Baptist Health



UAMS Disclosure Policy

It is the policy of the University of Arkansas for Medical Sciences (UAMS) to ensure balance, independence, objectivity, and scientific rigor in all directly or jointly provided educational activities.

All individuals who are in a position to control the content of the educational activity (course/activity directors, planning committee members, staff, teachers, or authors of CE) must disclose all relevant financial relationships they have with any commercial interest(s) as well as the nature of the relationship. The ACCME and ACPE describe relevant financial relationships as those in any amount occurring within the past 24 months that create a conflict of interest. Individuals who refuse to disclose will be disqualified from participation in the development, management, presentation, or evaluation of the CE activity.



Disclosures

The following speakers of this CE activity have relevant financial relationships with ineligible companies to disclose:

Erika Petersen, MD

- Consultant: Abbott/St. Jude, Biotronik, Nalu, Presidio, Saluda, Vertos, Medtronic, Nevro
- Grant/Research: Nevro, Saluda, SPR, Mainstay
- Stocks/Options: SynerFuse, neuro24

All potential conflicts of interest have been mitigated.



Planner and Faculty Disclosures

The remaining planners, speakers, moderators, and panelists of this CE activity have no relevant financial relationships with ineligible companies to disclose.

The accreditation compliance reviewer has no relevant financial relationships with ineligible companies to disclose.



Joint Accreditation Statement

In support of improving patient care, this activity has been planned and implemented by the University of Arkansas for Medical Sciences and Baptist Health. University of Arkansas for Medical Sciences is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC) to provide continuing education for the healthcare team.





Credit Designation Statements

AMA Credit Designation Statement

The University of Arkansas for Medical Sciences designates this live activity for a maximum of 7.75 AMA PRA Category 1 CreditsTM. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

ACPE Credit Designation Statement

These knowledge based activities will provide pharmacists up to 7.75 contact hours or 0.775 CEU. CE credit information, based on verification of live attendance and completion of the program evaluation, will be provided to NABP within 60 days after the activity completion.

ANCC Credit Designation Statement

The University of Arkansas for Medical Sciences designates this live activity for a maximum of 7.75 ANCC contact hours. Nursing contact hours will be awarded for successful completion of program components based upon documented attendance and completion of evaluation materials.

AAPA Credit Designation Statement

The University of Arkansas for Medical Sciences has been authorized by the American Academy of PAs (AAPA) to award AAPA Category 1 CME credit for activities planned in accordance with AAPA CME Criteria. This activity is designated for 7.75 AAPA Category 1 CME credits. PAs should only claim credit commensurate with the extent of their participation.



Credit Designation Statements

CDR Credit Designation Statement

This program has been approved for 7.75 contact hours of continuing education for dietitians by the Academy of Nutrition and Dietetics. CPEUs awarded will be commensurate with participation in the activity. Learners should enter this activity as type 102 on Professional Development Portfolio (PDP) activity logs.

EMS Credit Designation Statement

This program has been submitted to the Arkansas Department of Health Section of Emergency Medical Services to provide emergency medical service professionals up to 6.5 credit hours.

PACE Credit Designation Statement

This program has been pre-approved by The Commission for Case Manager Certification to provide continuing education credit to CCM® board certified case managers. The course is approved for 6.5 CE contact hours.

Other Health Professionals

Many allied health care licensing boards will accept attendance at a CME activity approved for AMA PRA Category 1 CreditsTM if the topics are within the health care professionals scope of practice. There is no guarantee that attendance at this activity will be accepted by your licensing board to fulfill your CE requirements. You are responsible for sending the documentation of attendance to your licensing board.



To Claim Credit

Complete the Credit Claim/Evaluation: https://www.surveymonkey.com/r/bhneuroscience24

The evaluation will close on 10/20/24 at midnight. Please complete the evaluation as soon as possible because after the evaluation closes, you will not be able to claim credit.

A certificate will be emailed to the address provided within 60 days of the activity end date.

Evaluation QR Code





Thank You To Our Supporters

- Medtronic
- UCB US Rare Disease
- Abbvie
- Alexion
- Arkansas Department of Health
- argenx
- Astrazeneca
- Boston Scientific
- CSI Pharmacy
- Eisai
- LivaNova
- Lundbeck
- Medtronic Neurovascular

- Mitsubishi Tanabe Pharma America
- Nevro
- Penumbra
- Pfizer
- Pulsara
- RapidAl
- Silk Road Medical
- SK Life Science
- Stryker Interventional
- Stryker Neurovascular
- Vital Care of Little Rock
- Baptist Health Recruitment & Retention



Baptist Health





Ace High Workforce and Teamwork

Objectives

- Attendees will leave with an understanding of the basic definition of leadership
- Attendees will learn the three questions every leader will be asked, and consider how their employees or coworkers would answer that question for them today
- 3. Attendees will learn the definition of situational leadership and how they can incorporate it into their daily work

Leadership Defined

"Leadership is influence, nothing more, nothing less"

"Leaders develop daily, not in a day"

"Leaders help to shape the culture of their organizations based on who they are and what they do".

Three Questions Asked of Leaders

1. Can I trust you?2. Do you care for me?3. Can you help me?



Situational Leadership

- All Drivers (Directive)
- All Putters (Supportive)
- All Clubs (Directive, Supportive, Flexible, Effective)

"EVERYDAY we have the OPPORTUNITY to be DIFFERENCE MAKERS in the lives of the people we SERVE"

- Russ Harrington



QUALITIES OF AN EVERYDAY DIFFERENCE MAKER





APPLICATION





Nothing morivates an employee more than a mission that's so important that it supersedes even personal ambition.



Ben Horowitz

Baptist Health



MARY CAROLE YOUNG

www.mrmblaw.com



mc.young@mrmblaw.com 1 Allied Drive, STE. 1600 Little Rock, AR 72202 (501) 374-6535 MUNSON

ROWLETT

MOORE

BOONE

KEEPING YOUR
CARDS CLOSE:
ARE YOUR
WORDS SAFE?



GOALS:

- To better understand the litigation process
- To better understand your personal privacy
- To better insulate you against litigation



WHAT IS LITIGATION?

Criminal v. Civil







REMIND ME OF LAST YEAR'S CHARTING HACKS TO KEEP ME OUT OF A LAWSUIT

Write this down!





CHARTING HACKS

• ALWAYS chart non-compliance





CHARTING HACKS

ALWAYS put in "QUOTES" from the patient and family

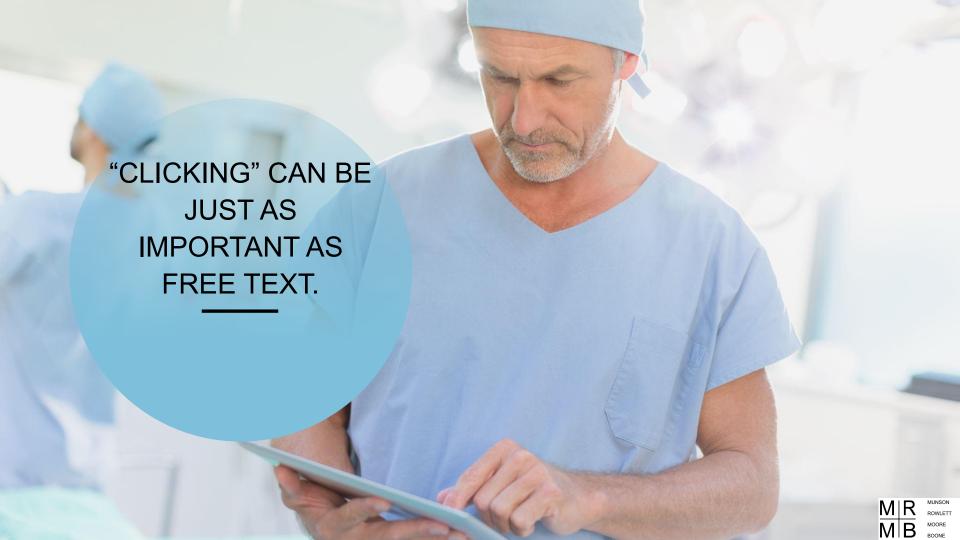


CHARTING HACKS

GIVE YOURSELF an insider reminder







NEVER BLAME OTHER PROVIDERS FOR AN **EVENT**

- INCREASES your chance of a lawsuit
- Attorney's aren't smart enough to know it's an event



WHAT IS
DISCOVERY?



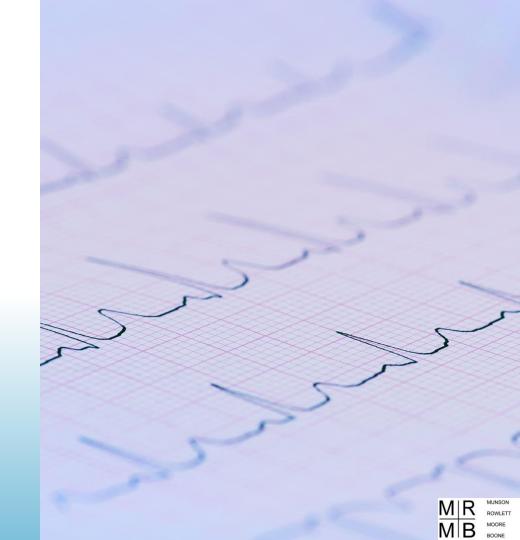
WRITTEN DISCOVERY

- Interrogatories
- Requests for Production



WHAT CAN BE PRODUCED?

Medical Chart





Photos Taken

WHAT CAN BE PRODUCED?

Emails









- Your personal social media?
- Your personal text messages?
- Your personal photographs?
- Private messages on your phone with a coworker?
- Private messages on your phone with your SPOUSE?



CAN ANYTHING BE EXEMPT?

- If it's on your personal phone and not your work phone
 - THAT'S A LIE!



EXEMPTIONS

- MAYBE your personal health records
- MAYBE your conversations with risk management or attorneys
- MAYBE your peer review





85% OF MY TIME WITH
MEDICAL PROVIDERS IS IN
PREPARATION
FOR DEPOSITIONS



You will be a better medical practitioner if you prep for deposition NOW





















QUESTIONS?

www.mrmblaw.com



MUNSON

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FOR YOU. FOR LIFE.

CNSInfections

Amanda Novack, MD Infectious Diseases





Objectives

- Highlight clinically relevant manifestations of meningitis
- Explore a few rare but interesting CNS infections
- Discuss role of vaccines in reducing incidence of bacterial meningitis



Definitions

Epidural space



Subdural space
Subarachnoid space

- -itis = inflammation
- Leptomeningitis
- Encephalitis
- Meningoencephalitis
- Meningismus
- Meningococcal meningitis
- Aseptic meningitis
- Kernig's sign
 - Brudzinski's sign





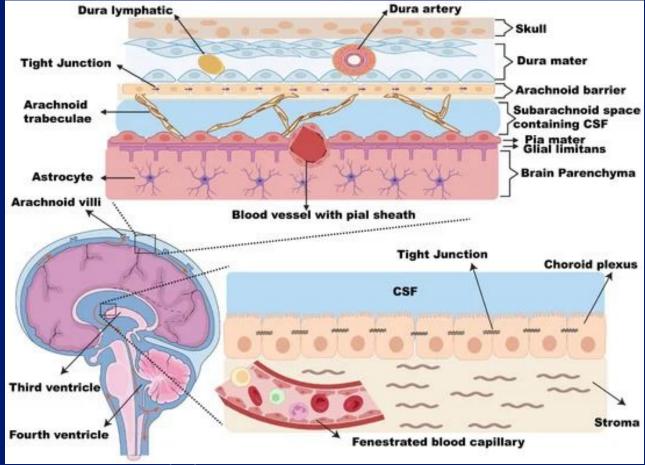
A Kemig sign

Dura mater

Pia mater

Brain

Arachnoid mater





Step 1: Put on a mask







- Sudden onset of 1) fever, 2) neck stiffness, 3) change in mental status
 only 41% of bacterial meningitis patients have this classic triad
- Severe headache and nausea are common
- Less common: seizures, aphasia, coma, cranial nerve palsy, rash, papilledema
- About ½ will have concomitant sinusitis or otitis
- Cerebral infarction is relatively common (and not mutually exclusive)
- Neck rigidity can be severe, but Kernig and Brudzinski are almost worthless in clinical practice
- "Jolt accentuation" is accentuation of headache with horizontal rotation



- Lab findings:
 - WBC is usually elevated with a left shift in bacterial meningitis. Can be normal or low in aseptic meningitis.
 - Coagulation studies can be consistent with DIC
 - Blood cultures are positive 50-90% of the time in bacterial meningitis



- Imaging: CT head should be performed before LP in the following
 - immunocompromised state
 - history of CNS disease (mass, stroke, previous infection)
 - new seizure
 - o papilledema
 - abnormal level of consciousness*
 - o focal neurologic deficit.

