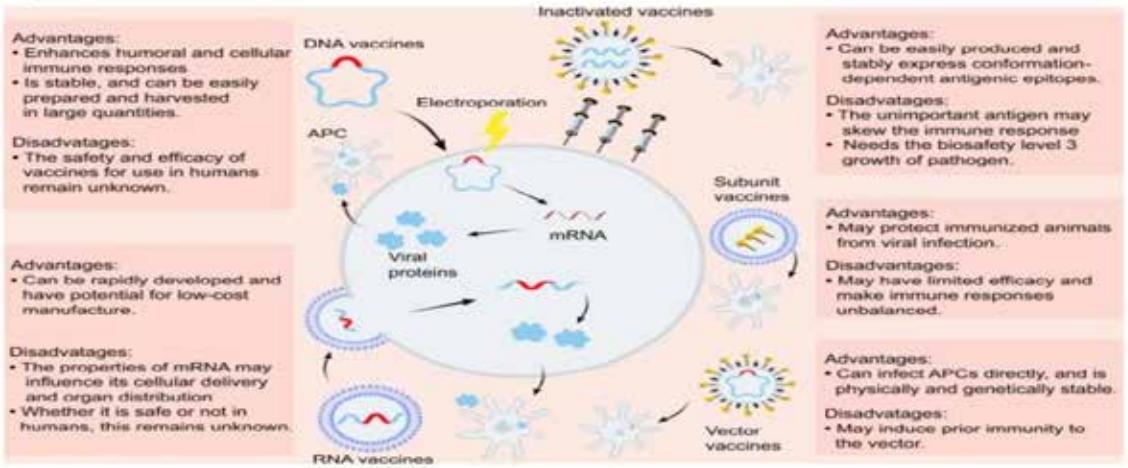
Fig. 1



The immune responses induced by SARS-CoV-2. **a** Innate immune response. SARS-CoV-2 infection induces imbalanced host immune responses, such as low IFN-I and -III levels but high pro-inflammatory cytokines. Nsp13 of SARS-CoV-2 targets the IFN pathway by associating with TBK1. The ORF6 protein interacts with the mRNA export factor NUP98-Rae1. The ORF9b indirectly interacts with MAVS via its interaction with Tom70. **b** Adaptive immune response. $CD4^+$ T-cell responses are primarily directed against the S, M, and N proteins and partially against nsp3, nsp4, and ORF8. $CD8^+$ T cells recognize SARS-CoV-2 M, N, S proteins, nsp6, and ORF3a. ORF8 is able to downregulate MHC-I

respectively, displaying only transient and self-limiting adverse reactions.[17]

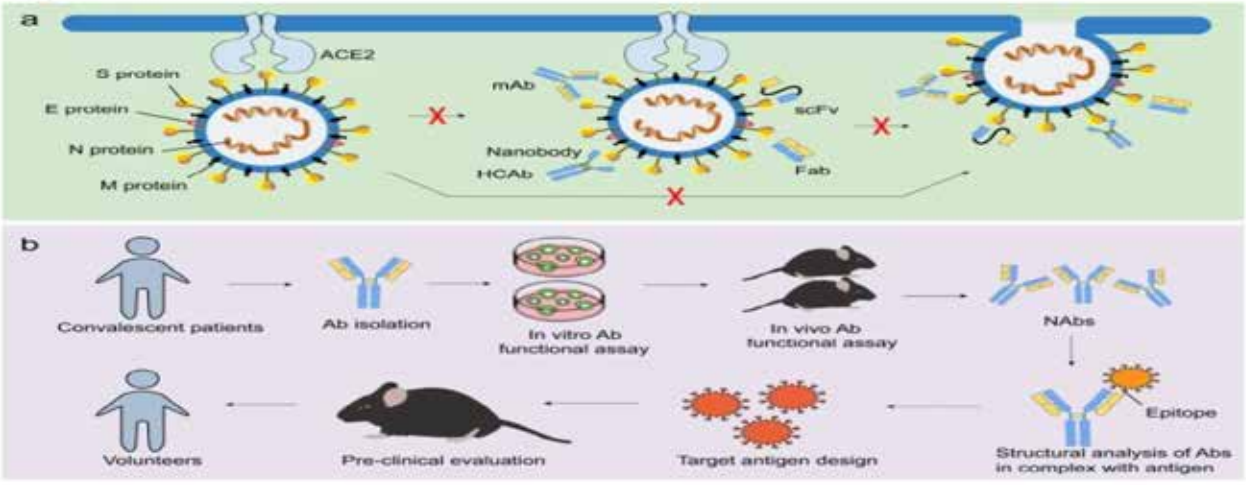
Fig. 2



Overview of the diverse types of vaccines, and their potential advantages and disadvantages

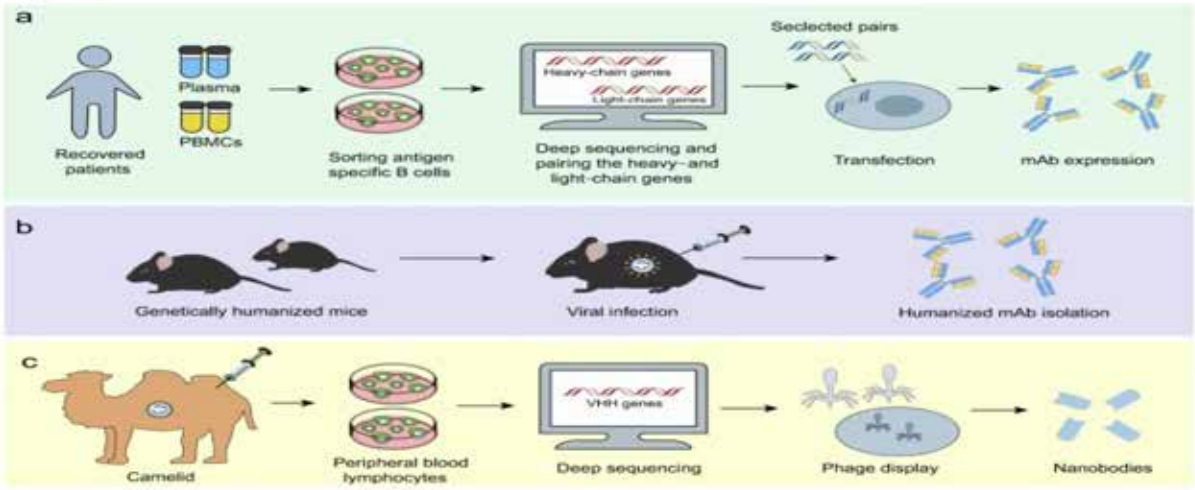
Full size image >

Fig. 3



NAbs against CoVs and the scheme of Reverse Vaccinology 2.0. **a** NAbs, such as mAbs, single-domain antibodies, scFvs, and Fabs, are able to target viral proteins, with RBD being the most potent target. This process may further block receptor binding and membrane fusion, commonly via targeting the S1 and/or S2 subunit. **b** The scheme of Reverse Vaccinology 2.0. Antibodies are isolated from convalescent patients and tested for their efficacy in vitro and in vivo. NAbs are further studied in complex with the antigen. Identifying the epitopes may aid in immunogen design, which will later be evaluated in animal models and humans

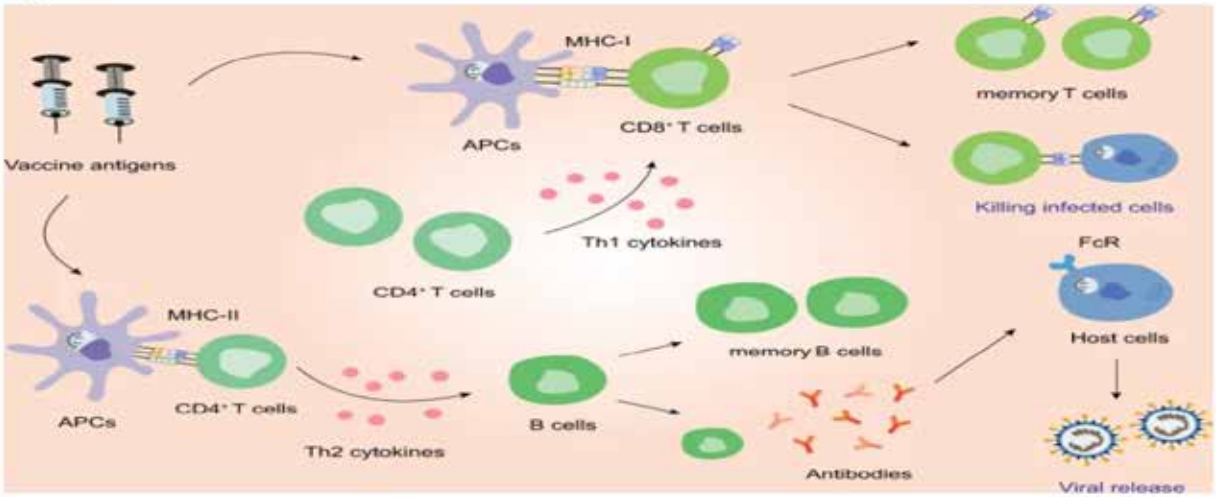
Fig. 4



NAbs isolation strategies. **a** mAbs can be isolated from convalescent people previously infected with virus. After sorting antigen-specific B cells, deep sequencing can help pair the heavy- and light-chain genes. Selected pairs via functional screening can be used to produce mAbs. **b** Humanized mAbs can be isolated from immunized transgenic animal models, like mice. **c** Nanobodies can be constructed based on sequences of the camelid immunized with viral proteins and produced by phage carrying the VHH encoding sequences

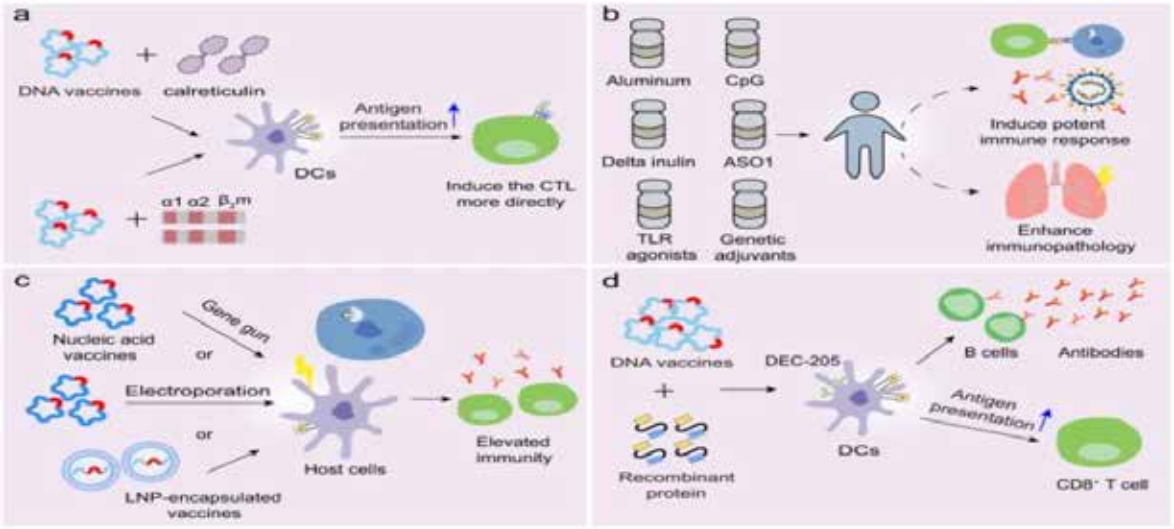
designing vaccines against SARS-CoV-2.

