UNC DEPARTMENT OF NEUROLOGY

Global Neurology: A bilateral global neurology residency rotation for UPCH-Peru and UNC-USA

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Outline

- What is global neurology?
- Burden of neurological illness Latin America
- The practice of neurology with limited resources
- UNC/UPCH Ongoing research efforts
- Training opportunities – UNC/UPCH bilateral neurology residency rotation
- Questions?

What is global neurology?

- **Global Health**: "study, research and practice that places a priority on improving health and achieving equity in health for all people worldwide"
- **Global Neurology:** application of these principles to the practice of neurology worldwide
- **Common misconception:** neurology is too specialized for global health; most pressing neurological issues are better addressed by general practitioners or pediatricians.

Growing interest in global neurology among neurology trainees & neurologists

Emerging Subspecialties in Neurology: Global health

Omar K. Siddiqi, MD
Igor J. Koralnik, MD
Masharip Atadzhanov, MD, PhD, FRCP
Gretchen L. Birbeck, MD, MPH, DTMH, FAAN

Neurology 80 February 19, 2013

Neurology goes global

Opportunities in international health

Jori E. Fleisher, MD
Farrah J. Mateen, MD, PhD

Neurology® Clinical Practice

RESIDENT & FELLOW SECTION

Education Research: A framework for global health curricula for neurology trainees

Koplan JP, et al. Towards a common definition of global health. Lancet 2009.
Mathers C, et al. World Health Organization; 2009.

Why Global Neurology?

- Global Burden of Disease Study 2016
  - Neurological disorders are the leading cause of disability and 2nd leading cause of mortality globally

- 75% of the global burden of neurological disease is in low-and middle-income countries (LMIC)
  - Including:
    - **80% of all epilepsy cases**
    - **85% of all strokes occur in LMIC**

Global Burden of Disease Study 2016 Neurology Collaborators. Lancet Neurol. 2019; 18:459-480
Report on Epilepsy in Latin America and the Caribbean – Pan American Health Organization 2013

Epilepsy in LAC

- Over 50% of epilepsy patients in Latin America and the Caribbean (LAC) receive no treatment
  - Four essential drugs: Phenobarbital, Phenytoin, Carbamazepine and Valproic Acid
- Lack of access to services:
  - Approximately one-third (36.0%) of the centers or services are located in the capitals of the countries
- Number of neurologist does not match burden of neurological disease

Table 7 Centers or specialized services for the care of people with epilepsy

Countries by subregion	Number of centers/services	Centers in the capital	Capital %	Pediatric specialization	Pediatrics %
Costa Rica	4	4	100	1	25.0
Cuba	14	5	35.7	4	28.6
Dominican Republic	8	4	50.0	1	12.5
El Salvador	9	9	100	3	33.3
Guatemala	1	1	100	0	n/a
Haiti	11	11	100	11	100
Honduras	63	15	23.8	13	20.6
Mexico	4	3	75.0	1	25.0
Panama	2	2	100	0	n/a
Subtotal	116: 9/9	54	46.6%	34: 9/7	29.3%
Argentina	78	22	28.2	29	37.2
Bolivia	1	1	100	0	n/a
Brazil	n/r	n/r	n/r	n/r	n/r
Chile	30	9	30.0	12	40.0
Colombia	45	12	26.7	12	26.7
Ecuador	1	1	100	1	100
Peru	1	1	100	0	n/a
Uruguay	3	3	100	1	33.3
Venezuela	49	14	28.6	3	6.1
Subtotal	208: 8/8	63	30.3%	58: 8/6	27.9%
Antigua and Barbuda	1	1	100	1	100
Bahamas	5	5	100	2	40.0
Grenada	0	n/a	n/a	0	n/a
Jamaica	12	n/r	n/r	2	16.7
Saint Kitts and Nevis	n/r	n/r	n/r	n/r	n/r
Saint Vincent and the Grenadines	0	n/a	n/a	0	n/a
Suriname	0	n/a	n/a	0	n/a
Subtotal	18: 6/3	6	33.3%	5: 6/3	27.8%
Total	342: 23/20	123	36.0%	97: 23/16	28.4%

Source: Tool for the assessment of resources devoted to epilepsy (modified version-PAHO/2012.