*In some countries, impaired mental status is not a contraindication for LP without a CT scan



Hurry up...

> Clin Infect Dis. 2015 Apr 15;60(8):1162-9. doi: 10.1093/cid/civ011. Epub 2015 Feb 5.

Adult bacterial meningitis: earlier treatment and improved outcome following guideline revision promoting prompt lumbar puncture

Martin Glimåker ¹, Bibi Johansson ¹, Örjan Grindborg ¹, Matteo Bottai ², Lars Lindquist ¹, Jan Sjölin ³



- Lumbar puncture
 - o important, but if it is delayed, you gotta start treatment anyway
 - antibiotics can affect gram stain and culture, but generally not the cell counts and chemistry on the CSF
 - opening pressure should be documented (but never is)
 - Tube 1: protein/glucose
 - Tube 2: gram stain and culture
 - Tube 3: blood counts
 - Tube 4: PCR, etc







Interpretation of Cerebrospinal Fluid Studies

	Gross	Proteins mg/dl	Glucose mg/dl	Cells/cmm
Normal	Clear	15-40	50-80	0-5 Lymphocytes
Bacterial	Cloudy	60-1000	0-45	1000-50000 Mostly neutrophils
Aseptic (Viral)	Clear	Normal or increased	Normal	100-1000 Mostly lymphocytes

Bacterial Meningitis causes

- Streptococcus pneumonia (vaccine preventable)
- Neisseria meningitidis (vaccine preventable)
- Listeria monocytogenes (almost exclusively in immunocompromised patients. Tends to cause seizures and focal deficits early in the course of infection)
- Staphylococcus aureus (usually associated with endocarditis or vertebral discitis/epidural abscess)
- Haemophilus influenzae (used to be really common, before vaccine was available. Now exceedingly rare)



Bacterial meningitis treatment

- Most of the time: Vancomycin 15mg/kg + Ceftriaxone 2g Q12h
- Before or with antibiotics: Dexamethasone 0.15mg/kg q6h
- Special cases
 - >50 years old: add Ampicillin
 - Penetrating trauma: change Ceftriaxone to Cefepime
 - Immunocompromised: Vanc + Meropenem
 - H/o hives to Ceftriaxone: Vanc + Meropenem
 - Life-threatening allergy to Cephalosporins: Vanc + Moxifloxacin
 - Ampicillin-allergic but needs Listeria coverage: Bactrim



Bacterial meningitis PROPHYLAXIS

- 98% of the time, no one needs it
- No, I promise, you really don't need it
- "Close contact" is within 3 feet for more than 8 hours
- "Prophylaxis is **not** indicated if exposure to the index case is brief. This
 includes the majority of health care workers unless there is direct exposure to
 respiratory secretions (as with intubation). The absolute increase in risk is very
 small, and antimicrobial prophylaxis is therefore not recommended for health
 care workers who have not had direct exposure to respiratory secretions"
- Fine, a single dose of Cipro 500mg
- (or IM Ceftriaxone 250mg if you're pregnant)



Bacterial meningitis prophylaxis

 Patient can come off droplet precautions after 24 hours of antibiotics

Bacterial meningitis treatment

- If cultures are positive, target therapy
 - continue dexamethasone for 4 days
 - S. pneumo: 10-14 days Ceftriaxone (or Vanc, if MIC >1.0)
 - Neisseria: 5-7 days Ceftriaxone
 - Listeria: 21 days ampicillin + gentamicin
 - Gram negative: 21 days
 - o Group B strep: 21 days ampicillin or penicillin
 - Staph aureus: never simple



Staphylococcus aureas meningitis

- Almost never causes isolated, spontaneous bacterial meningitis
- Typically associated with neurosurgery, penetrating head trauma, endocarditis, or discitis/epidural abscess
- If it is MSSA, change them to Nafcillin
 - it is malpractice to treat MSSA meningitis with Vancomycin.
 Vanc is absolutely clinically inferior to beta lactams
- If there is hardware, take it out
 - You can do it now, or in a few months when they relapse, but it is nearly impossible to cure with foreign material in place



"Aseptic" meningitis

- Aseptic originally meant "culture negative"
- Often used interchangeable with "viral meningitis"
- Potential causes:
 - Enterovirus/parechovirus (esp in summer/fall)
 - HSV (especially HSV-2)
 - VZV (especially if they have shingles)
 - Other herpesviruses (CMV, EBV, HHV6)
 - Arboviruses (West Nile)
 - HIV (esp as a symptom of ACUTE infection)
 - LCMV (if the board question mentions rats)
 - Mumps
 - Spirochetes (Syphilis or Lyme)

Glucose, CSF 40 - 70 mg/dL	51
Protein, CSF 15.0 - 40.0 mg/dL	34.0
Neutrophil % CSF %	0
Lymphocyte % CSF %	71
Monocyte % CSF %	29
Eosinophils % CSF %	0
Baso, CSF %	0
Other Cells % %	0
Number of Cells, CSF	100
	rganisms see



Recurrent aseptic meningitis

- Mollaret meningitis is a benign, recurrent HSV-2 meningitis
- Science indicates HSV-2 meningitis probably resolves with or without treatment, but we still always treat it
- Occasionally we'll do suppressive Valtrex on patients with multiple episodes of Mollaret meningitis
- Annoying, but does not seem to be associated with any long-term sequelae
- Most of the time, patient's don't have genital lesions at the time of the recurrent meningitis



Baptist Health

Cryptococcal meningitis

- Slow roll meningitis
- Symptom onset is often hard to nail down, over 1-3 weeks
- CSF WBC is usually not that high, but opening pressure is VERY high
- Cryptococcal antigen usually positive on CSF (but no need to trend)
 - Titer isn't a perfect correlate for disease, but titer <1:160 is more favorable
- It's the only diagnosis where I've had patients beg for another LP
- Most common in HIV patients. Non-HIV patients actually do WORSE
- Treatment is with Amphotericin + Flucytosine + controlling ICP
- If repeat CSF cultures are negative after 2 weeks of IV therapy, can transition to high dose PO fluconazole. Forever. Or at least a year

Noninfectious meningitis

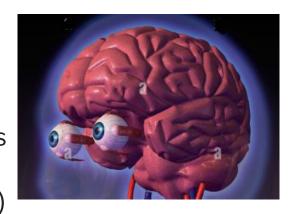
- Behçet syndrome
- Chemical meningitis
- Neoplastic meningitis
- Vogt-Koyanagi-Harada syndrome
- Hypersensitivity (esp to NSAIDs, Sulfonamindes, IVIG)
- Other autoimmune meningitis (e.g. lupus)



- "Neurosyphilis" is simply any version of syphilis
 Treponema pallidum infects the CNS/eyes
 - Can occur weeks after infection (secondary)
 - Can also occur decades later (tertiary)
 - Manifestations:
 - asymptomatic meningitis
 - symptomatic meningitis
 - vague vision changes
 - profound vision changes



- general paresis
- tabes dorsalis
- stroke



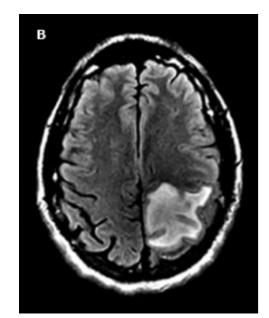


- Syphilis does what syphilis wants
 - posterior uveitis
 - panuveitis
 - o optic neuritis
 - interstitial keratitis
 - o anterior uveitis
 - intermediate uveitis
 - retinal vasculitis





- Syphilis does what syphilis wants
 - hydrocephalus
 - o arteritis of small-, medium-, or large-vessels
 - ischemia or infarction of brain or spinal cord
 - syphilitic gummas
 - seizures
 - hyperplastic pachymeningitis with polyradiculopathy
 - sensory loss
 - incontinence
 - muscle atrophy





- Diagnosis:
 - Syphilis plus ANYTHING wrong with CSF or eyes
 - Reasons to treat as neurosyphilis
 - CSF WBC >5 /µL
 - CSF protein >45 mg/dL
 - CSF VDRL reactive
 - Ophthalmologist says "this could be ocular syphilis"
 - Otolaryngologist says "this could be otologic syphilis"





- Treatment:
 - IV PCN-G, 24 million units per day x 14 days
 - Alternative: Ceftriaxone 2g/d x 14 days

If beta-lactam allergic, desensitize them





- Distinguished by abnormal brain function
 - Meningitis can cause discomfort, lethargy, headache, but cerebral function remains normal
 - Encephalitis involves altered mental status, motor/sensory deficits, altered behavior, personality changes, or speech/movement disorders.
 - Isolated seizures (with a postictal state) can be seen in meningitis, does not necessarily mean there is encephalitis



- Viral versus postinfectious encephalitis
 - Sometimes really hard to determine. Primary infection is characterized by viral inclusion on histological examination
 - Postinfectious encephalitis has no evidence of virus in CNS
 - Acute disseminated encephalomyelitis (ADEM)
 - anti-NMDA receptor encephalitis
 - A number of virus can cause infectious encephalitis as well as postinfectious encephalitis (measles, VZV, rubella)



- HSV-1 (which is WAY worse than HSV-2 meningitis)
 - most common cause of fatal sporadic encephalitis in the US
 - o can occur in immunocompetent or -compromised hosts
 - CSF can be underwhelming, but usually not normal
 - HSV-1 PCR on CSF is gold standard
 - MRI is usually abnormal (esp in temporal lobe)
 - Treatment should be fast
 - IV Acyclovir 10mg/kg q8h x 21 days
 - Fatality is 70% if untreated (25% if treated)
 - Survivors often have permanent defects





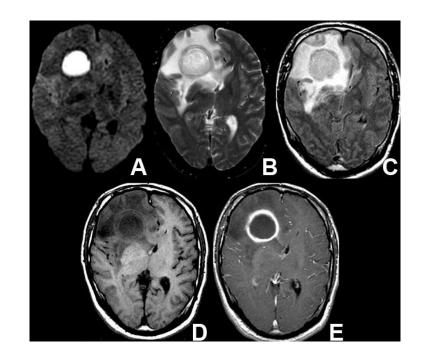


- Mosquito-Borne: Eastern Equine, Western Equine, Venezuelan equine, St. Louis, and West Nile virus
- Tick-Borne: Colorado tick fever, Powassan virus, Lyme disease, Rocky Mountain Spotted Fever
- Worldwide: Nipah virus, Hendra virus, LCMV, Avian flu
- Rabies



Brain abscess

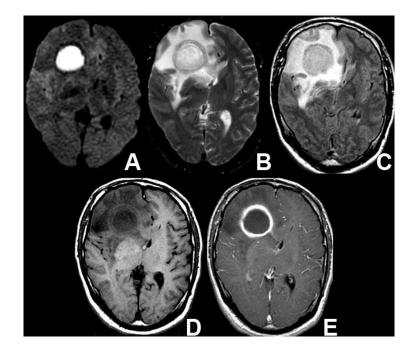
- Direct spread versus hematogenous
- Common in pulmonary AVMs
- Most frequently oral flora
- Common causes
 - Strep anginosus
 - Bacteroides
 - Prevotella
 - Cutibacterium
 - Fusobacterium
 - Actinomyces





Brain abscess

- Treatment
 - most need surgery (for dx and tx)
 - usually need weeks and weeks of antibiotics along with repeat imaging