Fig. 5

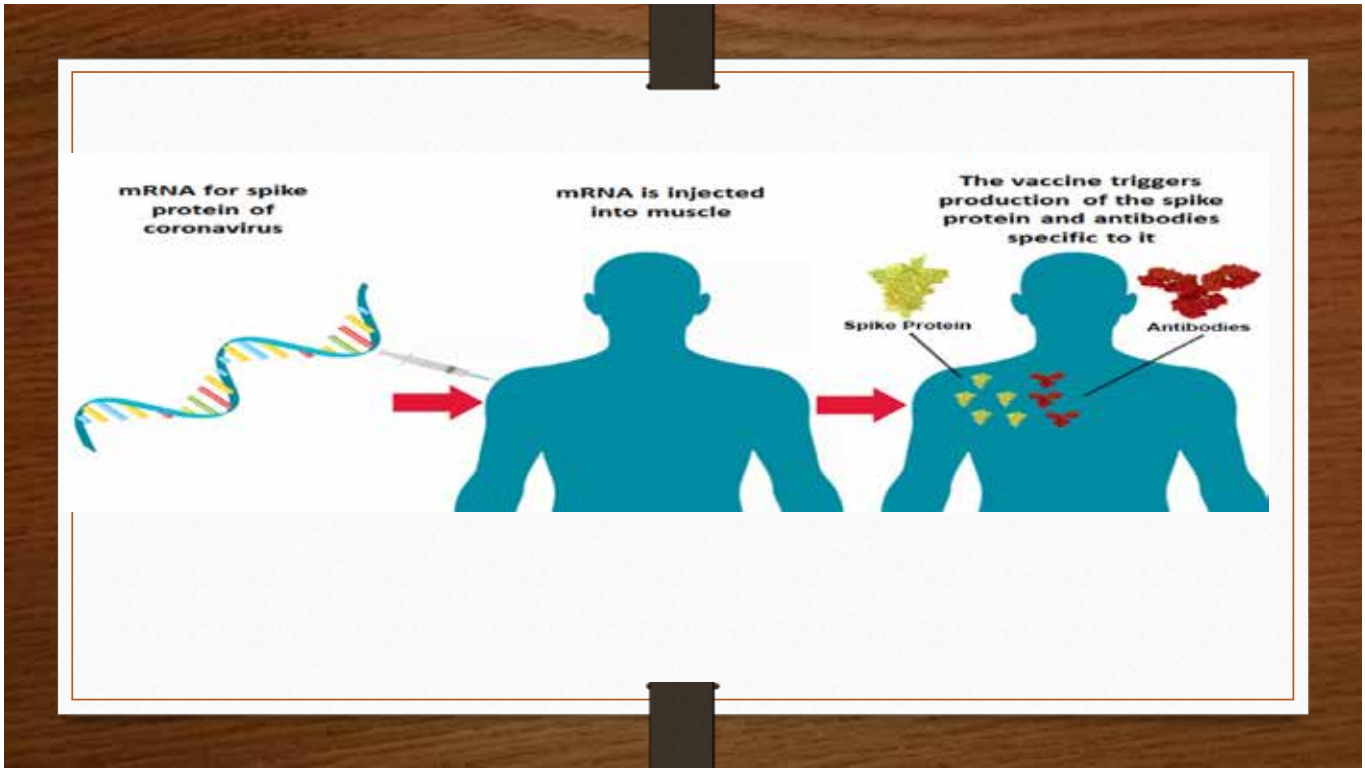


The immune responses induced by vaccines. Antigen-presenting cells (APCs) can process vaccine antigen and present it to $CD8^+$ T cells and $CD4^+$ T cells. $CD8^+$ T cells can be stimulated by Th1 cytokines and in turn acquires the ability to attack the infected cells. Th2 cytokines can aid in the differentiation of B cells. The activated B cells can produce NAbs. However, imbalanced immune responses have the potential to cause pulmonary immunopathology, partially due to aberrant Th2

Fig. 6



Potential strategies to optimize vaccines. **a** DNA vaccines linked with calreticulum or the cDNA of human β_2-microglobulin and the α-1 and α-2 domains of MHC-I heavy chain can facilitate antigen presentation and induce the CTL response more directly. **b** Adjuvants have the potential to promote the immune response against CoVs, although several are involved in the immunopathology. **c** Certain



RNA vaccines

- RNA vaccines are a relatively recent development.
- Similar to DNA vaccines, ***the genetic information for the antigen is***
- ***delivered instead of the antigen itself***
- The antigen is then expressed in the cells of the vaccinated individual
- Either mRNA (with modifications) or a self-replicating RNA can be used

Recombinant protein vaccines

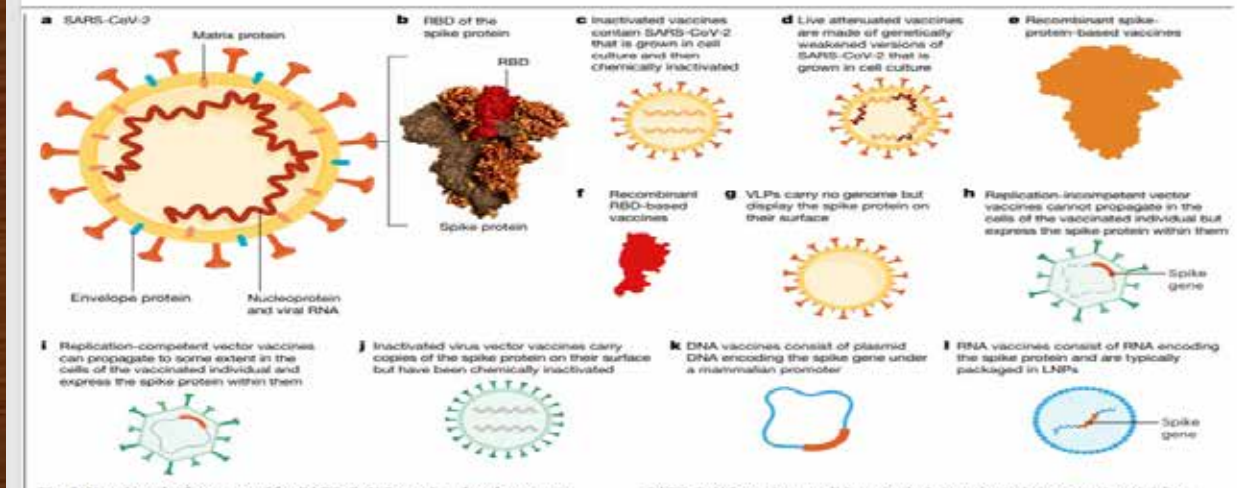


Fig. 3 | Vaccine platforms used for SARS-CoV-2 vaccine development. **a**, A schematic of the structural proteins of the SARS-CoV-2 virion, including the lipid membrane, the genomic RNA covered by the nucleoprotein on the inside, the envelope and matrix proteins within the membrane, and the spike protein on the surface of the virus. **b**, The structure of the spike protein; one monomer is highlighted in dark brown and the RBD is shown in red. **c**–**l**, Current SARS-CoV-2 vaccine candidates include inactivated virus vaccines (**c**), live attenuated vaccines (**d**), recombinant protein vaccines based on the spike protein (**e**), the RBD (**f**) or on virus-like particles (**g**), replication-incompetent vector vaccines (**h**), replication-competent vector vaccines (**i**), inactivated virus vector vaccines that display the spike protein on their surface (**j**), DNA vaccines (**k**) and RNA vaccines (**l**).

Recombinant protein vaccines

Recombinant protein vaccines can be divided into recombinant

- spike-protein-based vaccines (Fig. 3e)
- recombinant RBD-based vaccines (Fig. 3f)
- virus-like particle (VLP)-based vaccines (Fig. 3g).

Recombinant proteins can be expressed in different expression systems

- ***insect cells, mammalian cells, yeast and plants***
- RBD-based vaccines could also be expressed in Escherichia coli.

The elicited immune response is influenced by

- The type and extent of post-translational modifications, vary depending on the expression system.
- E.g. : **Recombinant spike-protein-based vaccines** modifications such as deletion of the polybasic cleavage site, inclusion of two (or more) stabilizing mutations, and inclusion of trimerization domains—
- The mode of purification (soluble protein versus membrane extraction)

Advantages

- They can be produced without handling live virus
- Some recombinant protein vaccines—**such as the FluBlok vaccine** for influenza—have been licensed, and experience in producing them.

Novavax

NVX-CoV2373 from Novavax

- Novavax has published a primary analysis of the results from their randomized, observer-blind, placebo-controlled phase I trial
- 131 healthy adults aged 18–59 (NCT04368988).

This vaccine candidate uses

- a recombinant version of the full-length spike protein in which the polybasic cleavage site is deleted
- two stabilizing proline residues are present, which is expressed in insect cells and purified by membrane extraction.

The spike protein

- Exhibits rosette formation via its hydrophobic tails—similar to the FluBlok recombinant haemagglutinin-based vaccine from Sanofi—**which has been termed as a 'nanoparticle' by Novavax**
- The antigen was formulated with or without the saponin-containing **adjuvant Matrix-M**
- Given at doses of 5 µg or 25 µg in a prime–boost regimen with a 3-week interval
- The group receiving the unadjuvanted vaccine showed essentially no response
- after the prime dose and barely responded after the boost

Summary of Clinical Trials

There is a gradient of immunogenicity in neutralizing antibodies elicited by the vaccine candidates:

- ❑ Inactivated andAdV5 vaccine candidates are at the lower end, ChAdOx1 nCoV-19
- ❑ The mRNA candidates are in the medium range
- ❑ **The recombinant protein vaccine candidate is at the high end, eliciting the greatest titers**

Tolerability

- ❑ **The inactivated and recombinant protein vaccines perform relatively well**
- ❑ Followed by the mRNA vaccines—which show increased reactogenicity after the second dose
- ❑ and then followed by AdV-vectored vaccines.