n/a: not available

n/r: not reported

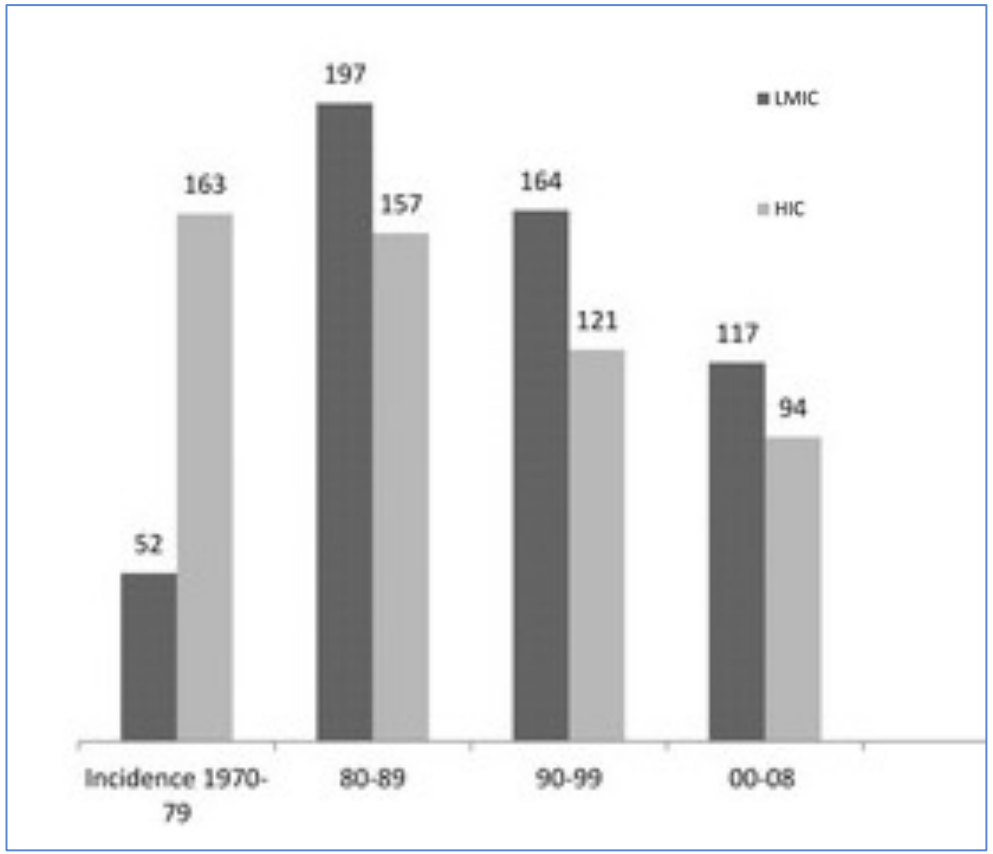
Report on Epilepsy in Latin America and the Caribbean – Pan American Health Organization 2013

Stroke in Latin America and the Caribbean

- Globally 1970 – 2008 stroke incidence:
  - 42% decrease HIC
  - > 100% increase in LMIC

- LAC stroke is the 1st or 2nd leading cause of death

- ~ 40% of these deaths occurs during the person's most productive years of their life



Variation in Incidence (cases/100 000 person-years) (%).

Addo et al. Socioeconomic status and Stroke. Stroke 2012

Prevalent cases, deaths and DALYs in those aged 20-64 years between 1990 and 2013