Grab Bag

of CNS infections





Polio

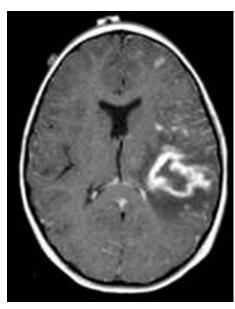






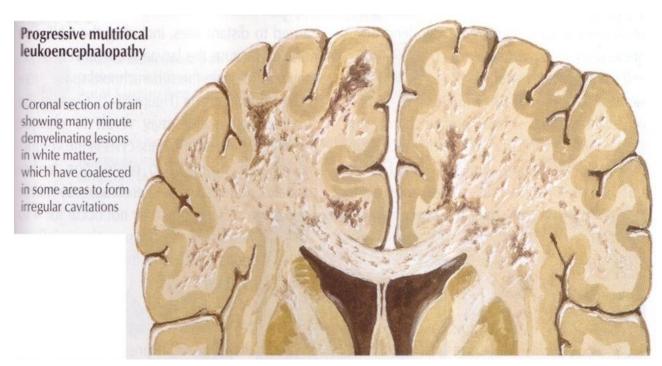
Tuberculosis



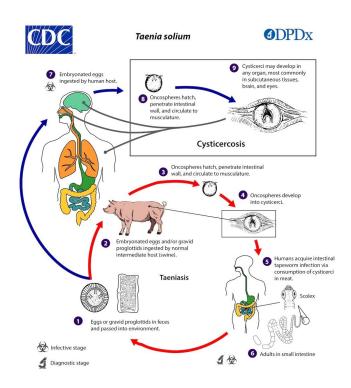


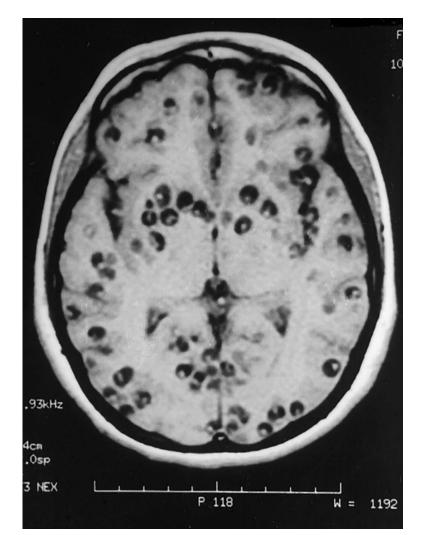


JC Virus



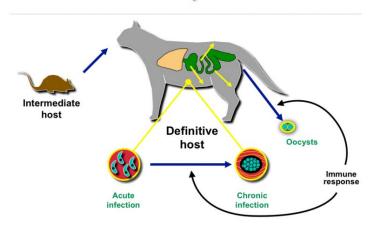
Neurocysticercosis

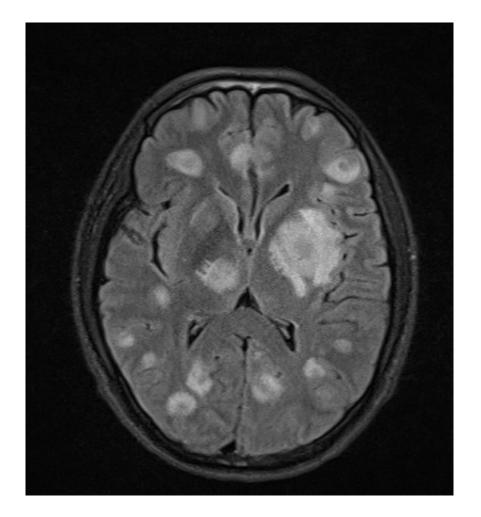




Toxoplasmosis

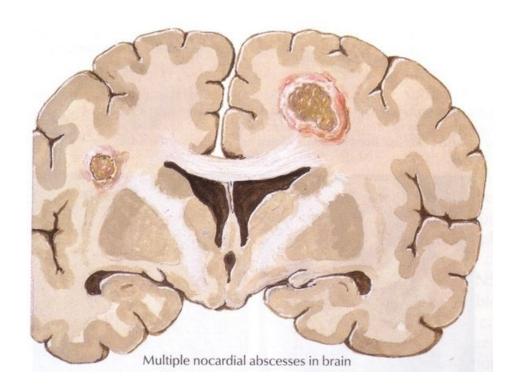
Life cycle

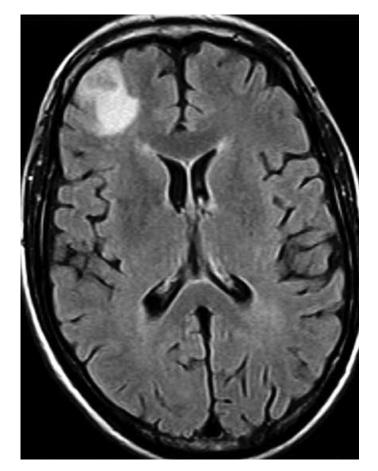




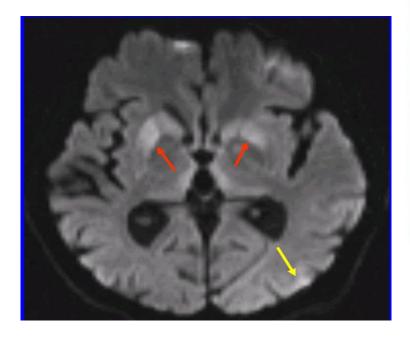


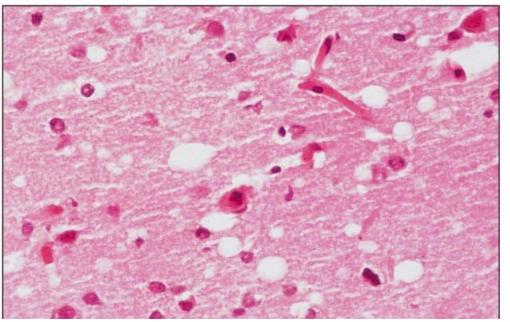
Nocardiosis





Prion Disease







Questions?

Amanda.Novack@baptist-health.org



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FOR YOU. FOR LIFE.



Learning Objectives:

- 1. Participants will appreciate the advances in treatment of neurological disorders over recent decades
- 2. Attendees will appreciate how emerging technologies are changing our management of common neurological disorders
- 3. Participants will appreciate the need for continuous knowledge updates and the evolution of lifelong learning/continuous certification

Nothing Relevant to Disclose



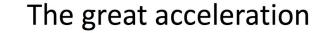


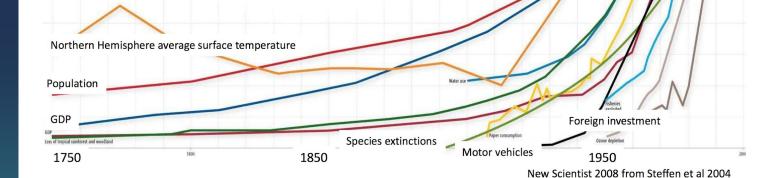
Thank You for Being Late

AN OPTIMIST'S GUIDE TO THRIVING
IN THE AGE OF ACCELERATIONS

THOMAS L.

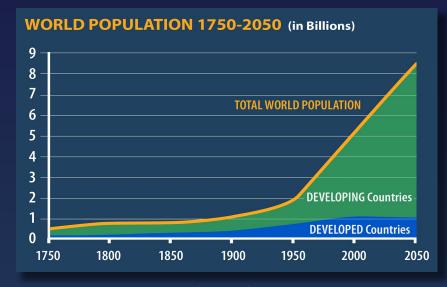
AUTHOR OF THE WORLD IS FLAT





Our World In Perspective

- •This year, the <u>Eight Billionth</u> child was born into our world!
- •Currently we have 4 births per second vs 2 deaths per second
- •Worldwide we have 140 million births per year!
- •In the past 2 decades, the mortality for children <5 y/o has <u>decreased</u> from 12.6 million to 5 million deaths per year (60% decline)
- •140 million births/3000 Pediatric Neurosurgeons=46,666 new children for each of us to care for each year



It takes nearly a decade to train one pediatric neurosurgeon
Average neurosurgeon does 225 cases per year (Dewan et al. JNS 2018)
How are we going to care for them all?



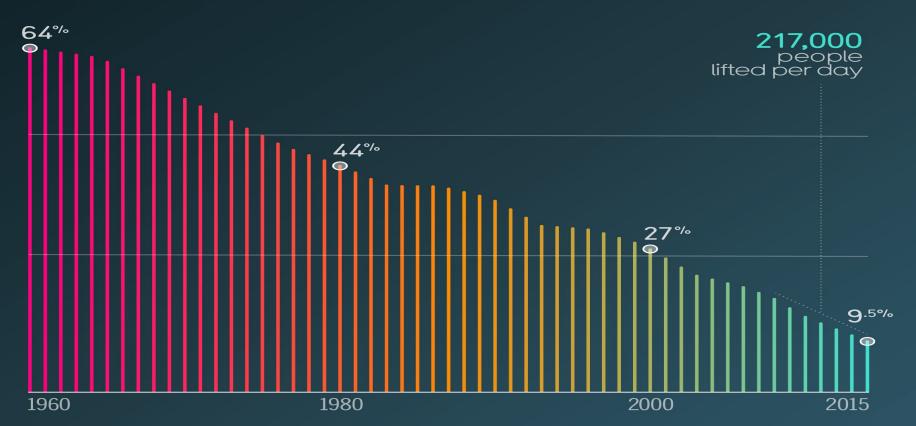
HEALTH

The Eight Millennium Development Goals

- 1) To eradicate extreme poverty and hunger
- 2) To achieve universal primary education
- 3) To promote gender equality and empower women
- 4) To reduce child mortality
- 5) To improve maternal health
- 6) To combat HIV/AIDS, malaria, and other diseases
- 7) To ensure environmental sustainability
- 8) To develop a global partnership for the future

Extreme Poverty is Decreasing

% world population living on less than \$1.90 per day



beautifulnews

source: Our World in Data

Share of population living in extreme poverty by world region



Extreme poverty is defined as living with less than 1.90\$ per day (in 2011 International Dollar). International dollars are adjusted for price differences across countries and across time.



SUSTAINABLE GEALS



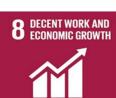




























GENDER EQUALITY



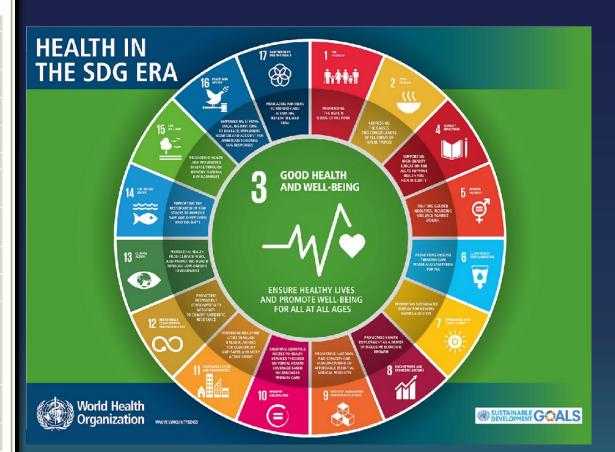
SDG 3 "Ensure healthy lives and promote wellbeing for all at all ages"

The goals within a goal: Health targets for SDG 3

Health target By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births * By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births * By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being * Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol *

- By 2020, halve the number of global deaths and injuries from road traffic accidents
- By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes *
- Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all
- By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
- Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate *
 - Support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all *
 - Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States
- Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks

SDG 3 and UHC





2015 A Game Changer

2013

Establishment of Lancet Commission on Global Surgery:

"To develop and assemble the best evidence on the state of surgery worldwide"

- Global surgery as an equal partner in health: no longer the neglected stepchild
- "Universal access to safe, affordable surgical and anesthesia care when needed"

Jim Kim, World Bank

2015

World Health Assembly (WHA) Resolution 68.15:

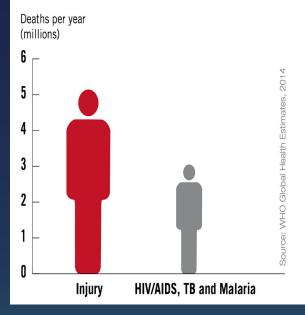
"Strengthening of Emergency and Essential Surgical and Anesthesia Care as a Component of Universal Health Coverage"



- 5 Billion people do not have access to safe, affordable surgical and anesthetic care when needed
- •In LMICs 9 of 10 people have no access to basic lifesaving, disability averting surgical care
- 143 million additional surgical procedures are needed in Low and Middle Income Countries (LMICs) each year to save lives and prevent disability

The scale of the problem

Injury deaths compared to other leading causes of mortality, world, 2012.