Phased Distribution of EUA Vaccines

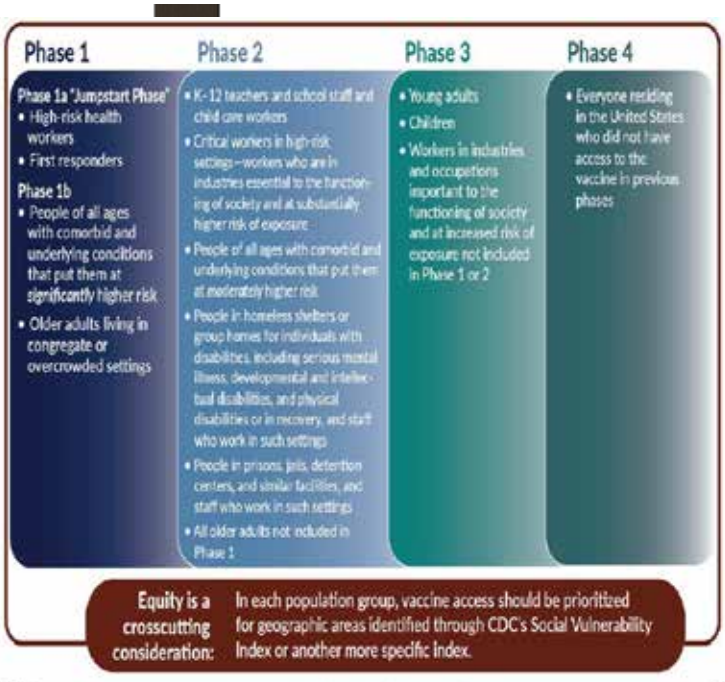


FIGURE: A Phased Approach to Vaccine Allocation for COVID-19

NATIONAL ACADEMY of MEDICINE

The National Academies of SCIENCES ENGINEERING MEDICINE

Expiration and Beyond Use Date (BUD)

Determining when a vaccine or diluent expires is a critical step in proper storage and handling. Understanding vaccine expiration dates can help save your practice time and money.

All vaccines have expiration dates, and some routinely recommended vaccines have a beyond use date (BUD), which is calculated based on the date the vial is first punctured and the storage information in the package insert.

For COVID-19 vaccines:

- The expiration date may change for some vaccines as more stability data become available.
- The EUA Fact Sheets for Healthcare Providers or manufacturer websites will provide more information about expiration dates and BUDs.

EUA Fact Sheet for Recipients

Each vaccine-specific EUA Fact Sheet for Recipients will provide the following information:

- Basic information on COVID-19, symptoms, and what to discuss with a healthcare provider before vaccination
- Who should and should not receive the vaccine
- That recipients have the choice to receive the vaccine
- Dosage and vaccine series information
- Risks and benefits of the vaccine, including common side effects
- Information on reporting side effects to VAERS
- An explanation of what an EUA is and why it is issued
- Any approved available alternatives for preventing COVID-19
- Additional resources

What Does an EUA Mean for Healthcare Providers?

An EUA means that a COVID-19 vaccine has been authorized for use. The scope of authorized use is specified in the EUA Fact Sheet for Healthcare Providers (similar to a package insert for licensed vaccines).

For healthcare providers, conditions of use require:

- Providing the recipient/caregiver the Fact Sheet for Recipients (similar to a vaccine information statement [VIS] for licensed vaccines), which communicates vaccine benefits and risks to the recipient, via hard copy or electronic means
- Reporting vaccine administration data to CDC
- Reporting vaccine administration errors and specified adverse events to VAERS

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EUA Fact Sheet for Healthcare Providers

Each vaccine-specific EUA Fact Sheet for Healthcare Providers will provide the following information:

- COVID-19 disease description
- Dosage and administration information
- Storage and handling instructions
- Dose preparation and administration information
- Requirements for use of vaccine under EUA
- Risks and benefits, including common adverse events (AEs)
- Any approved available alternatives for preventing COVID-19
- Reporting requirements, including reporting AEs to VAERS
- Additional resources

HOWARD UNIVERSITY

Novavax Vaccine Trial Howard

Phase 3, Randomized, Placebo-Controlled Study to Evaluate the Efficacy, Safety, and Immunogenicity of a SARS-CoV-2 Recombinant Spike Protein Nanoparticle Vaccine (SARS-CoV-2 rS) with Matrix-M1™

- Approx. 50,000 exposed in Phase 2 and international trials
- 2:1 randomization
- 2 shots, 21 days apart
- Up to 2 years follow-up
- Primary outcomes – COVID cases and severe COVID cases
- Secondary outcomes – Immune biomarkers
- Adverse events

1. Adults≥ 18 years of age by virtue of age, race, ethnicity or life circumstances are considered at risk of exposure to and infection with SARS-CoV-2.
2. Willing and able to give informed consent and comply with study procedures.
3. Participants of childbearing potential must agree to be heterosexually inactive from at least 28 days prior to enrollment and through 3 months after the last vaccination OR agree to consistently use a medically acceptable method of contraception.
4. Medically stable, medically acceptable vital signs.
5. Agree to not participate in any other SARS-CoV-2 prevention trial during the study follow-up.

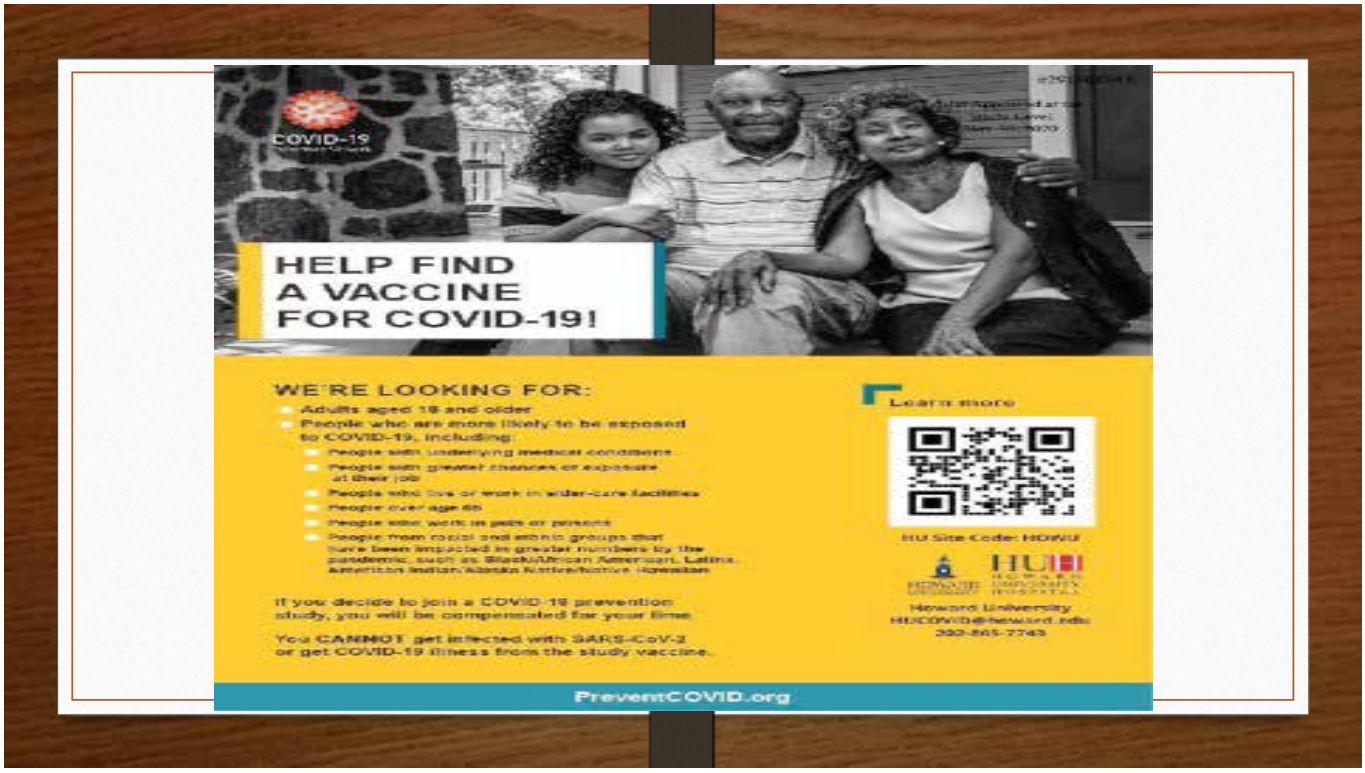
1. Unstable acute or chronic illness. Criteria include:
- ❑ Significant changes in prescribed medication in the past 2 months.
- ❑ Workup of undiagnosed illness
- ❑ Well-controlled HIV with undetectable HIV RNA and CD4 count > 200 cells/μL - OK

3. History of a previous laboratory-confirmed diagnosis of SARS-CoV-2 infection or COVID-19.
4. Received influenza vaccination or any other adult vaccine within 4 days prior to or within 7 days after either study vaccination.
5. Immunocompromised by disease or medication.
7. Received immunoglobulin, blood-derived products, or immunosuppressant drugs within 90 days prior to first study vaccination.
8. Active cancer (malignancy) on chemotherapy that is judged to cause significant immunocompromise within 1 year prior to first study vaccination (with the exception of malignancy cured via excision, at the discretion of the investigator).
9. Any known allergies to products contained in the investigational product.
10. Participants who are breastfeeding, pregnant or who plan to become pregnant within 3 months following last study vaccination.
12. Study team member or first-degree relative of any study team member.
13. Current participation in any other COVID-19 prevention clinical trial.

Recommendations

- Inform participants of interim results and EUA status
- Offer active vaccine to placebo group participants when they become eligible for vaccination outside the trial
- Crossover to the vaccines should happen as part of the trial to allow follow-up data
- Encourage participants to stay in the trial to allow long-term safety and efficacy data to be collected for full licensure
- Reminded participants they can withdraw at any time.