	Year	Prevalence	95% UI	Death	95% UI	DALYs	95% UI
HS							
Developing	1990	1,450,240	1,391,277–1,510,464	716,996	636,079–797,977	25,688,495	22,803,083–28,597,621
	2013	2,665,770	2,521,485–2,789,120	935,939	839,444–1,060,482	32,834,364	29,352,075–37,133,284
Developed	1990	530,589	490,269–574,953	140,931	119,814–160,849	4,839,572	4,165,098–5,492,067
	2013	1,059,315	983,851–1,138,970	111,795	98,625–129,473	3,861,930	3,426,825–4,432,344
Global	1990	1,980,830	1,918,964–2,056,065	857,927	761,615–955,263	30,528,067	27,119,019–33,944,576
	2013	3,725,085	3,548,098–3,871,018	1,047,735	945,087–1,184,192	36,696,295	33,011,678–41,372,106
IS							
Developing	1990	1,724,774	1,632,729–1,810,733	225,925	181,026–266,063	7,573,447	6,058,331–8,960,467
	2013	3,214,108	3,033,261–3,446,309	356,408	280,551–414,875	11,769,652	9,345,527–13,601,182
Developed	1990	2,076,621	1,954,109–2,206,981	95,635	78,800–112,305	3,157,115	2,664,748–3,664,830
	2013	4,044,107	3,869,281–4,238,562	79,564	68,651–96,978	2,963,492	2,551,752–3,520,588
Global	1990	3,801,396	3,660,560–3,957,700	321,560	259,801–370,056	10,730,563	8,685,007–12,392,179
	2013	7,258,216	6,996,272–7,569,403	435,972	354,018–504,656	14,733,144	12,209,576–17,011,339

Disability-adjusted life years (DALYs) =

Years of Life lost (YLL) + Years lived with disability (YLD)

DALYs: is a year of healthy life lost (including premature death or disability

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Krishnamurthi R.V, et al. Neuroepidemiology 2015

Population-based stroke incidence estimates in Peru: Exploratory results from the CRONICAS cohort study

Maria Lazo-Porras,[a,b,*] Antonio Bernabe-Ortiz,[a,#*] Robert H. Gilman,[a,c,d] William Checkley,[a,e] Liam Smeeth,[f] and J. Jaime Miranda,[a,g]

The Lancet Regional Health - Americas
2022;5: 100083
Published online 30 October 2021
https://doi.org/10.1016/j.lana.2021.100083

- To estimate the incidence and explore risk factors of first-ever stroke in Peru
- 2471 individual, median time follow up 7 years
- Age standardized incidence of stroke of 98.8 per 100,000 person-years
  - USA:
    - 29.2 per 100,000 person years in Asian/Pacific Islanders
    - 52.3 per 100,000 person years in Non-Hispanic Black, respectively
- High incidence of first-ever strokes in Peruvian general population

Impact of Global Neurology

Brief Communication

A collaborative effort to establish a comprehensive epilepsy program in Peru

Jorge G. Burneo [a], Jose C. Delgado [b], David A. Steven [a], Carlos M. Vasquez [b], Mario A. Alonso-Vanegas [c], Jose E. Cavazos [d], Lizardo Mija [b], Willy Zapata [b], Lucio Portilla [b]

GLOBAL PERSPECTIVES

Establishment of epilepsy surgery in Peru

David A. Steven, MD, MPH, Carlos M. Vasquez, MD, Jose C. Delgado, MD, Willy Zapata-Luyo, MD, Alicia Becerra, MD, Elliot Barreto, MD, Miguel F. Arango, MD, and Jorge G. Burneo, MD, MSPH

Correspondence
Dr. Steven
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Neurology® 2018;91:368-370. doi:10.1212/WNL.0000000000006029

Fighting Against Stroke in Latin America: A Joint Effort of Medical Professional Societies and Governments

frontiers in Neurology

October 2021 | Volume 12 | Article 743732

Sheila Cristina Ouriques Martins[1,2,3,4*], *Pablo Lavados*[5], *Thais Leite Secchi*[1,2,3], et al

- 2018: First Latin American Stroke Ministerial Meeting
- Stroke physician and healthcare manager representatives from 13 countries signed the Declaration of Gramado.
- 2020 results:
  - **Public stroke awareness initiatives increased from 25% to 75%**
  - **All countries have started programs to encourage physical activity**
  - **Increase in strategies to identify and treat hypertension, diabetes and lifestyle risk factors**
  - **Stroke centers increased from 322 to 448: thrombolysis and mechanical thrombectomy**
  - **Telemedicine has increased but is restrictive to few hospitals**
  - Pre-hospital organization remains limited
  - Patient have late, if any, access to rehabilitation after hospital discharge