Put in the Right Perspective:

- Three times as many people die each year from lack of access to basic surgical care than die from HIV/AIDS, tuberculosis and malaria combined
- 18.6 million people die each year due to lack of essential surgical care
- The leading cause of death from trauma is a head injury

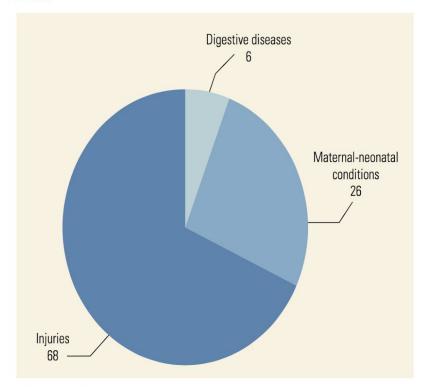
Unmet Surgical Need

28-32% of the global burden of disease is from surgical conditions



Figure 2.2 Distribution of Burden Avertable by Scaling Up Basic Surgical Care Deliverable at First-Level Hospitals in Low- and Middle-Income Countries

Percent



Source: Data in table 2.3.

Note: Percentages are based on a surgical package that could treat four gastrointestinal diseases, four maternal-neonatal conditions, and injuries that could be managed with simple interventions.



- Investing in surgical services in LMIC is affordable, saves lives, decreases disability and promotes economic improvement
- Target of 5000 operations/100,000 people
- •2.2 million more surgeons, anesthetists and obstetricians are needed
- Cost estimated at \$420 Billion
- •By inactivity, lost output (total GDP losses) totals \$12.3 trillion dollars, reducing annual GDP growth by as much as 2%



Surgery is an "indivisible, indispensable part of healthcare"

- Should be an integral part of health care delivery
- A pre-requisite for full attainment of local and global health goals
- Universal access is part of the 2015 Sustainable Health Goals



> J Neurosurg. 2018 Apr 1;1-10. doi: 10.3171/2017.11.JNS171500. Online ahead of print.

Global neurosurgery: the current capacity and deficit in the provision of essential neurosurgical care. Executive Summary of the Global Neurosurgery Initiative at the Program in Global Surgery and Social Change

Michael C Dewan ^{1 2}, Abbas Rattani ^{1 3}, Graham Fieggen ⁴, Miguel A Arraez ⁵, Franco Servadei ⁶, Frederick A Boop ⁷, Walter D Johnson ⁸, Benjamin C Warf ⁹ ¹⁰, Kee B Park ¹,

• Currently 49,201 73,000 neurosurgeons worldwide

· China + Japan 18,000

10,719 Europe

• US + Canada 5,296

 India 3,500

Africa

- 44% live in High Income Countries
- 22,740 neurosurgeons need to be trained to meet the current need $(2.\overline{5})$ times the current number being trained)



- The average neurosurgeon can comfortably perform 223 cases/year
- 13.4 million new cases arise per year (>80% occur in LMICs)
 - · Traumatic Brain Injury
 - Stroke
 - Tumor
 - · Hydrocephalus/Spina Bifida
 - Epilepsy
- 5 million cases deficit per year
- 22 million patients have neurological disorders and could benefit from neurosurgical consultation per year
- From: Global Neurosurgery: the current capacity and deficit in the provision of essential neurosurgical care. Executive Summary...Dewan MJ, Park K. J Neurosurg 2018 Apr 1:1-10. doi:10.3171/2017.11JNS171500.

WHO Causes of Death Worldwide

- •Number one cause of death in kids is accidents/injuries
- •69 Million Cases of Traumatic Brain Injury worldwide per annum
- •Incidence is 3x higher in LMICs
 - •55.9 Million (80%) are Mild
 - •5.48 Million are Severe
 - •5 Million die from TBI per year (14,000 per day)
 - •Accounts for 9% of the world's deaths
 - •90% of injury related deaths are in LMICs

Global unmet need for neurosurgery related to TBI exceeds 2 million cases per year

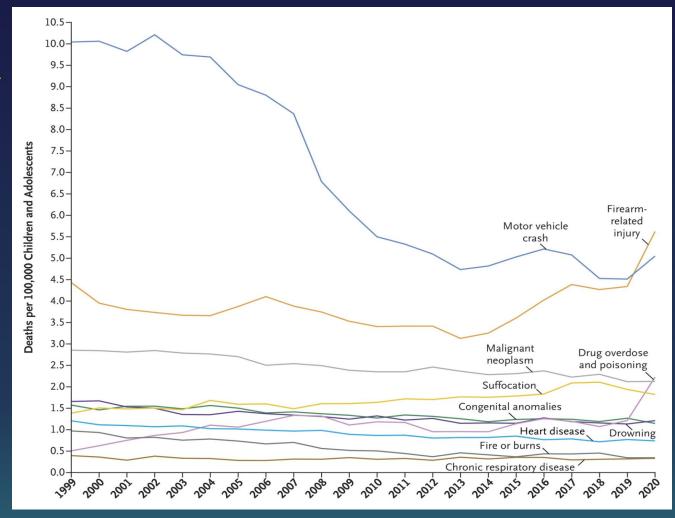




NEJM 2022; 386:1955-1956 Doi:10.1056/NEJMc2201761

> US Statistics 45,222 deaths from gunshot wounds

13.5% increase 2019-2020



CORRESPONDENCE | VOLUME 18, ISSUE 2, P136-137, FEBRUARY 01, 2019

Traumatic brain injury: global collaboration for a global challenge

Angelos G Kolias ☑ • Andres M Rubiano • Anthony Figaji • Franco Servadei • Peter J Hutchinson

Published: February, 2019 • DOI: https://doi.org/10.1016/S1474-4422(18)30494-0

CLINICAL RESEARCH: GLOBAL NEUROSURGERY

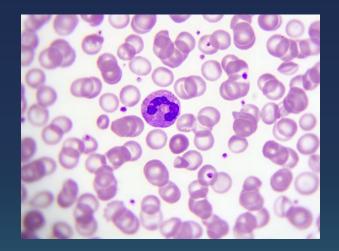
Consensus-Based Development of a Global Registry for Traumatic Brain Injury: Establishment, Protocol, and Implementation

Joannides, Alexis J.; Korhonen, Tommi K.; Clark, David; Gnanakumar, Sujit; Venturini, Sara; Mohan, Midhun; Bashford, Thomas; Baticulon, Ronnie; Bhagavatula, Indira Devi; Esene, Ignatius; Fernández-Méndez, Rocío; Figaji, Anthony; Gupta, Deepak; Khan, Tariq; Laeke, Tsegazeab; Martin, Michael; Menon, David; Paiva, Wellingson; Park, Kee B.; Pattisapu, Jogi V.; Rubiano, Andres M.; Sekhar, Vijaya; Shabani, Hamisi K.; Sichizya, Kachinga; Solla, Davi; Tirsit, Abenezer; Tripathi, Manjul; Turner, Carole; Depreitere, Bart; Iaccarino, Corrado; Lippa, Laura; Reisner, Andrew; Rosseau, Gail; Servadei, Franco; Trivedi, Rikin A.; Waran, Vicknes; Kolias, Angelos; Hutchinson, Peter on behalf of the GEO-TBI collaborative and the NIHR Global Health Research Group on Acquired Brain and Spine Injury

Causes of Death in Children

- •Number two cause is cancer
- •Number one cause of cancer in children is leukemia





Causes of Death in Children

- •Number two cause of childhood cancer is a brain tumor
- •The number one cancer-related cause of death is a brain tumor!





World Health Assembly Resolution 70.12: To Reduce Childhood Cancer Deaths By 50% By the Year 2030

WHO Global Initiative for Childhood Cancer

Setting a bold target for 2030



By 2030,

Double the cure rate, ensuring at least 60% survival for children with cancer globally, and reducing suffering for all

Saving **one million** more children

Cure All Framework: WHO Global Initiative for Childhood Cancer



Increasing access, advancing quality, saving lives

CHILDHOOD CANCER: ADDRESS THE INEQUITY



IN HIGH-INCOME COUNTRIES

80% OF CHILDREN WITH CANCER WILL SURVIVE

IN LOW-8 MIDDLE-INCOME COUNTRIES

20% OF CHILDREN WILL SURVIVE



80% of childhood cancers occur in LMICs 90% of childhood cancer deaths occur in LMICs

Global Initiative for Childhood Cancer: Index Cancers



Acute Lymphoblastic Leukemia Most common

worldwide



Burkitt
Lymphoma
Common in many
low-income
countries



Hodgkin Lymphoma Common in adolescents



Retinoblastoma Connecting communities for early diagnosis



Wilms
Tumor
Connecting
multidisciplinary
services



From addressing common challenges...

...to connecting vital partners

- Highly curable, with proven therapies
 - Prevalent in all countries
- · Represents 50-60% of all childhood cancers
- Helps to advance comprehensive childhood cancer services and systems strengthening













Global Initiative for Childhood Cancer: Index Cancers



Acute
Lymphoblastic
Leukemia
Most common
worldwide



Burkitt
Lymphoma
Common in many
low-income
countries



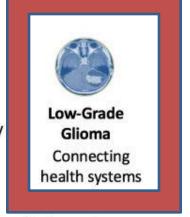
Hodgkin Lymphoma Common in adolescents



Retinoblastoma Connecting communities for early diagnosis



Wilms
Tumor
Connecting
multidisciplinary
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From addressing common challenges...

...to connecting vital partners

- Highly curable, with proven therapies
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- Represents 50-60% of all childhood cancers
- Helps to advance comprehensive childhood cancer services and systems strengthening









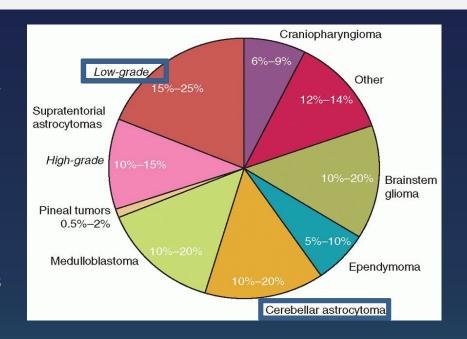








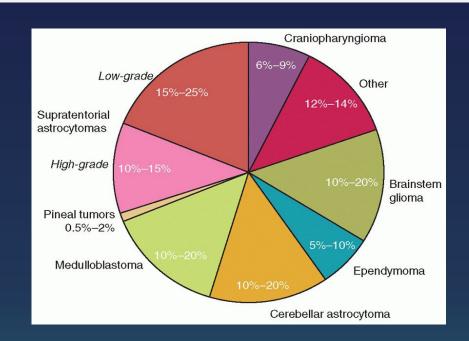
- Pediatric CNS are composed of many types of tumors
- Diverse in terms of:
 - Histology
 - Clinical characteristics
 - Response to treatment modalities
 - Outcomes





A diverse group

The 5-year survival of a child with a brain tumor is not determined by the biology of the tumor but by the country in which the child receives his care!!



80% of children with cancer live in a low- or middle-income country



Rodriguez-Galindo C, et al. *J Clin Oncol*.