• Rid A, Lipsitch M, Miller FG. The Ethics of Continuing Placebo in SARS-CoV-2 Vaccine Trials. *JAMA*. Published online December 14, 2020. doi:10.1001/jama.2020.25053



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New Lung Cancer Screening
New Guidelines (March 2021)

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- I have No Financial Disclosures

Objectives

- Review the New US Preventive Services Task Force (USPSTF) Lung Cancer Screening Guidelines
- Review how the New Guidelines Increase Eligibility in Women, Blacks & Hispanics
- Explore Role of Tailored Criteria to improve Screening Inequities/Disparities

2020 Lung Cancer Statistics United States

- Lung Cancer
  - 2nd most common cancer in both men & women
  - Number one cause of cancer deaths in US
    - More people die of lung cancer than colon, prostate and breast cancers combined.
  - Major public health burden
    - Estimated new cases: 228,820
    - 5-Year (2012-2016) Estimated Prevalence: 385,269
    - Estimated Deaths: 135,720

2020 Cancer Statistics

Estimated New Cases

Males			Females		
Prostate	191,930	21%	Breast	276,480	30%
Lung & bronchus	116,300	13%	Lung & bronchus	112,520	12%
Colon & rectum	78,300	9%	Colon & rectum	69,650	8%
Urinary bladder	62,100	7%	Uterine corpus	65,620	7%
Melanoma of the skin	60,190	7%	Thyroid	40,170	4%
Kidney & renal pelvis	45,520	5%	Melanoma of the skin	40,160	4%
Non-Hodgkin lymphoma	42,380	5%	Non-Hodgkin lymphoma	34,860	4%
Oral cavity & pharynx	38,380	4%	Kidney & renal pelvis	28,230	3%
Leukemia	35,470	4%	Pancreas	27,200	3%
Pancreas	30,400	3%	Leukemia	25,060	3%
All Sites	**893,660**	**100%**	**All Sites**	**912,930**	**100%**

2020 Cancer Statistics

Estimated Deaths

Males			Females		
Lung & bronchus	72,500	23%	Lung & bronchus	63,220	22%
Prostate	33,330	10%	Breast	42,170	15%
Colon & rectum	28,630	9%	Colon & rectum	24,570	9%
Pancreas	24,640	8%	Pancreas	22,410	8%
Liver & intrahepatic bile duct	20,020	6%	Ovary	13,940	5%
Leukemia	13,420	4%	Uterine corpus	12,590	4%
Esophagus	13,100	4%	Liver & intrahepatic bile duct	10,140	4%
Urinary bladder	13,050	4%	Leukemia	9,680	3%
Non-Hodgkin lymphoma	11,460	4%	Non-Hodgkin lymphoma	8,480	3%
Brain & other nervous system	10,190	3%	Brain & other nervous system	7,830	3%
All Sites	**321,160**	**100%**	**All Sites**	**285,360**	**100%**

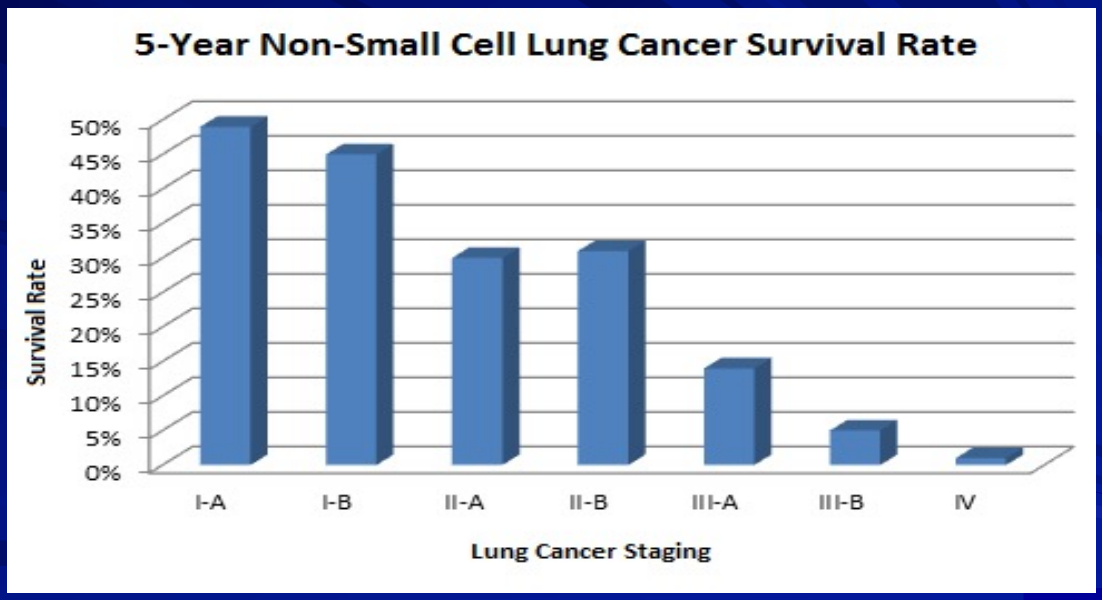
- Lung cancer has a generally poor prognosis, with an overall 5-year survival rate of 20.5%.
  - Most patients have no symptoms in the early stage of the disease
  - Majority of cases present with the disease at an advanced stage.
- Early-stage lung cancers have better prognosis and are more amenable to treatment
- Prevention & early detection of lung cancer by screening are our best tools in the fight against this rather aggressive and deadly disease.

Lung Cancer Histological Types

- Non-Small Cell Lung Ca (75% - 85%)
  - Squamous carcinoma
  - Adenocarcinoma
  - Adenosquamous carcinoma
  - Large cell carcinoma (poorly differentiated)
- Small Cell lung Ca (15% - 25%)

Staging of lung cancer

- Non-Small Cell Lung Cancer
  - Tumor Node Metastasis (TNM) staging system
    - Clinical diagnostic staging based upon all investigations (clinical, laboratory, radiologic and pathologic)
      - 4 different stages (with different Tx approach & prognosis)
- Small Cell Lung Cancer
  - Limited disease (single radiation port)
  - Extensive disease



Risk Factors for lung cancers

- ***Cigarette smoking*** and ***older age*** are the 2 most important risk factors for lung cancer
  - The disease occurs mostly in people who smoke & are >65 years of age
  - Small % of people are >45 yrs by time of diagnosis
- Risk of lung cancer in persons who smoke increases with ***cumulative quantity and duration of smoking*** and ***with age*** but decreases with increasing time since smoking.

Cigarette smoking & lung cancer

- Cigarette Smoking
  - Accounts for approximately 90% of all lung cancers
- In addition to old age and extent & duration of smoking other factors that increase risk of developing lung cancer in smokers include exposure to other carcinogenic factors such as asbestos, silica etc.

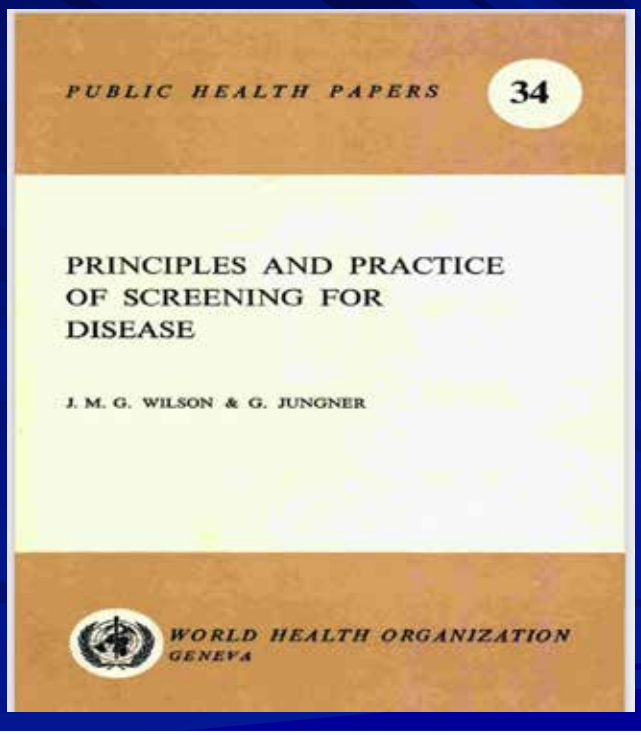
Other Risk factors for lung cancer

- Environmental toxins
  - Asbestos, radon, metals (arsenic, chromium, nickel), ionizing radiation and polycyclic aromatic hydrocarbons
- Lung diseases (COPD, fibrosis, alpha-1 antitrypsin deficiency, Tuberculosis)
- HIV infection
- Race, Ethnicity, Family history
- ?Dietary factors (Beta carotene, Vit E)

Lifetime chance of lung cancer

- Men (smokers & non-smokers)
  - 1 in 15
  - Black men 15% more likely than white men
    - Black men less likely to develop SCLC
- Women (smokers & non-smokers)
  - 1 in 17
  - Black women have a 14% lower risk than white women

- Disease Screening Protocols:
  - New War of the 1960's



- In 1971, President Richard Nixon ***declared war on cancer*** & signed the **National Cancer Act** leading to great research advances in the US
- In the subsequent years there have been declines in mortality overall for specific cancers such as breast, colorectal, prostate and lung cancers
- These declines have been attributed to cancer *prevention, early detection* (i.e mammography, colonoscopy, smoking prevention & lung ca screening w LDCT) & *effective cancer therapy*

- However, Interventions that lead to decreased mortality are not necessarily shared equally to all demographics in the United States.
- As a result, those interventions do not benefit some as well as others resulting in significant disparities in diagnosis, treatment and mortality of a number of cancers, including lung cancer.

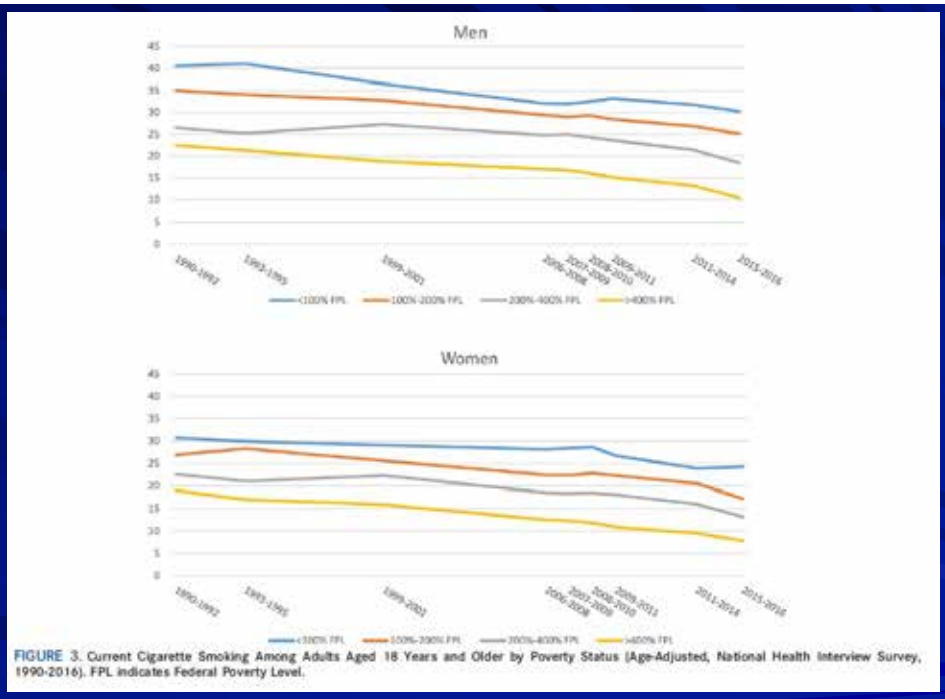
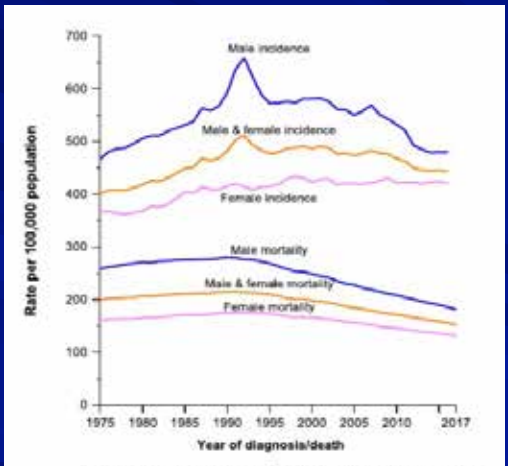


FIGURE 3. Current Cigarette Smoking Among Adults Aged 18 Years and Older by Poverty Status (Age-Adjusted, National Health Interview Survey, 1990-2016). FPL indicates Federal Poverty Level.