ICU – EEG

LATINAMERICAN BRAIN INJURY CONSORTIUM (LABIC) TERAPIA NEUROINTENSIVA EN LATINOAMÉRICA

Curso de Neuro ICU - EEG

Directora del curso

Clio Rubinos MD, MSCR – University of North Carolina

Ponentes

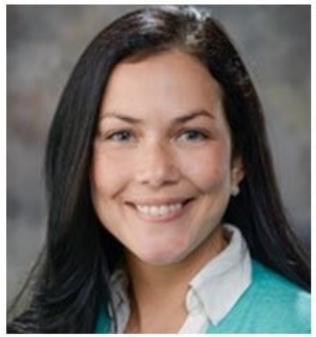
Maria Jose Bruzzone MD, MSCR – University of Florida

Andrea Lowden MD – University of Texas Southwestern Medical Center

Andres Rodriguez MD, FACNS– Emory University

Clio Rubinos MD, MSCR – University of North Carolina

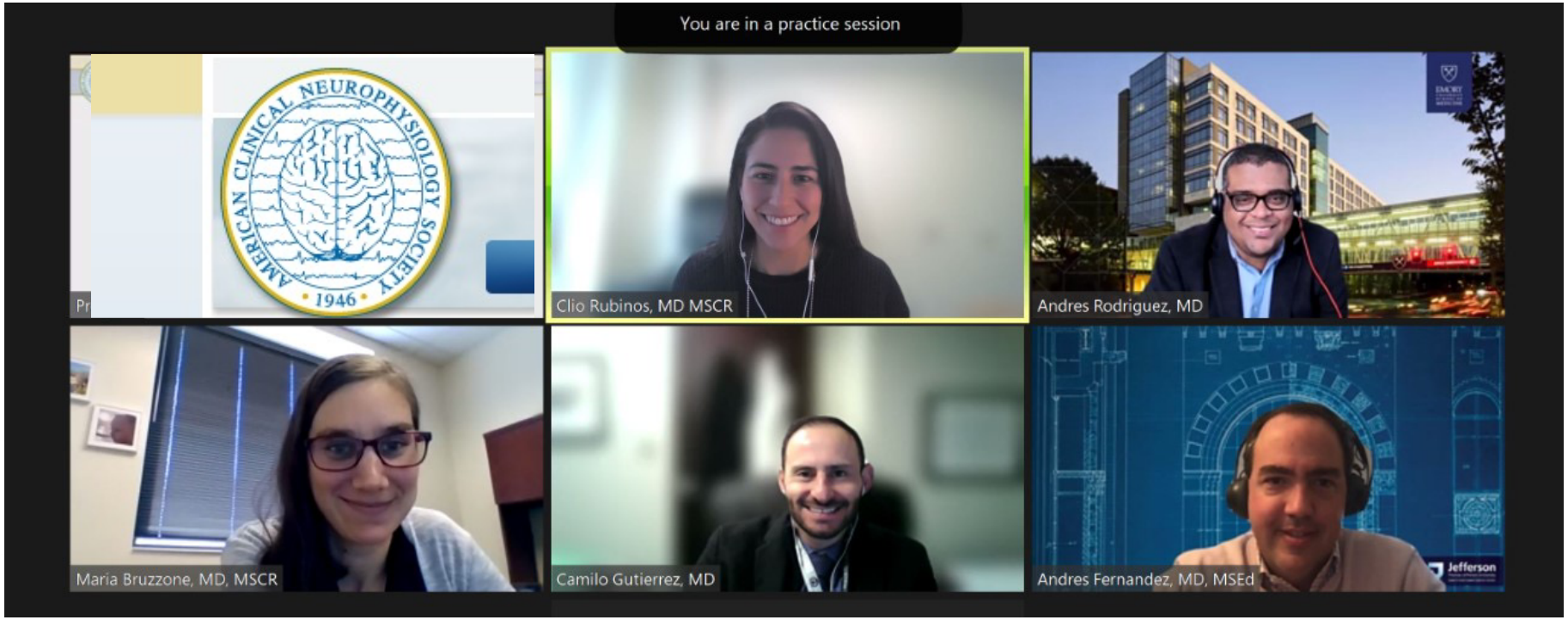
ACNS ENDORSED SYMPOSIUM

ACNS GUIDELINE

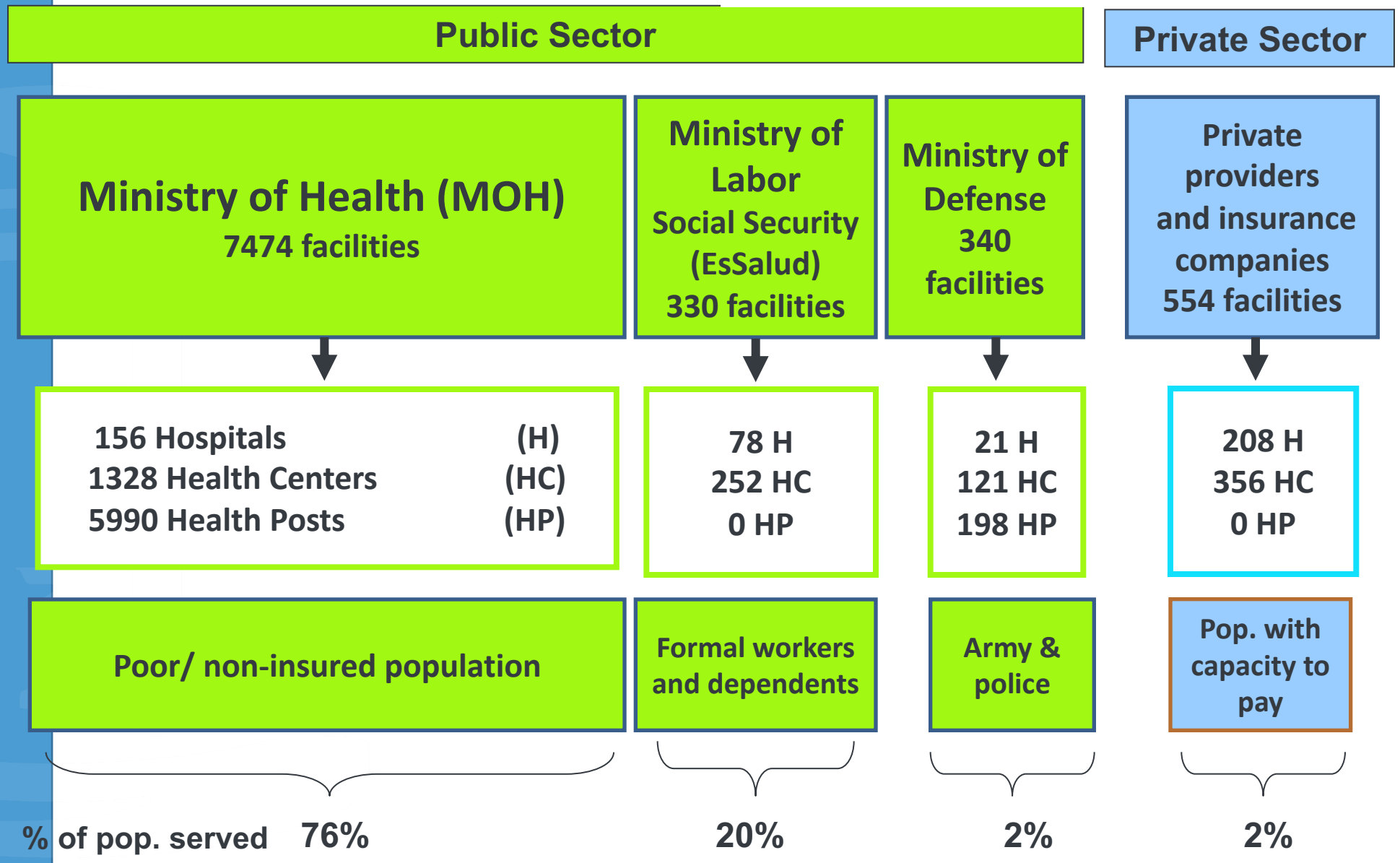
American Clinical Neurophysiology Society's Standardized Critical Care EEG Terminology: 2021 Version

Lawrence J. Hirsch,* Michael W.K. Fong,† Markus Leitinger,‡ Suzette M. LaRoche,§ Sandor Beniczky,‖ Nicholas S. Abend,¶ Jong Woo Lee,# Courtney J. Wusthoff,** Cecil D. Hahn,†† M. Brandon Westover,‡‡ Elizabeth E. Gerard,§§ Susan T. Herman,‖‖ Hiba Arif Haider,§ Gamaleldin Osman,¶¶ Andres Rodriguez-Ruiz,§ Carolina B. Maciel,## Emily J. Gilmore,* Andres Fernandez,*** Eric S. Rosenthal,††† Jan Claassen,‡‡‡ Aatif M. Husain,§§§ Ji Yeoun Yoo,‖‖‖ Elson L. So,¶¶¶ Peter W. Kaplan,### Marc R. Nuwer,**** Michel van Putten,†††† Raoul Sutter,‡‡‡‡ Frank W. Drislane,§§§§ Eugen Trinka,‡ and Nicolas Gaspard‖‖‖‖