Worldwide, 43% of childhood cancer cases will go undiagnosed:

- Western Europe and North America: 3% undiagnosed
- Western Africa: 57% undiagnosed

Global 5-year survival from childhood cancer is 37.4%:

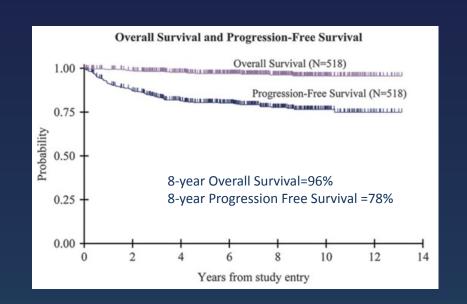
- North America: 83% survival
- Eastern Africa: 8.1% survival

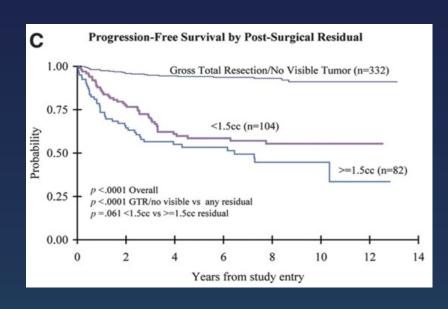
Approx. income thresholds based on GNI per capita(US\$):

LIC: <= \$1,000 LMIC: \$1,000 - 4,000 UMIC: \$4,000 - 12,500



Low Grade Glioma Survival in HICs

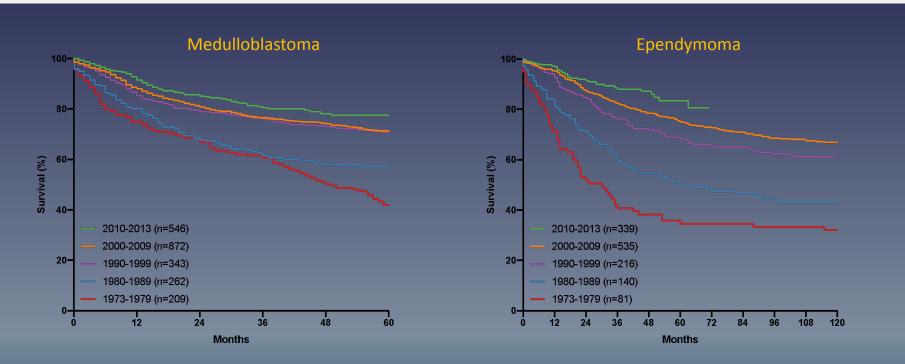




Primary Neurosurgery for Pediatric Low-Grade Glioimas: a prospective multi-institutional study from the Children's Oncology Group Wisoff JH, Sanford RA, Kun LE, et al., Neurosurgery 68:1548-1555, 2011



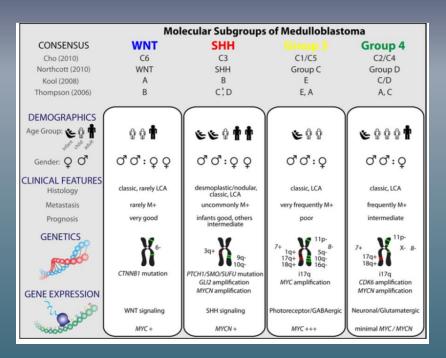
Improvements have been achieved

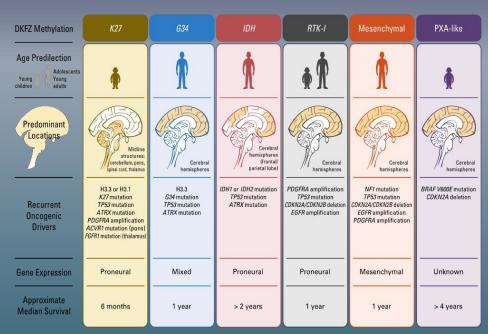


In HICs the 5-year survival for most childhood brain tumors is 80%

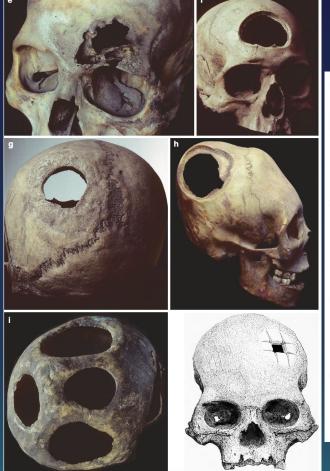
From Microscope to Microchip: a transformation of the field

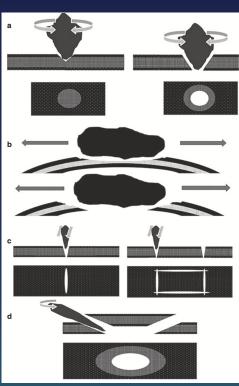


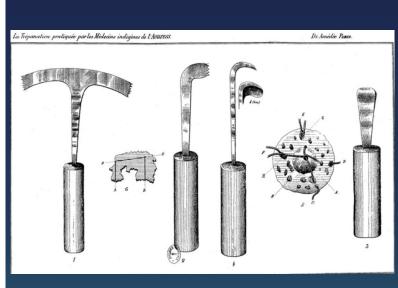




Trepanations were performed around the world



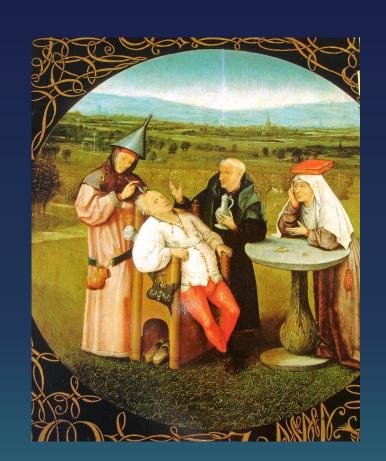


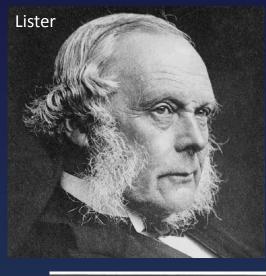


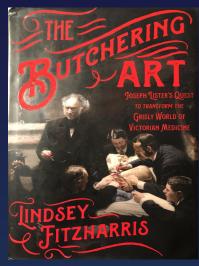
Awake Craniotomy Described in Dead Sea Scrolls

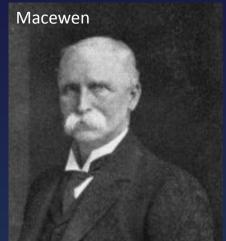


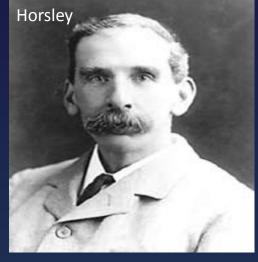
Extraction of the Stone of Madness Hieronymus Bosch 1488-1516

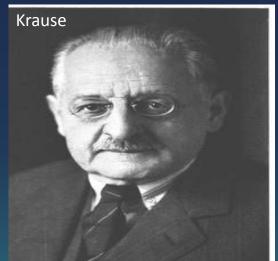




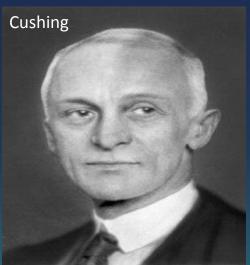


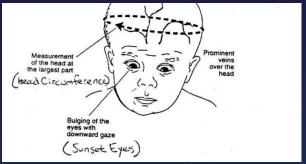


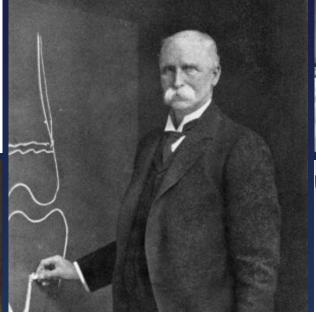






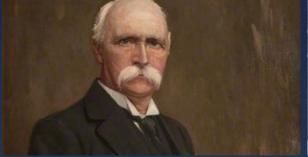


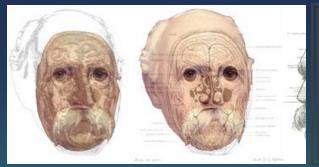












Macewen's Sign

1879 – Meningioma resection

[100 years of intubation anesthesia. William Macewen, a pioneer of endotracheal intubation].

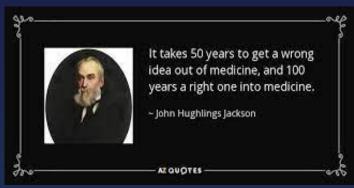
[Article in German] Brandt L, Pokar H, Schütte H.

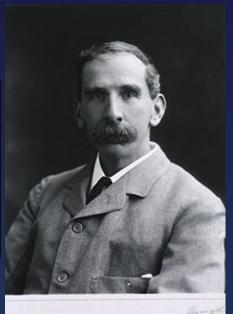
Abstract

Endotracheal anaesthesia with the help of orotracheal intubation is 100 years old. In 1880, William Macewen was the first to describe and to perform that technique. In his paper entitled "clinical observations on the introduction of tracheal tubes by the mouth instead of performing tracheotomy or laryngotomy' he describes in addition two cases of endotracheal intubation lasting at least 36 h. He can, therefore, be said also to have performed the first long-time intubation.

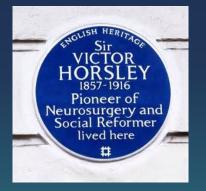


The German Trendelenberg first performed endotracheal intubation for surgery in 1869 but through a tracheostomy. He did this to prevent blood from oozing into the trachea during pharyngeal surgery. He was also the first to give "narcosis". ie general anesthesia with chloroform via intubation.

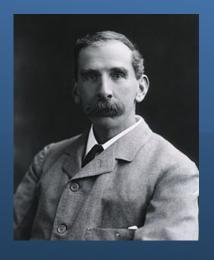


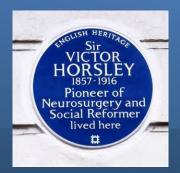
















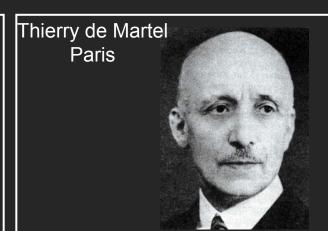


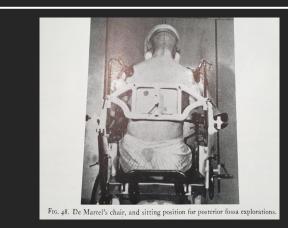




1890 – Reported series of 44 craniotomies

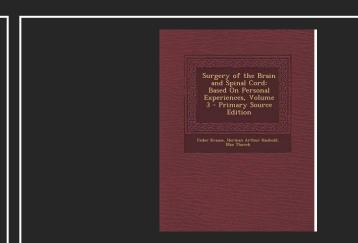


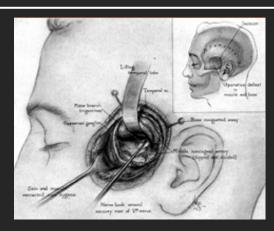


















BERLIN, DEN 22. APRIL 1909

35. JAHI

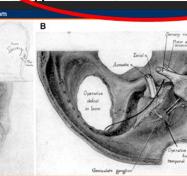
Einklemmung bzw. Strangulation der Cauda equina.

ERLIN W. AM KARLSBAD 5

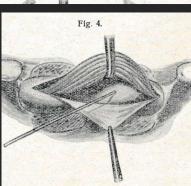
1. Oppenheim und F. Krause in Berlin.

iquor cerebrospinalis auf, der bei Eröffnung der Dura den Subarachnoidealräumen oberhalb des Engpasses he

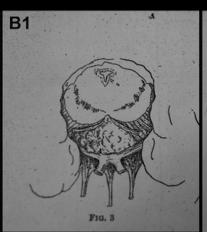
Fig. 2.











FACULTÉ DE MÉDECINE DE PARIS

LE DOCTORAT EN MÉDECINE

Présentée et sontenue jeuli 23 jujú 1809, à 1 heure

Par JACOURS ONANOFY

NA NAUMbras (Reselle, la 15 justice 1809

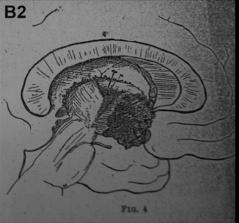
SUR UN CAS D'ÉPITHÉLIOMA

PARIS
OLLIER-HENRY, LIBRAIRE-EDITEUR
11, 13, max no 1/2002-no-minocone, 11, 13

Juges: ME. { DECULATO's, professor.
BALLET, MANOT, agripts.