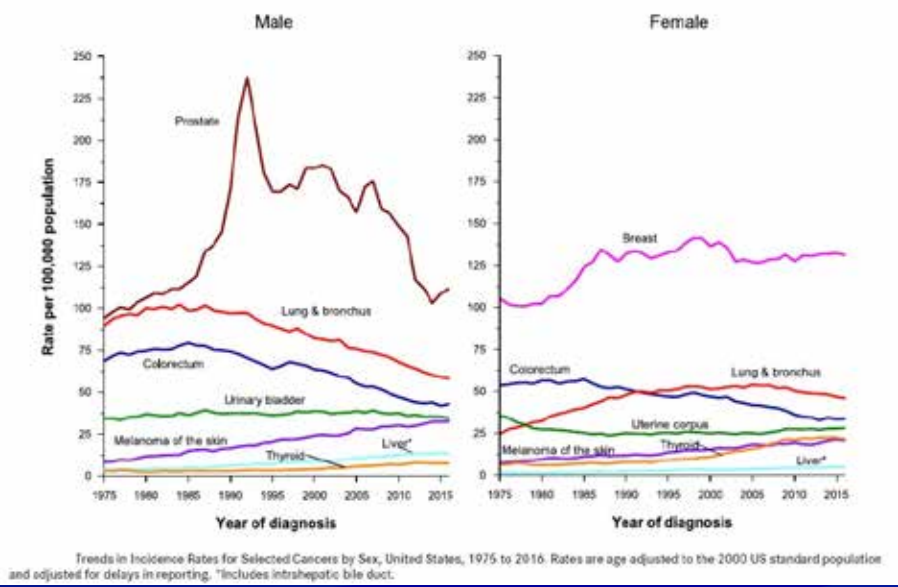
CA CANCER J CLIN 2018;68:106–115

Trends in Cancer Incidence and Mortality



Trends in Cancer Incidence (1975 to 2016) and Mortality Rates (1975 to 2017) by Sex, United States. Rates are age adjusted to the 2000 US standard population. Incidence rates also are adjusted for delays in reporting.

Incidence Rates for selected Cancers by Gender



Trends in Incidence Rates for Selected Cancers by Sex, United States, 1975 to 2016. Rates are age adjusted to the 2000 US standard population and adjusted for delays in reporting. *Includes intrahepatic bile duct.

- Search for an ideal screening test for lung cancer started in the 1960s
  - Serial CXR & Sputum Cytology (1960 & 1970s)
    - 55,000 male workers to receive a biannual CXR for 3 years or a baseline CXR and end-of-study CXR only
  - Low-dose Chest CT vs CXR (1990s)
    - Conventional CT: Not ideal for screening due to high radiation exposure & long scan time
    - Low-dose CT: Excellent image resolution & comparable in sensitivity & specificity of lung nodule detection with conventional CT mode
      - Early Lung Cancer Action Project (ELCAP)
        - More malignant & benign nodules were detected with LDCT scan when compared to CXR

- Lung Ca Incidence/Mortality disproportionately affect women and racial ethnic minority populations, yet screening guidelines for the past several years were derived from clinical trials of predominantly White men.
- New USPSTF Lung Ca screening Guidelines **expanded the age range and reduced the pack-years history** hoping to ameliorate sex and race/ethnicity related disparities in lung cancer screening.

New USPSTF Lung Cancer Screening Guidelines

- Systematic Review
  - Seven randomized Clinical Trials (N= 84,486)
    - National Lung Screening Trial 2002-2004 (N= 53,454)
    - Nederlands-Leuvens-Lonkanker Screening Onderzoek (NELSON) Trial 2003-2006 (N= 15,792)
    - DANTE Trial (Italy) 2001-2006 (N= 2,472)
    - DLCST Trial (Denmark) 2004-2006 (N= 4,104)
    - Italung (Italy) 2004-2006 (N= 3,206)
    - LSS (US) 2000-2001 (N=3318)
    - LUSI (Germany) 2007-2011 (N=4052)

National Lung Screening Trial (NLST)

- 53,454 patients (33 participating institutions)
  - (enrolled from August 2002 to April 2004)
  - Randomized to receive either a LDCT (26,722) or CXR (26,732) annually for 3 years & then followed for an additional 3.5 years with no screening.
  - Eligible patients:
    - between 55 and 74 years of age
    - history of cigarettes smoking of at least 30-pack-year
    - Former smokers who had quit within the previous 15 years
  - Positive Results
    - Defined as non-calcified nodules >4mm for LDCT or any noncalcified nodules or mass for CXR

. Selected Baseline Characteristics of the Study Participants.*

Characteristic	Low-Dose CT Group (N = 26,722)	Radiography Group (N = 26,732)
	number (percent)	
Age at randomization		
<55 yr†	2 (<0.1)	4 (<0.1)
55–59 yr	11,440 (42.8)	11,420 (42.7)
60–64 yr	8,170 (30.6)	8,198 (30.7)
65–69 yr	4,756 (17.8)	4,762 (17.8)
70–74 yr	2,353 (8.8)	2,345 (8.8)
≥75 yr†	1 (<0.1)	3 (<0.1)
Sex		
Male	15,770 (59.0)	15,762 (59.0)
Female	10,952 (41.0)	10,970 (41.0)
Race or ethnic group‡		
White	24,289 (90.9)	24,260 (90.8)
Black	1,195 (4.5)	1,181 (4.4)
Asian	559 (2.1)	536 (2.0)
American Indian or Alaska Native	92 (0.3)	98 (0.4)
Native Hawaiian or other Pacific Islander	91 (0.3)	102 (0.4)
More than one race or ethnic group	333 (1.2)	346 (1.3)
Data missing	163 (0.6)	209 (0.8)
Hispanic ethnic group‡		
Hispanic or Latino	479 (1.8)	456 (1.7)
Neither Hispanic nor Latino	26,079 (97.6)	26,039 (97.4)
Data missing	164 (0.6)	237 (0.9)
Smoking status		
Current	12,862 (48.1)	12,900 (48.3)
Former	13,860 (51.9)	13,832 (51.7)

National Lung Screening Trial (NLST)

- Rate of positive screening tests
  - 24.2% with low dose CT vs 6.9% with CXR
- Incidence of lung cancer
  - 645 cases per 100,000 person years (1060 cancers) in LDCT group
  - 572 cases per 100,000 person years (941 cancers) in CXR group
- Calculated deaths per 100,000 person years
  - 247 deaths from lung cancer in CT group
  - 309 deaths from lung cancer in CXR group
- ➢ 20% Relative reduction in lung cancer-related mortality with low dose CT screening as compared to CXR

NLST

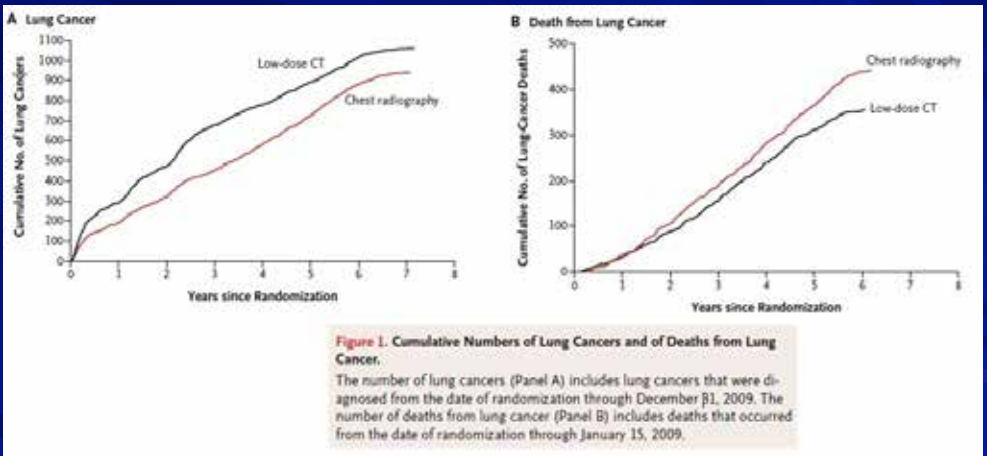


Figure 1. Cumulative Numbers of Lung Cancers and of Deaths from Lung Cancer.
The number of lung cancers (Panel A) includes lung cancers that were diagnosed from the date of randomization through December 31, 2009. The number of deaths from lung cancer (Panel B) includes deaths that occurred from the date of randomization through January 15, 2009.

Dutch-Belgian Lung cancer Screening Trial (NELSON)

- Large, Multi-Center, Randomized, Controlled Population-based Trial (started in 2000)
  - Aim: Show reduction in lung ca mortality of 25% or more with volume-based, LDCT lung-ca screening in **high-risk male participants** 10 yrs of follow-up
    - 13,195 men (primary analysis), 2,500 women (subgroup analysis)
    - Ages between 50 and 74
  - Randomly assigned to
    - Undergo CT screening at
      - T0 (baseline), year 1, year 3 and year 5.5
    - No screening

Table 1. Baseline Characteristics of the Male Participants at Randomization.*

Characteristic	Screening Group (N = 6583)	Control Group (N = 6612)
Age		
Median (IQR) — yr	58 (55–63)	58 (54–63)
Range — yr	46–76	34–89
Distribution — no./total no. (%)†		
<50 yr	3/6560 (<0.1)	6/6571 (0.1)
50–54 yr	1611/6560 (24.6)	1694/6571 (25.8)
55–59 yr	2226/6560 (33.9)	2231/6571 (34.0)
60–64 yr	1554/6560 (23.7)	1475/6571 (22.4)
65–69 yr	797/6560 (12.1)	781/6571 (11.9)
70–74 yr	329/6560 (5.0)	337/6571 (5.1)
≥75 yr	40/6560 (0.6)	47/6571 (0.7)
Pack-yr of smoking‡		
Median (IQR)	38.0 (29.7–49.5)	38.0 (29.7–49.5)
Range	0.4–159.5	1.3–156.0
Cigarettes smoked per day — no./total no. (%)		
≤10	20/6565 (0.3)	18/6596 (0.3)
11–15	1470/6565 (22.4)	1437/6596 (21.8)
16–20	1859/6565 (28.3)	1859/6596 (28.2)
21–25	1732/6565 (26.4)	1779/6596 (27.0)
26–30	669/6565 (10.2)	723/6596 (11.0)
31–40	454/6565 (6.9)	437/6596 (6.6)
>40	361/6565 (5.5)	343/6596 (5.2)

xxxxx

Table 3. Lung-Cancer Stage and Histologic Type of All First-Detected Lung Cancers in Male Participants at 10 Years of Follow-up or on December 31, 2015.*