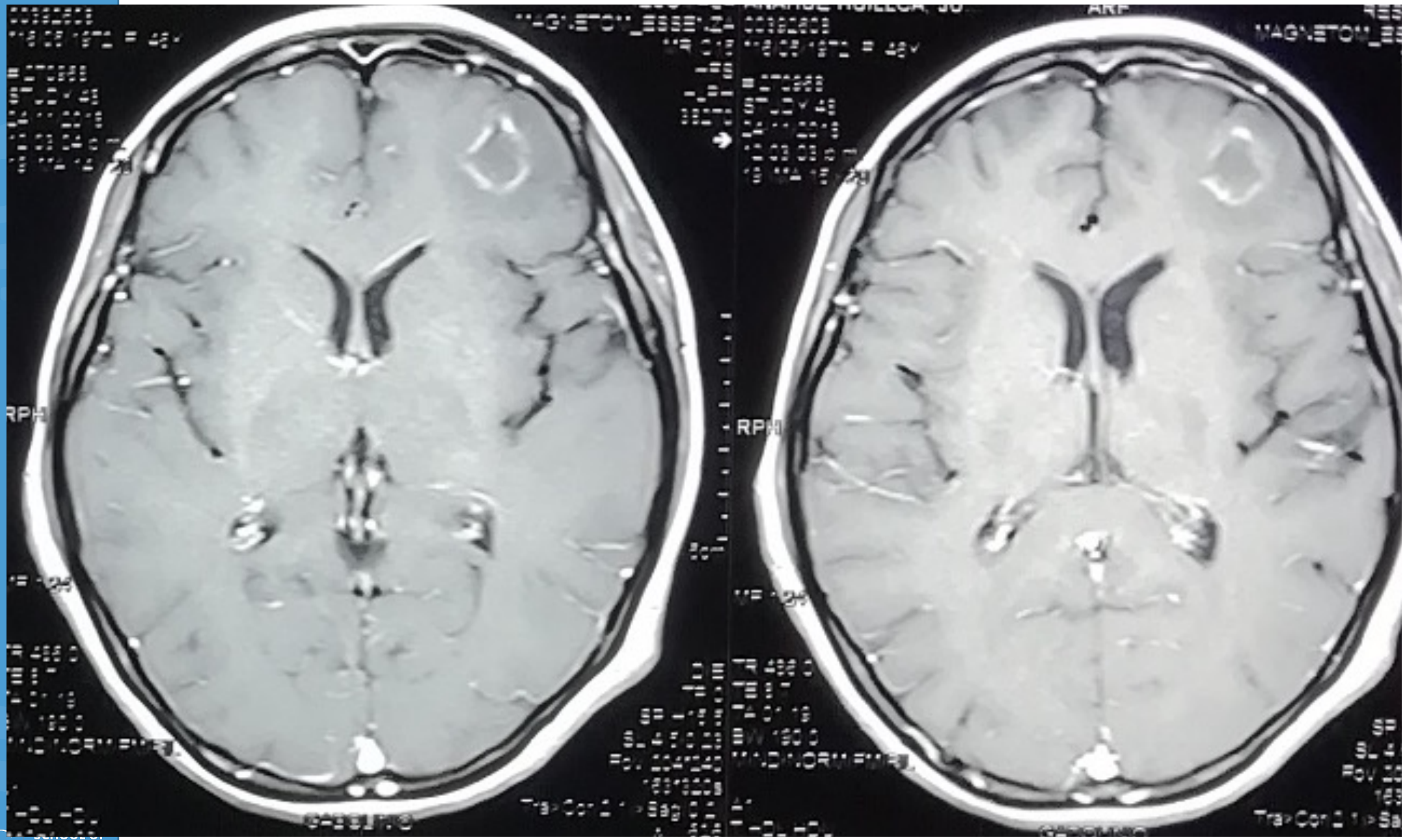
One world, two realities

Health system in Peru



Hospital Cayetano Heredia
Lima, Peru

- Ministry of Health public tertiary referral hospital
- The largest neurology department in Peru
- One CT scanner, no MRI scanner, one EEG machine; many medications not available in-hospital