Le Candidat répondre une guarden que les arrors faites sur les diserne parties

Aundo 1892 THESE





1892 First Reported Craniopharyngioma

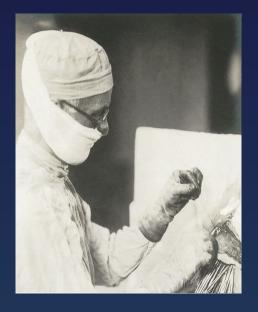
Cases collected Paris 1921-1973

- Good 25%
- Fair 27%
- Death 12.7%
- Poor "severe hypothalamic damage incompatible with long life - 35%"
- GTR = 40% poor outcome





Harvey Cushing



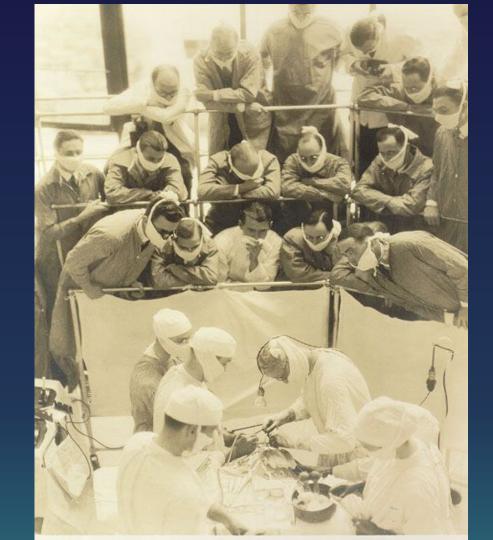


After an address by Cushing to the American College of Surgeons in 1919 the chairman of the session, Dr. William Mayo, rose and solemnly announced "Gentlemen, we have this day witnessed the birth of a new specialty-neurological surgery."

A History of Neurosurgery. Edited by SAMUEL H GREENBLATT. (Pp 623; £72.00). Illinois:The American Association of Neurological Surgeons, 1997. ISBN 1-879284-17-0.







Robert Watson MD



Flanigan and Boop started UAMS residency program in 1971



Dr Al-Mefty UAMS School of Micro-neurosurgery



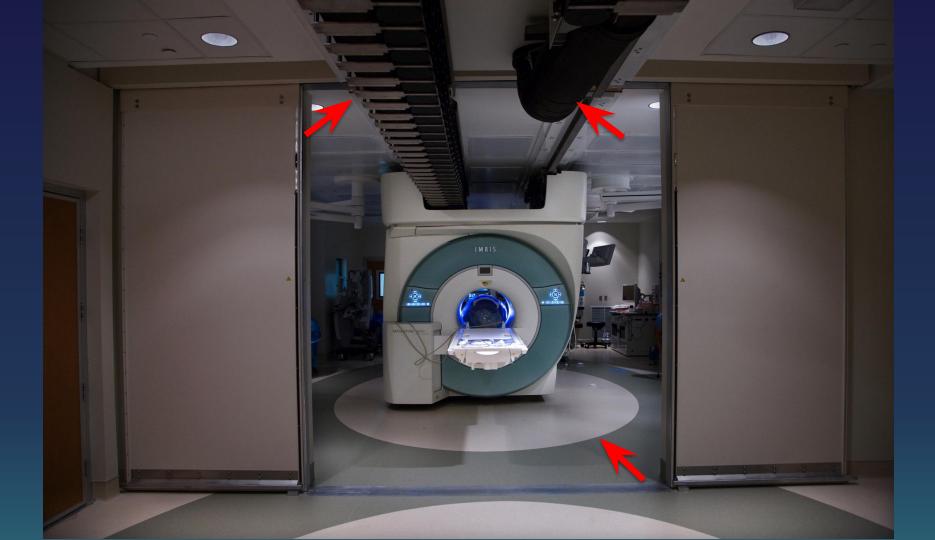










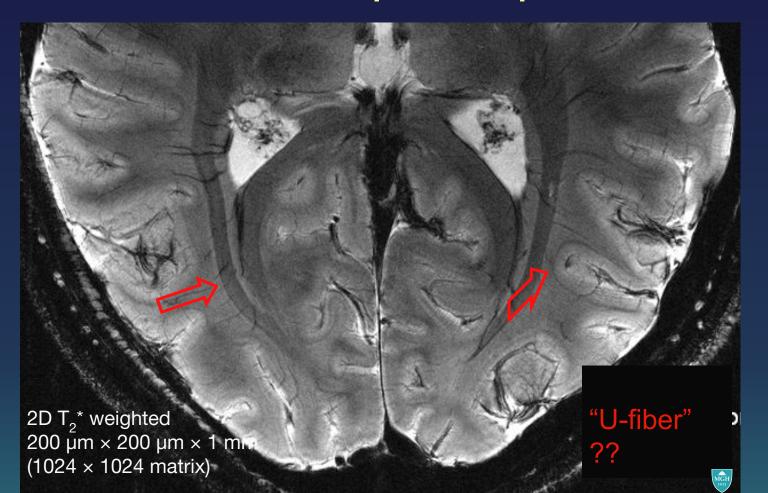


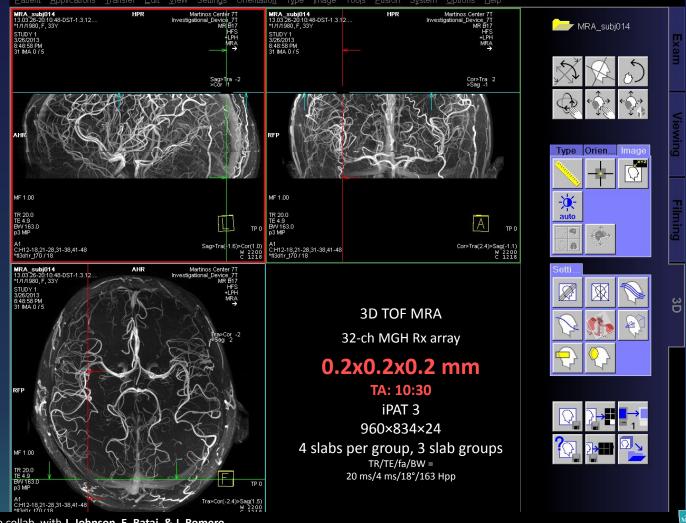
2018 FDA approval of 7 Tesla MRI

And so we keep a close eye on new developments...

Such as the now FDA-cleared 7 Tesla...

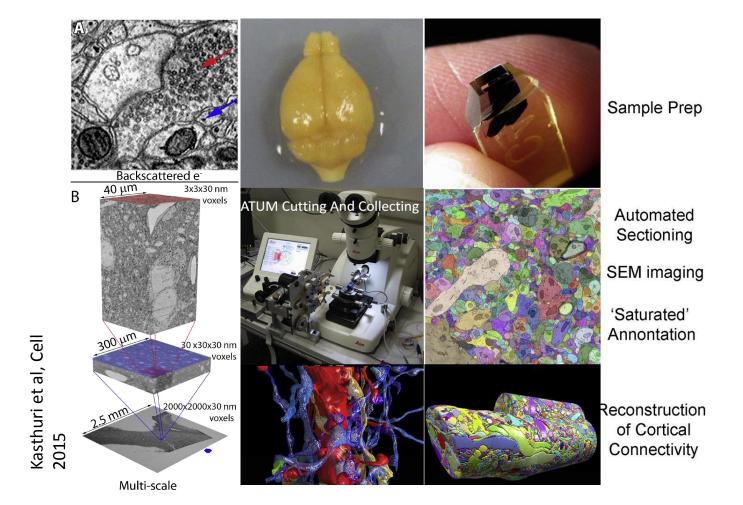
$T2* - 7 T 32ch 200 \mu m \times 200 \mu m \times 1 mm$

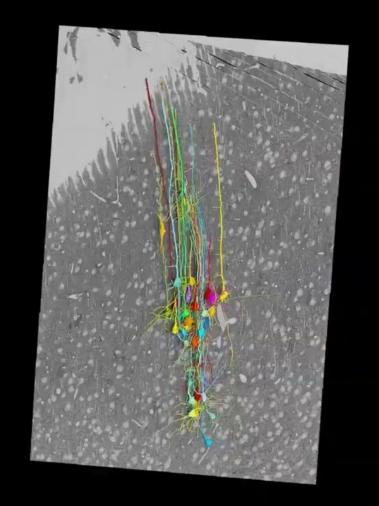


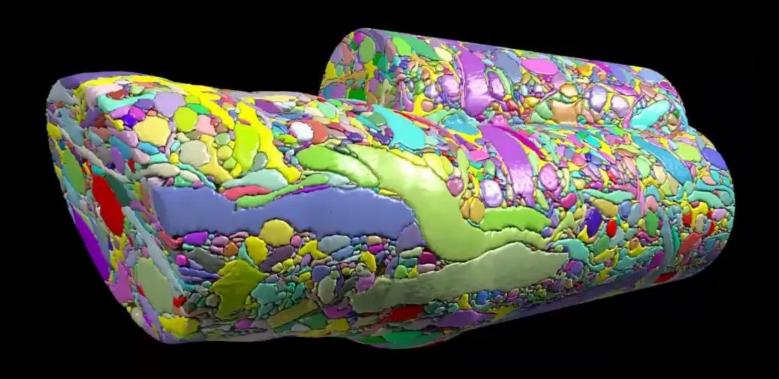


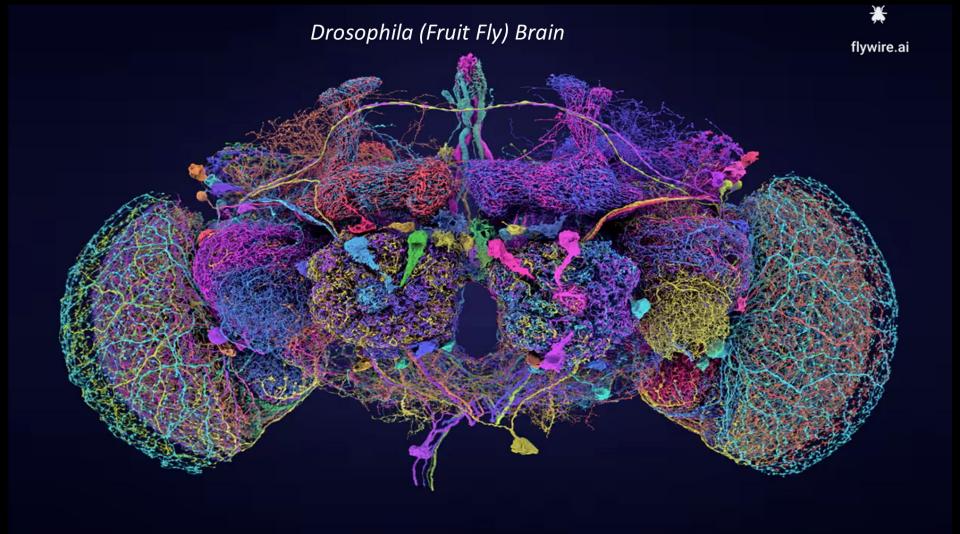


Saturated Reconstruction of Brain Tissue

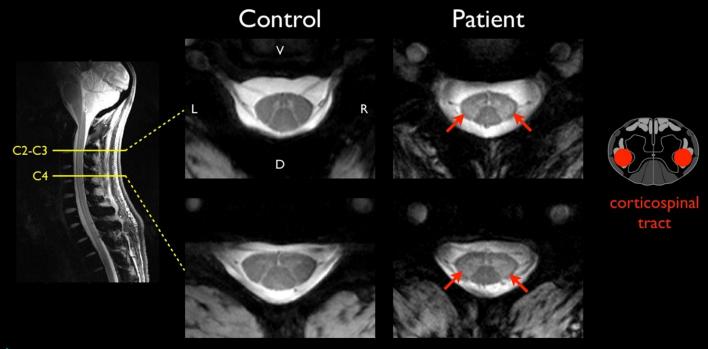








ALS vs. Control





Intra-operative neural monitoring



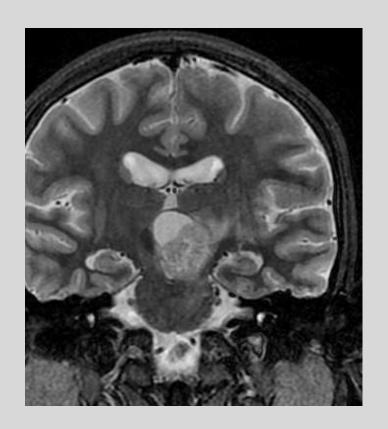
M. A.