Variable	Screening Group			Control Group
	Screening-Detected Lung Cancer (N=203)†	Non–Screening-Detected Lung Cancer (N=141)	Any Lung Cancer (N=344)	Any Lung Cancer (N=304)
	number of participants (percent)			
Stage				
IA	95 (46.8)	10 (7.1)	105 (30.5)	21 (6.9)
IB	24 (11.8)	10 (7.1)	34 (9.9)	20 (6.6)
IIA	8 (3.9)	4 (2.8)	12 (3.5)	13 (4.3)
IIB	11 (5.4)	6 (4.3)	17 (4.9)	17 (5.6)
IIIA	20 (9.9)	14 (9.9)	34 (9.9)	43 (14.1)
IIIB	13 (6.4)	14 (9.9)	27 (7.8)	34 (11.2)
IV	19 (9.4)	73 (51.8)	92 (26.7)	139 (45.7)
Unknown	13 (6.4)	10 (7.1)	23 (6.7)	17 (5.6)
Histologic type‡				
Adenocarcinoma	123 (60.6)	56 (39.7)	179 (52.0)	133 (43.8)
Squamous-cell carcinoma	39 (19.2)	38 (27.0)	77 (22.4)	94 (30.9)
Small-cell carcinoma	13 (6.4)	27 (19.1)	40 (11.6)	46 (15.1)
NSCLC	8 (3.9)	8 (5.7)	16 (4.7)	13 (4.3)
Other	20 (9.9)	12 (8.5)	32 (9.3)	18 (5.9)

* Percentages may not total 100 because of rounding. NSCLC indicates non–small-cell lung carcinoma.
† Data on three screening-detected lung cancers were not available in the national cancer registry (date of diagnosis unknown).
‡ Cases of lung cancer were classified into five main histologic types: adenocarcinoma, squamous-cell carcinoma, small-cell carcinoma, non–small-cell carcinoma, and other (*International Classification of Diseases for Oncology*, third edition).[20] The exact classification in subgroups is presented in Table S12.

Result Summary of Nelson Trial

- At 10 years follow up
  - Incidence of lung cancer
    - 5.58 cases per 1000 person-years in screening group
    - 4.91 cases per 1000 person-years in the control group
  - Lung cancer mortality
    - 2.50 deaths per 1000 person-years in screening group
    - 3.30 deaths per 1000 person-years in the control group
  - Cumulative rate ratio for death from lung cancer
    - 0.76 (95% CI, 0.61-0.94 P=0.01) in screening group as compared with the control group
    - Among Women the rate ratio was
      - 0.67 (95% CI, 0.38 to 1.14)

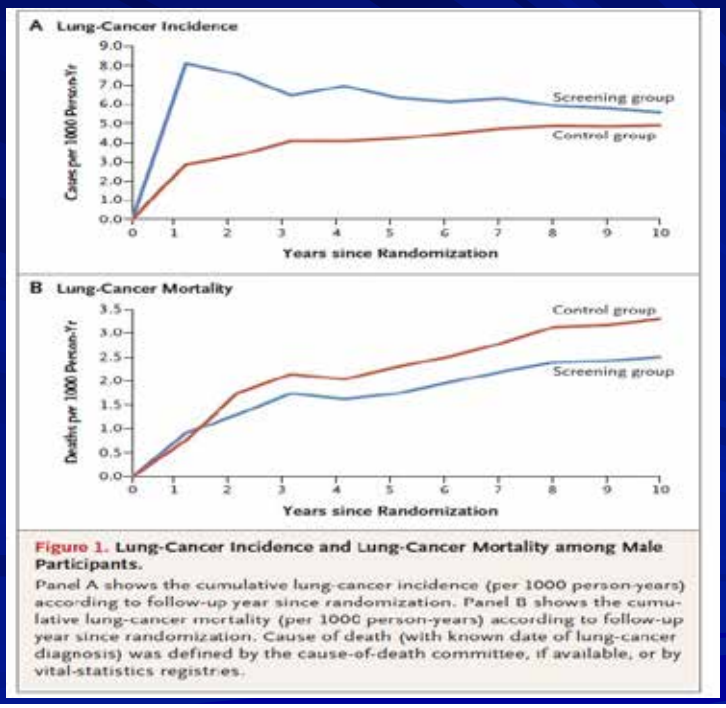


Figure 1. Lung-Cancer Incidence and Lung-Cancer Mortality among Male Participants.

Panel A shows the cumulative lung-cancer incidence (per 1000 person-years) according to follow-up year since randomization. Panel B shows the cumulative lung-cancer mortality (per 1000 person-years) according to follow-up year since randomization. Cause of death (with known date of lung-cancer diagnosis) was defined by the cause-of-death committee, if available, or by vital-statistics registries.

Figure. Clinician Summary: Screening for Lung Cancer

What does the USPSTF recommend?	**Adults aged 50 to 80 years who have a 20 pack-year smoking history and currently smoke or have quit within the past 15 years:** • Screen for lung cancer with low-dose computed tomography (CT) every year. • Stop screening once a person has not smoked for 15 years or has a health problem that limits life expectancy or the ability to have lung surgery. Grade: B
To whom does this recommendation apply?	Adults aged 50 to 80 years who have a 20 pack-year smoking history and currently smoke or have quit within the past 15 years. (See below for definition of pack-year.)
What's new?	The USPSTF has revised the recommended ages and pack-years for lung cancer screening. It expanded the age range to 50 to 80 years (previously 55 to 80 years) and reduced the pack-year history to 20 pack-years of smoking (previously 30 pack-years).
How to implement this recommendation?	1. **Assess risk based on age and pack-year smoking history:** Is the person aged 50 to 80 years and have they accumulated 20 pack-years or more of smoking? a. A pack-year is a way of calculating how much a person has smoked in their lifetime. One pack-year is the equivalent of smoking an average of 20 cigarettes—1 pack—per day for a year. 2. **Screen:** If the person is aged 50 to 80 years and has a 20 pack-year or more smoking history, engage in shared decision-making about screening. a. The decision to undertake screening should involve a discussion of its potential benefits, limitations, and harms. b. If a person decides to be screened, refer them for lung cancer screening with low-dose CT, ideally to a center with experience and expertise in lung cancer screening. c. If the person currently smokes, they should receive smoking cessation interventions.
How often?	• Screen every year with low-dose CT. • Stop screening once a person has not smoked for 15 years or has a health problem that limits life expectancy or the ability to have lung surgery.
What are other relevant USPSTF recommendations?	The USPSTF has made recommendations on interventions to prevent the initiation of tobacco use in children and adolescents, and on behavioral and pharmacotherapy interventions for tobacco smoking cessation in adults, including pregnant women. These recommendations are available at https://www.uspreventiveservicestaskforce.org
Where to read the full recommendation statement?	Visit the USPSTF website (https://www.uspreventiveservicestaskforce.org) to read the full recommendation statement. This includes more details on the rationale of the recommendation, including benefits and harms; supporting evidence; and recommendations of others.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision-making to the specific patient or situation.

Table. Summary of USPSTF Rationale

Rationale	Assessment
Detection	The USPSTF found adequate evidence that LDCT has sufficient sensitivity and specificity to detect early-stage lung cancer
Benefits of early detection and intervention and treatment	The USPSTF found adequate evidence that annual screening for lung cancer with LDCT in a defined population of high-risk persons can prevent a substantial number of lung cancer–related deaths
Harms of early detection and intervention and treatment	• The harms associated with LDCT screening include false-positive results leading to unnecessary tests and invasive procedures, incidental findings, short-term increases in distress due to indeterminate results, overdiagnosis, and radiation exposure • The USPSTF found adequate evidence that the harms of screening for lung cancer with LDCT are moderate in magnitude
USPSTF assessment	The USPSTF concludes with moderate certainty that annual screening for lung cancer with LDCT is of moderate net benefit for persons at high risk of lung cancer based on age, total cumulative exposure to tobacco smoke, and years since quitting smoking

Abbreviations: LDCT, low-dose computed tomography; USPSTF, US Preventive Services Task Force.

Box. US Preventive Services Task Force Low-Dose Computed Tomographic Screening Recommendations for Lung Cancer

A-55-80-30-15

In 2013, The US Preventive Services Task Force (USPSTF) recommended annual screening for lung cancer with low-dose computed tomography (LDCT) for adults aged 55 to 80 years who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years (abbreviated as A-55-80-30-15).[23]

A-50-80-20-15

For this updated recommendation, the USPSTF has changed the age range and pack-year eligibility criteria and recommends annual screening for lung cancer with LDCT for adults aged 50 to 80 years who have a 20 pack-year smoking history and currently smoke or have quit within the past 15 years (abbreviated as A-50-80-20-15).

- Despite **decreasing** incidence/mortality rates due to lung ca in the general population, certain minorities & vulnerable populations remain at elevated risk
  - Black individuals who smoke continue to have a higher risk of developing & dying from lung cancer with less smoking exposure compared with White smoker (**N Engl J Med. 2006; 354(4): 333-342**)
  - Black patients referred to lung screening program experience lower rates of screening & longer time to follow up (Lake & al. **BMC Cancer 2020; 561**)
  - Hispanics are more likely to have advanced stages of lung cancer when diagnosed & they are less likely to undergo surgery (**Am J Resp Crit Care Med, 2005**)

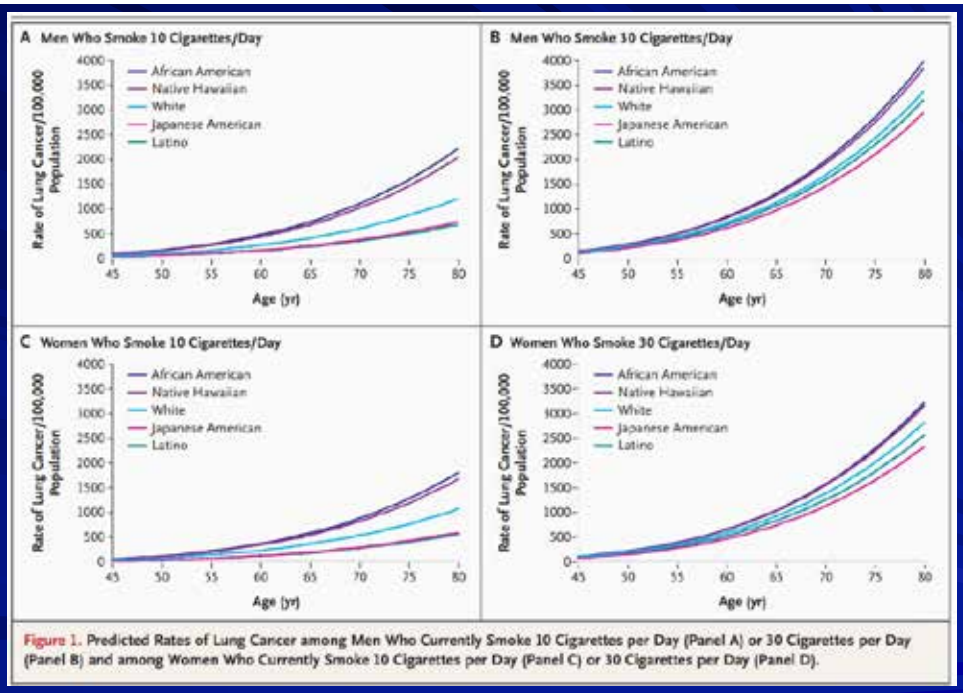


Figure 1. Predicted Rates of Lung Cancer among Men Who Currently Smoke 10 Cigarettes per Day (Panel A) or 30 Cigarettes per Day (Panel B) and among Women Who Currently Smoke 10 Cigarettes per Day (Panel C) or 30 Cigarettes per Day (Panel D).

N Engl J med 2006; 354:333-342

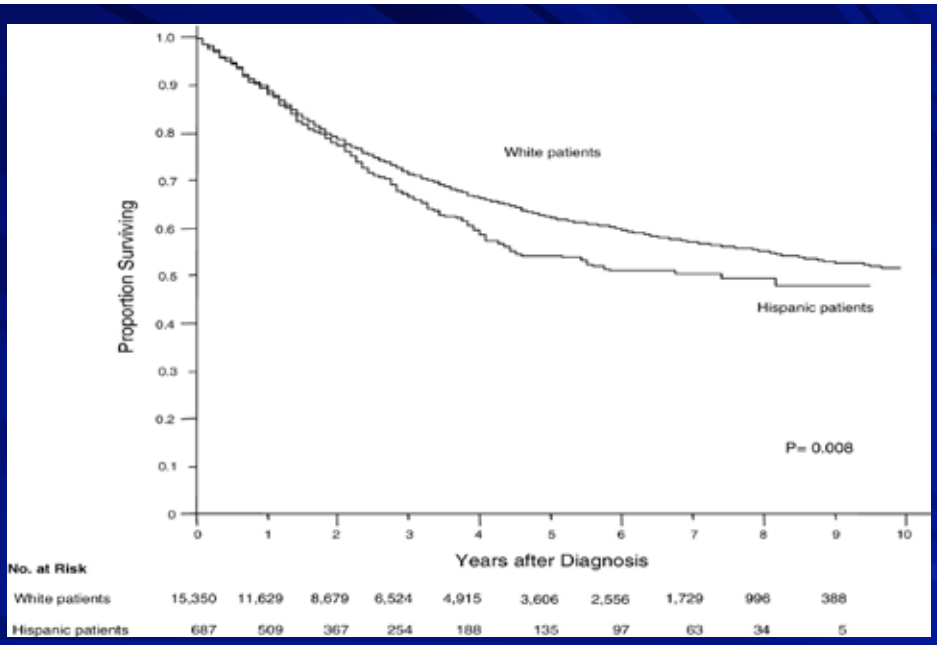
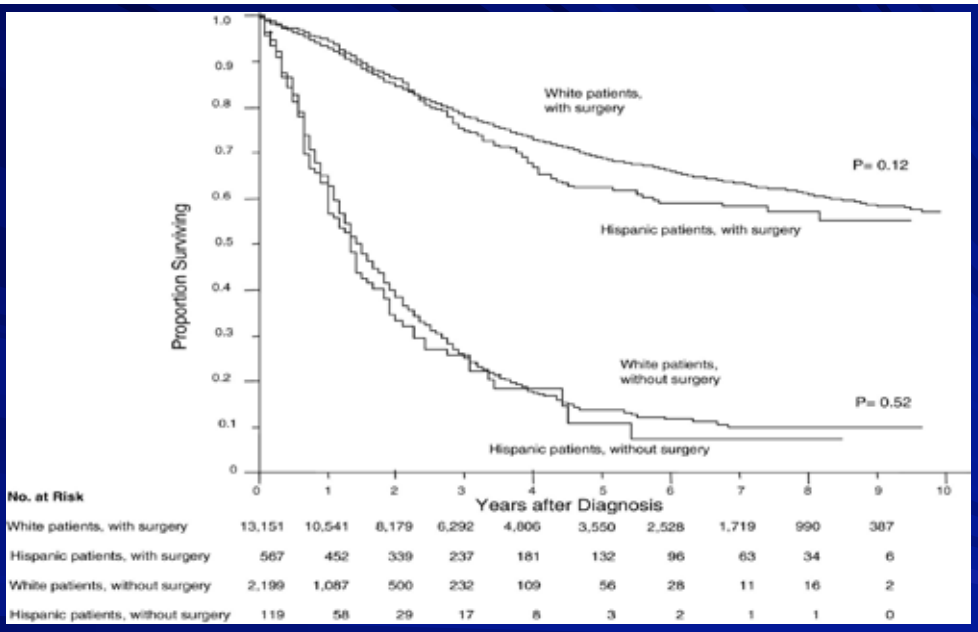


Figure 1. Lung cancer–specific Kaplan-Meier survival curves by ethnicity. Lung cancer–specific survival was significantly worse for Hispanics compared with whites (log-rank test, p = 0.008).

Published in: Juan P. Wisnivesky; Thomas McGinn; Claudia Henschke; Paul Hebert; Michael C. Iannuzzi; Ethan A. Halm; *Am J Respir Crit Care Med* 2005 1711158-1163.



No. at Risk										
White patients, with surgery	13,151	10,541	8,179	6,292	4,806	3,550	2,528	1,719	990	387
Hispanic patients, with surgery	567	452	339	237	181	132	96	63	34	6
White patients, without surgery	2,199	1,087	500	232	109	56	28	11	16	2
Hispanic patients, without surgery	119	58	29	17	8	3	2	1	1	0

Figure 2. Lung cancer–specific Kaplan-Meier survival curves according to treatment and ethnicity. Lung cancer–specific survival was similar among Hispanic and white patients who underwent surgery (log-rank test, p = 0.12). Those who did not undergo surgery also had similar survival (log-rank test, p = 0.52).

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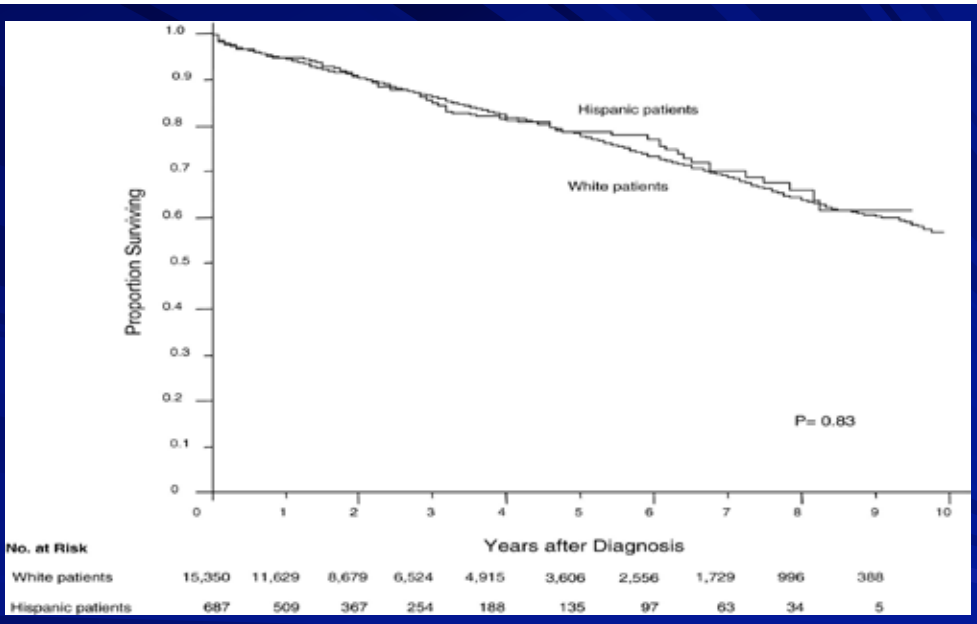

No. at Risk										
White patients	15,350	11,629	8,679	6,524	4,915	3,606	2,556	1,729	996	388
Hispanic patients	687	509	367	254	188	135	97	63	34	5

Figure 3. Survival from causes other than lung cancer by ethnicity. Non–lung cancer survival for Hispanics and whites was not significantly different (log-rank test, p = 0.8). For this analysis, deaths from lung cancer were treated as random, censored observations. The curves are a measure of the overall burden of serious comorbid conditions.

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Lung cancer among never smokers (LCINS)

- Geographic/Gender differences in incidence
  - In Asia, 60-80% of women with lung cancer are never smokers
  - In the United States
    - One analysis of data from patients in 5 large cohort studies
      - 19% of lung cancers in women occur in nonsmokers, compared to about 9% in nonsmoking men

There is Currently No Screening for Lung Cancer among never smokers.

Determinants of Cancer Disparities

- 3 major determinants of Health Disparities
  - Culture
  - Poverty (Low Socioeconomic status)
  - Historical Effects of Social Injustice
- To Overcome some of the barriers, it is important to be aware of their existence and understand the meaning of these critical social variables. They exists in every society & in every group within any society

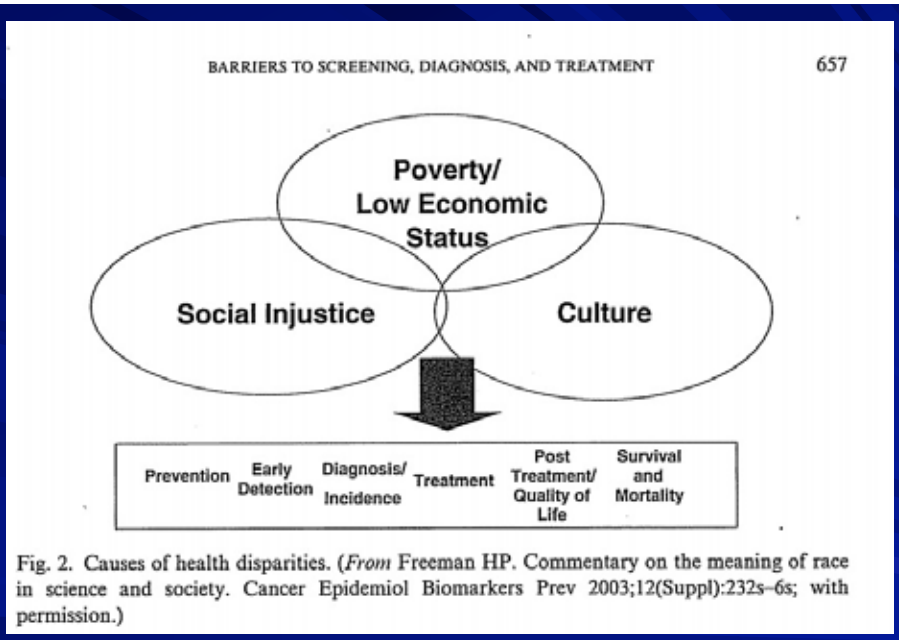


Fig. 2. Causes of health disparities. (*From* Freeman HP. Commentary on the meaning of race in science and society. Cancer Epidemiol Biomarkers Prev 2003;12(Suppl):232s–6s; with permission.)