13 y/o presented with hydrocephalus in 2012; Treated with ETV/endoscopic biopsy Dx: GBM

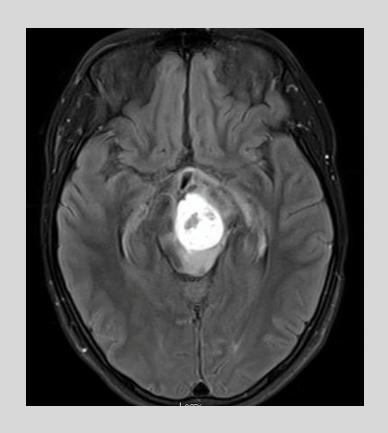
XRT + Chemotherapy with progression Right hemiballismus and failure of upgaze/convergence

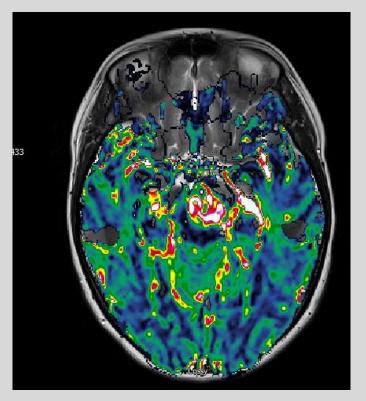
Pre-op MRI 2015



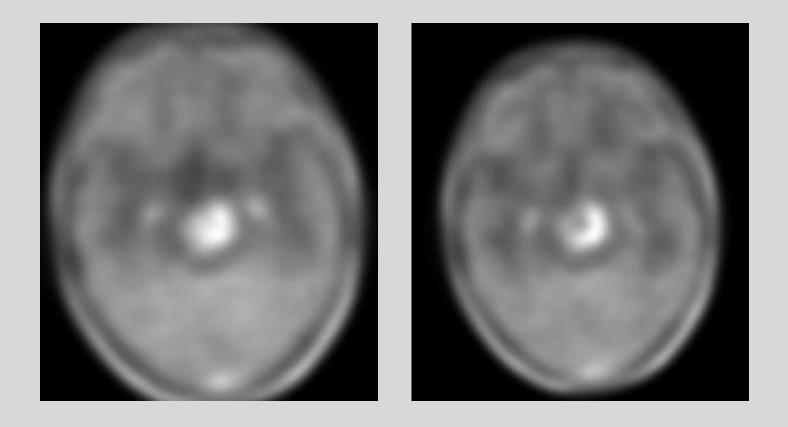


Axial T2 Flair and Perfusion

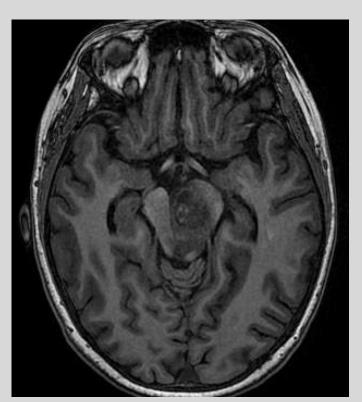


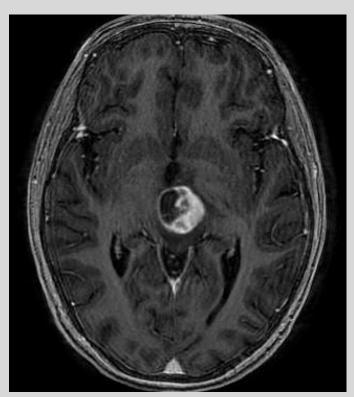


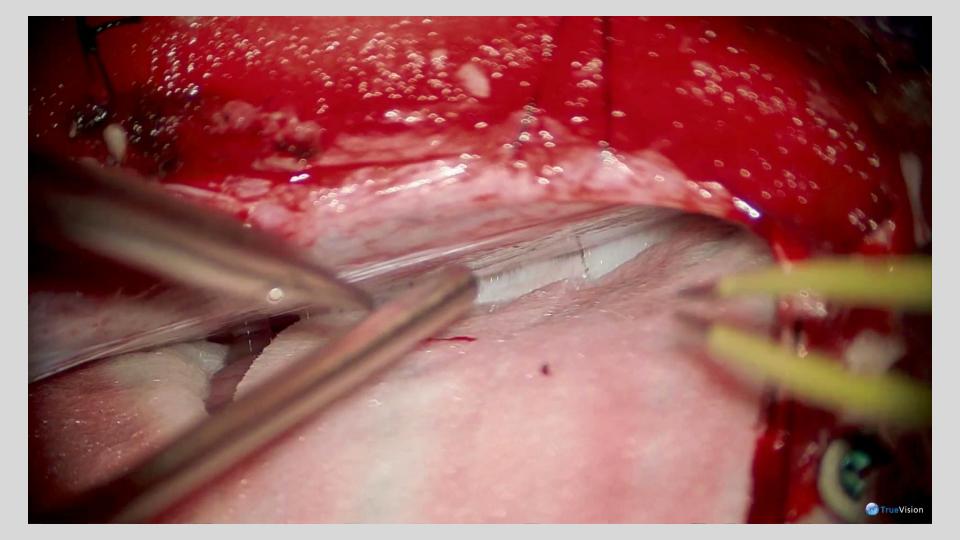
Tumor Avid on Methionine PET



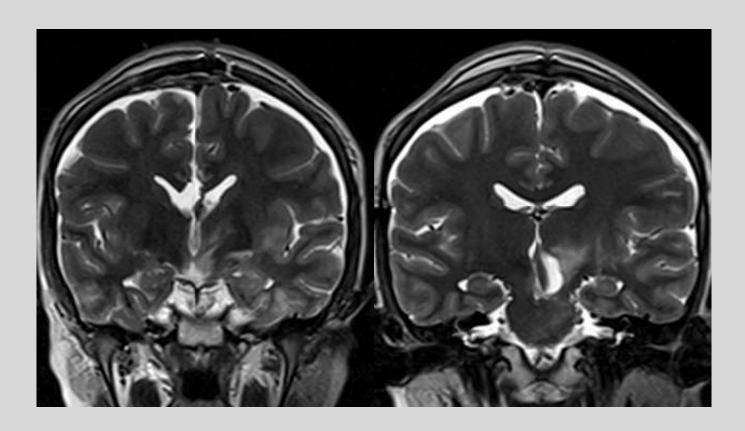
Pre-op Axial T1 without and with Gd







Intra-op MRI



3 month post-op functional status

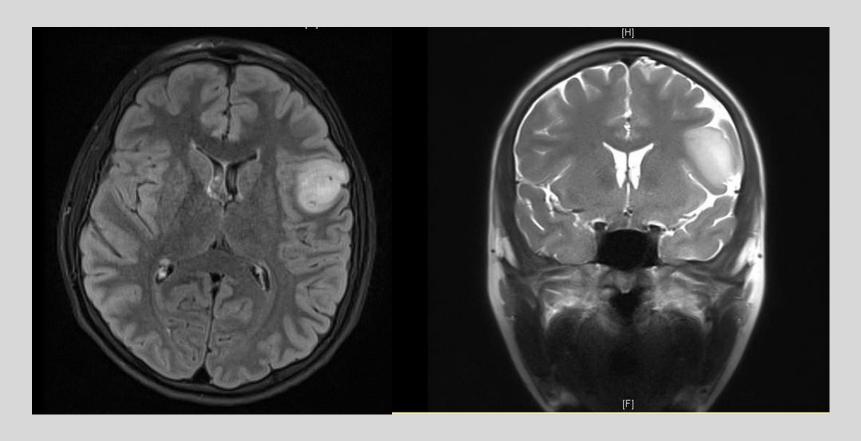


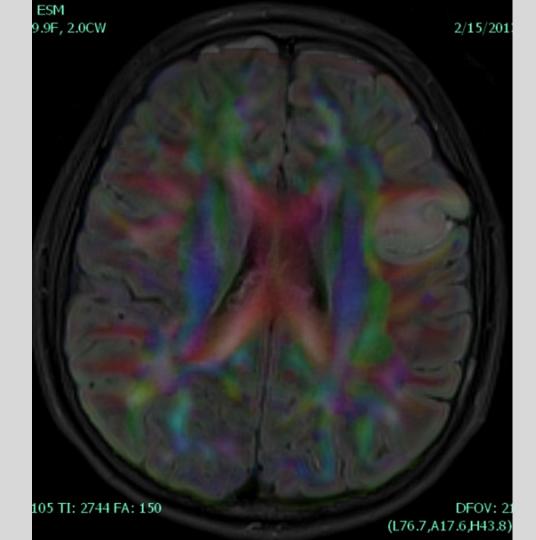


Trans-cranial Magnetic Stimulation (TMS)

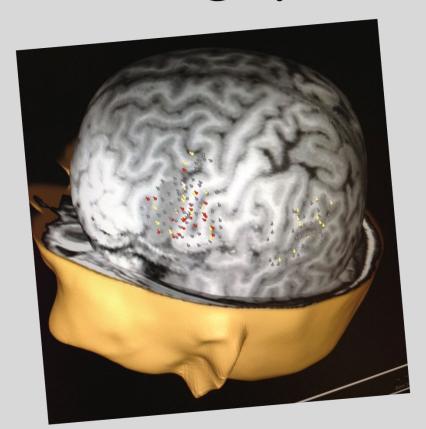


14 y/o presented with first seizure



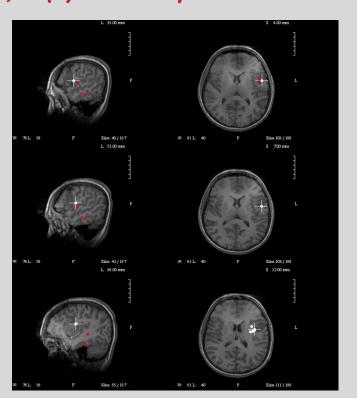


TMS localizing speech area

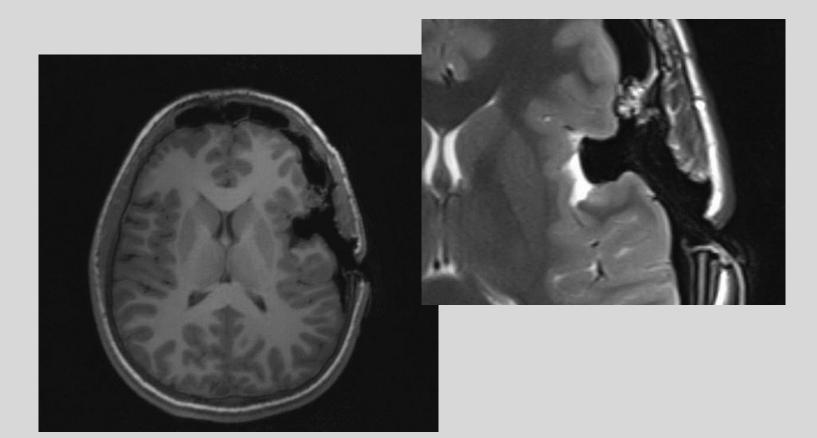


Same day tri-modality functional brain mapping prior to resection of a lesion involving eloquent cortex: technical feasibility. Choudhri AG, Narayana S, Rezaie R, Whitehead MT, McAfee SS, Wheless JW, Boop FA, Papanicolau AC. Neuroradiol J. 2013 Oct; 26(5):548-54. Epub 2013