CA Cancer J Clin 1989;39(5); 266-88; with permission

Barriers related to culture

It is important to distinguish between race and culture. Culture is not synonymous with race. Many cultures exist within any so-called racial group [6]. For example, there are many cultures in the Asian racial group, including Chinese, Japanese, Filipino, Korean, Vietnamese, and Thai.

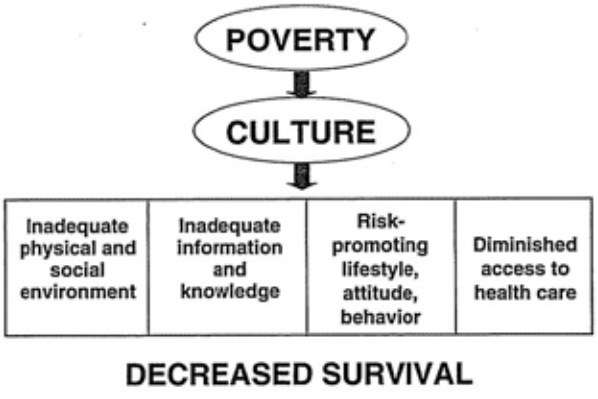
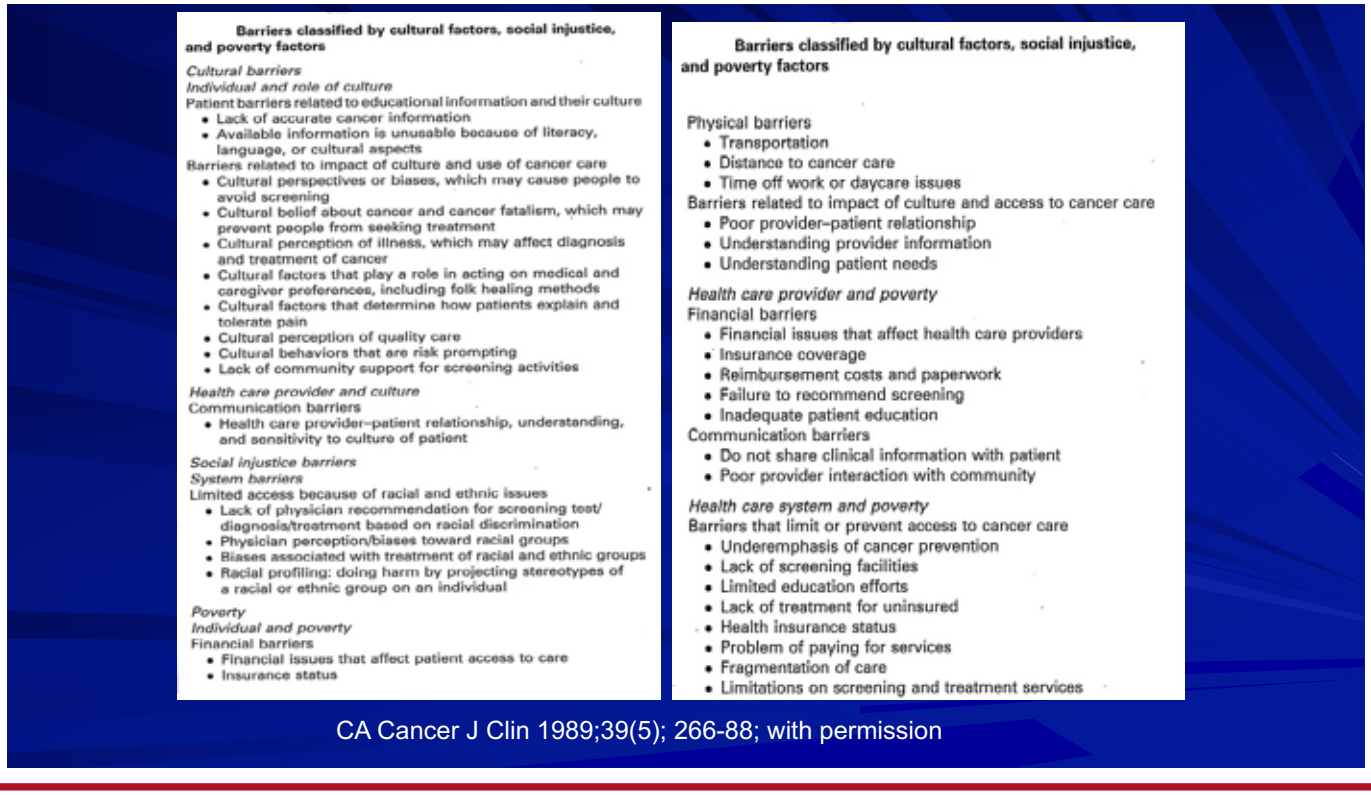


Fig. 3. The association of poverty and lack of resources. (*From* Freeman HP. Cancer in the socioeconomically disadvantaged. CA Cancer J Clin 1989;39(5):266–88; with permission.)



Barriers classified by cultural factors, social injustice, and poverty factors

Cultural barriers
Individual and role of culture
Patient barriers related to educational information and their culture
- Lack of accurate cancer information
- Available information is unusable because of literacy, language, or cultural aspects

Barriers related to impact of culture and use of cancer care
- Cultural perspectives or biases, which may cause people to avoid screening
- Cultural belief about cancer and cancer fatalism, which may prevent people from seeking treatment
- Cultural perception of illness, which may affect diagnosis and treatment of cancer
- Cultural factors that play a role in acting on medical and caregiver preferences, including folk healing methods
- Cultural factors that determine how patients explain and tolerate pain
- Cultural perception of quality care
- Cultural behaviors that are risk prompting
- Lack of community support for screening activities

Health care provider and culture
Communication barriers
- Health care provider–patient relationship, understanding, and sensitivity to culture of patient

Social injustice barriers
System barriers
Limited access because of racial and ethnic issues
- Lack of physician recommendation for screening test/ diagnosis/treatment based on racial discrimination
- Physician perception/biases toward racial groups
- Biases associated with treatment of racial and ethnic groups
- Racial profiling: doing harm by projecting stereotypes of a racial or ethnic group on an individual

Poverty
Individual and poverty
Financial barriers
- Financial issues that affect patient access to care
- Insurance status

Barriers classified by cultural factors, social injustice, and poverty factors

Physical barriers
- Transportation
- Distance to cancer care
- Time off work or daycare issues

Barriers related to impact of culture and access to cancer care
- Poor provider–patient relationship
- Understanding provider information
- Understanding patient needs

Health care provider and poverty
Financial barriers
- Financial issues that affect health care providers
- Insurance coverage
- Reimbursement costs and paperwork
- Failure to recommend screening
- Inadequate patient education

Communication barriers
- Do not share clinical information with patient
- Poor provider interaction with community

Health care system and poverty
Barriers that limit or prevent access to cancer care
- Underemphasis of cancer prevention
- Lack of screening facilities
- Limited education efforts
- Lack of treatment for uninsured
- Health insurance status
- Problem of paying for services
- Fragmentation of care
- Limitations on screening and treatment services

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New Lung Cancer Screening Guidelines

- A-50-80-20-15
- Vs
- A-55-80-30-15
- More than likely will lead to a larger group of people being screened with both potential benefits & harm of screening
- All Clinicians need to be more aware of the existence of some of these cultural differences when advising patients

Thank You

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Thank You for Attending the Fourth Annual World Health Continuing Medical Education Conference:
Health Disparities Impacting Global and Local Caribbean Populations
Provided by Healthfirst, Howard University College of Medicine, and MediNova

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About Healthfirst

Healthfirst is New York's largest not-for-profit health insurer, earning the trust of 1.6 million members by offering access to affordable healthcare. Sponsored by New York City's leading hospitals, Healthfirst's unique advantage is rooted in its mission to put members first by working closely with its broad network of providers on shared goals. Healthfirst takes pride in being pioneers of the value-based care model, recognized as a national best practice. For more than 25 years, Healthfirst has built its reputation in the community for top-quality products and services New Yorkers can depend on. It has grown significantly to serve the needs of members, offering market-leading products to fit every life stage, including Medicaid plans, Medicare Advantage plans, long-term care plans, qualified health plans, and individual and small group plans. Healthfirst serves members in New York City and on Long Island, as well as in Westchester, Sullivan, and Orange counties.

For more information on Healthfirst, visit **healthfirst.org**.

Howard University College of Medicine

Founded in 1868, the College of Medicine takes pride in its long and illustrious history of training students to become competent and compassionate physicians who provide health care in medically underserved communities.

While the College offers excellent research and research training opportunities, the major emphasis is on preparing students to deliver patient care in communities that have a shortage of physicians and public health professionals.

The College living alumni, more than 4,000, are a testimony that an excellent medical education can be obtained at Howard. Although opportunities for minority students have increased at other medical schools, the College uniquely addresses the special health care needs of medically underserved communities and continues to produce a significant number of the nation's minority physicians. The College is a part of Howard University, a comprehensive research university. While the University community has traditionally been predominantly black, Howard has been an interracial and cosmopolitan institution throughout its history, with students, faculty and staff of all races and from many foreign nations. All must meet the high standards

of excellence of Howard University, which has the largest concentration of black faculty and student scholars in the, country.

In addition to the College of Medicine, the Howard University Health Sciences Center includes the Howard University Hospital; the College of Dentistry; the College of Pharmacy, Nursing and Allied Health Sciences; the Louis Stokes Health Sciences Library; and the Student Health Center. Located in the nation's capital, the College can draw upon the immense medical resources of this area, including the National, Institutes of Health and the National Library of Medicine.

MediNova

Our Mission

We have a two-part mission:
To provide accessible, high-quality medical treatment to the underserved communities of Northeastern Haiti in a manner that protects the dignity and independence of our patients with the highest standards of integrity, impartiality and openness.

To advance the field of primary medical care in the community by providing educational opportunities for both current and future local medical practitioners.

Our Vision

We are seeking to advance the continued growth, advancement and sustainability of medical care in the region by both directly providing primary care to underserved communities and individuals in a manner reflecting our commitment to respect, excellence and integrity in addition to training future and current local medical practitioners in the latest and most effective means of treatment.

We believe that all individuals have the right to the highest attainable standard of physical and mental health, which includes access to medical services.

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