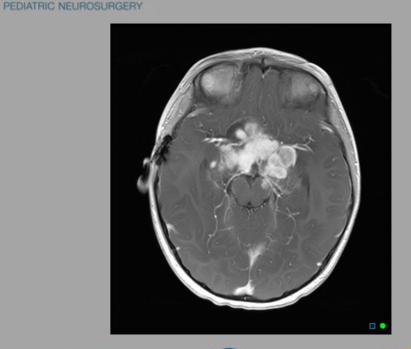


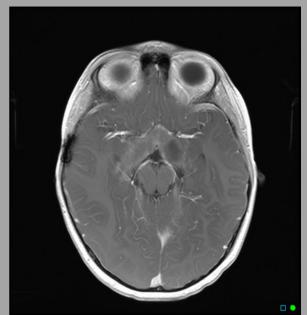
Post-Resection I-MRI





Pilocytic Astrocytoma with V600E mutation responding to Vemurafenib







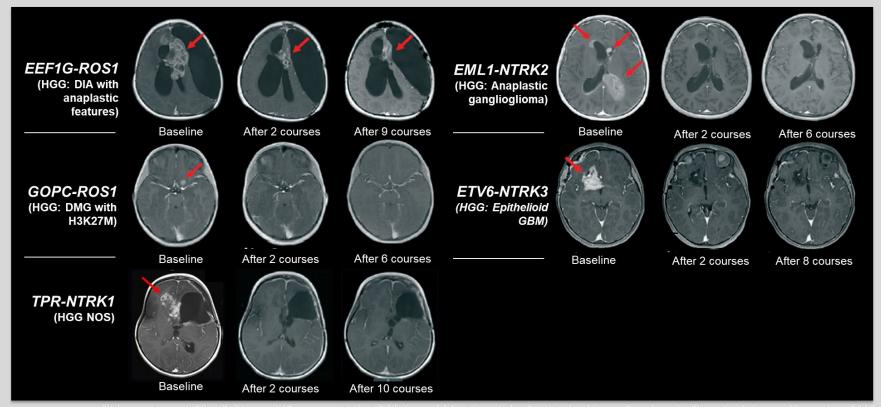




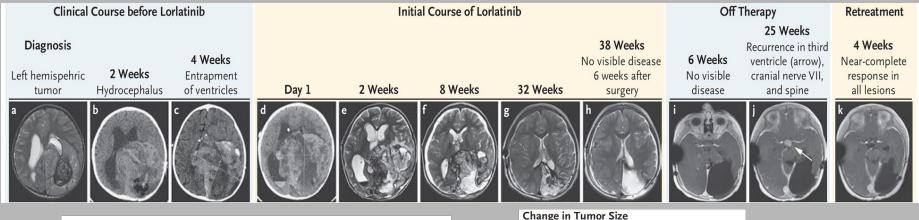


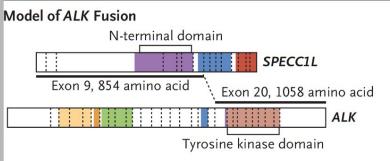


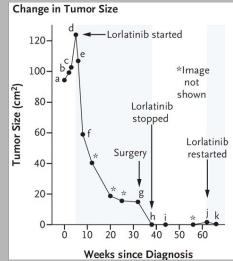
Remarkable responses in pediatric patients with CNS tumors with targetable fusions on Entrectinib therapy



Stunning response in moribund child with brain penetrant ALK inhibitor







Bagchi, Robinson et al. NEJM 2021



Walking naturally after spinal cord injury using a brain-spine interface

https://doi.org/10.1038/s41586-023-06094-5 Received: 1 August 2022

Accepted: 17 April 2023

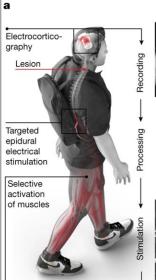
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From: Walking naturally after spinal cord injury using a brain-spine interface

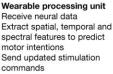


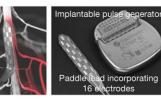
Jocelyne Bloch^{1,2,3,11™} & Grégoire Courtine^{1,2,3,11™}

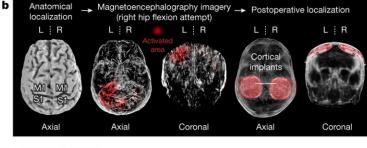












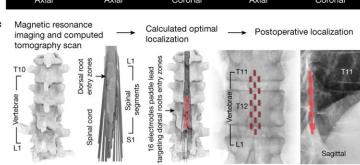


Fig. 2: Calibration of the BSI.

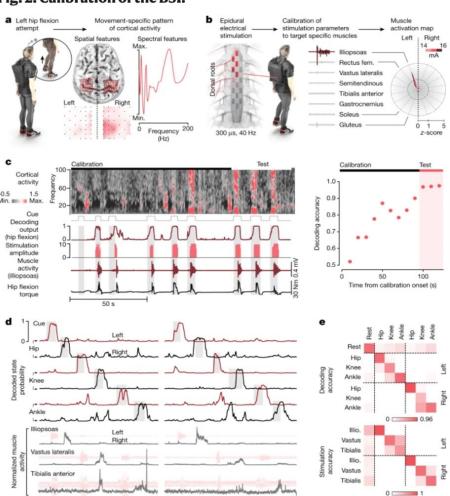


Fig. 3: The BSI restores natural control of walking.

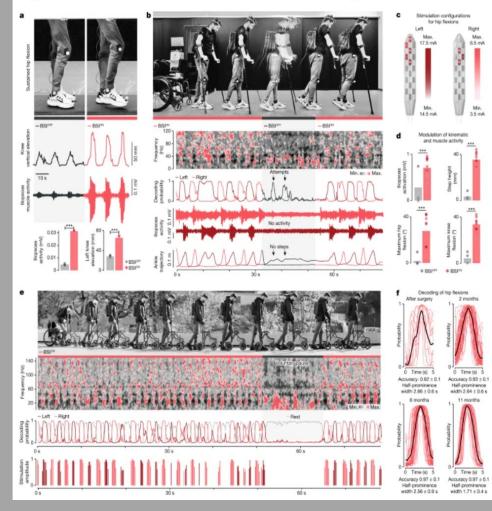
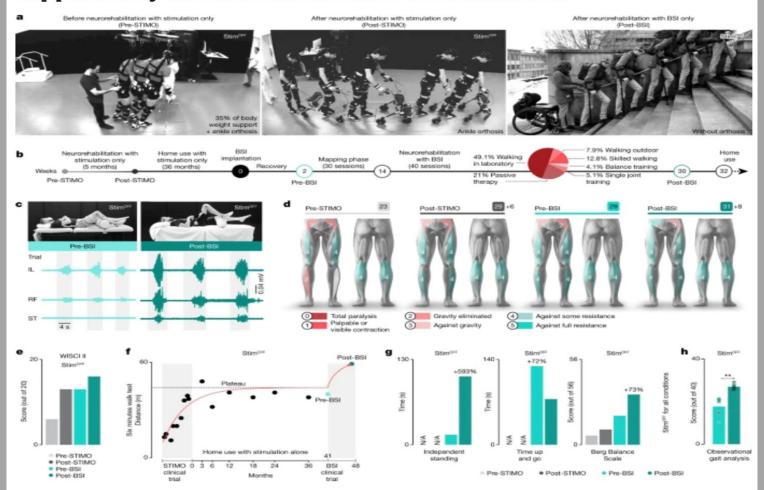


Fig. 4: Neurological improvements following neurorehabilitation supported by the BSI in the absence of stimulation.



Spina Bifida and Hydrocephalus

WHA Resolution for folic acid supplementation Submitted in May 2022

Clinical Trial > Lancet. 1991 Jul 20;338(8760):131-7.

Prevention of neural tube defects: results of the Medical Research Council Vitamin Study. MRC **Vitamin Study Research Group**

No authors listed

PMID: 1677062

Abstract

A randomised double-blind prevention trial with a factorial design was conducted at 33 centres in seven countries to determine whether supplementation with folic acid (one of the vitamins in the B group) or a mixture of seven other vitamins (A,D,B1,B2,B6,C and nicotinamide) around the time of conception can prevent neural tube defects (anencephaly, spina bifida, encephalocele). A total of



Periconceptual folic acid supplementation reduced the incidence of spina bifida and anencephaly by 72%

Spina Bifida and Hydrocephalus -30 years later-

UK introduces folic acid fortification of flour to prevent neural tube defects



1199

30 years ago the MRC Vitamin Study Research Group. led by Professor Sir Nicholas Wald, reported that folic acid supplementation for women around the time of conception reduced the risk of serious neural tube defects (NTDs; anencephaly, spina bifida, and encephalocele) in their babies.1 That study led to the introduction of mandatory folic acid fortification of staples such as flour in more than 80 countries in an effort to reduce the incidence of NTDs. As recently as July, 2021, New Zealand mandated fortification with folic acid.2 In 2019 there was a public consultation in the UK on options for folic acid fortification3 and on Sept 20, 2021, the UK Government announced it will introduce the mandatory fortification of nonwholemeal wheat flour with folic acid.4

Decisions on major public health matters such as mandatory folic acid fortification are the responsibility of governments, informed by scientific risk assessments and taking into account other relevant factors such as economic and societal impacts.5 The first full scientific evaluation in the UK took place in 20005 and the issue was revisited in 2006.6 Since then the research evidence base has grown and there were further UK assessments in 20097 and 2017.8 All of these evaluations5-8

concluded that the use of folic acid supplements periconceptionally reduces the risk of NTD-affected pregnancy but that the uptake remained too low and 50140-6736(21)02134-6 further gains could be made with the introduction of folic acid fortification of flour. Not all cases of NTDs are responsive to folic acid9 and the beneficial effect depends on the baseline folate status of the woman, the incidence of NTDs in the population, and other factors intrinsic to the population, such as the frequency of MTHFR C677T genotypes.10 Even



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250,000 new spina bifida babies are born per year!

Received: 7 November 2020 Revised: 25 November 2020

Accepted: 4 December 2020



HYPOTHESIS

Projected impact of mandatory food fortification with folic acid on neurosurgical capacity needed for treating spina bifida in Ethiopia

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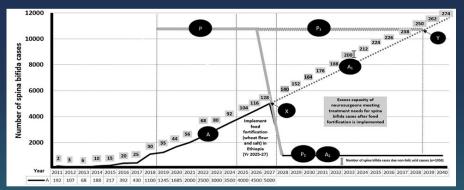
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3Department of Neurosurgery, Addis Ababa University Addis Ababa Ethiopia

Abstract

Spina bifida, also known as meningomyelocele, is a major birth defect mostly associated with folate deficiency in the mother early in pregnancy. The prevalence of spina bifida is disproportionately high in Ethiopia compared to the global average; about 10,500 liveborn are affected annually. Many affected infants



DOI: 10.1002/bdr2.1857

Prevention of Spina Bifida-F with Mandatory Fortification of Staple Foods with Folic Acid

World Health Assembly Resolution on Food Fortification



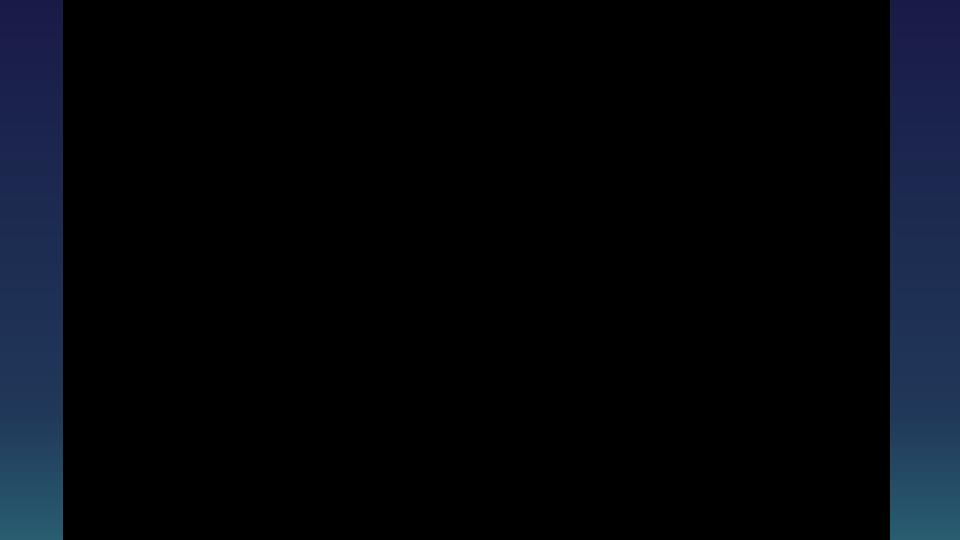
GAPSBi-F
Global Alliance for Prevention of Spina Bifida-F

WHO Geneva May 2022











Thank You!

LUNCH TIME!



LUNCH TIME!

BREAKOUT SESSIONS FROM 12:00PM-1:55PM

- Stroke Breakout Ballroom A/B
- Neurosurgery Breakout CAT/DEGR Room
- Neurology Breakout OUT/HAM Room

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