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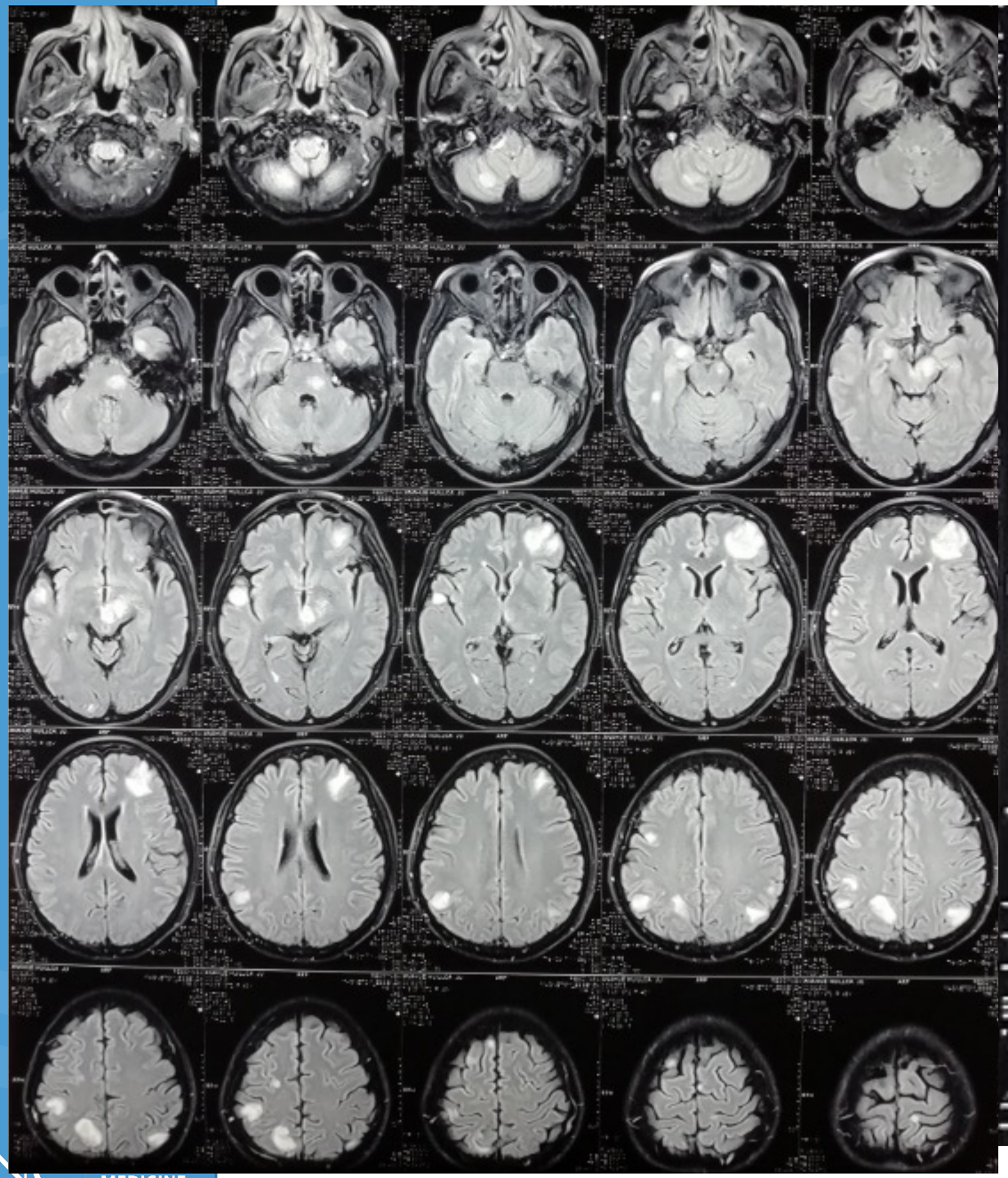

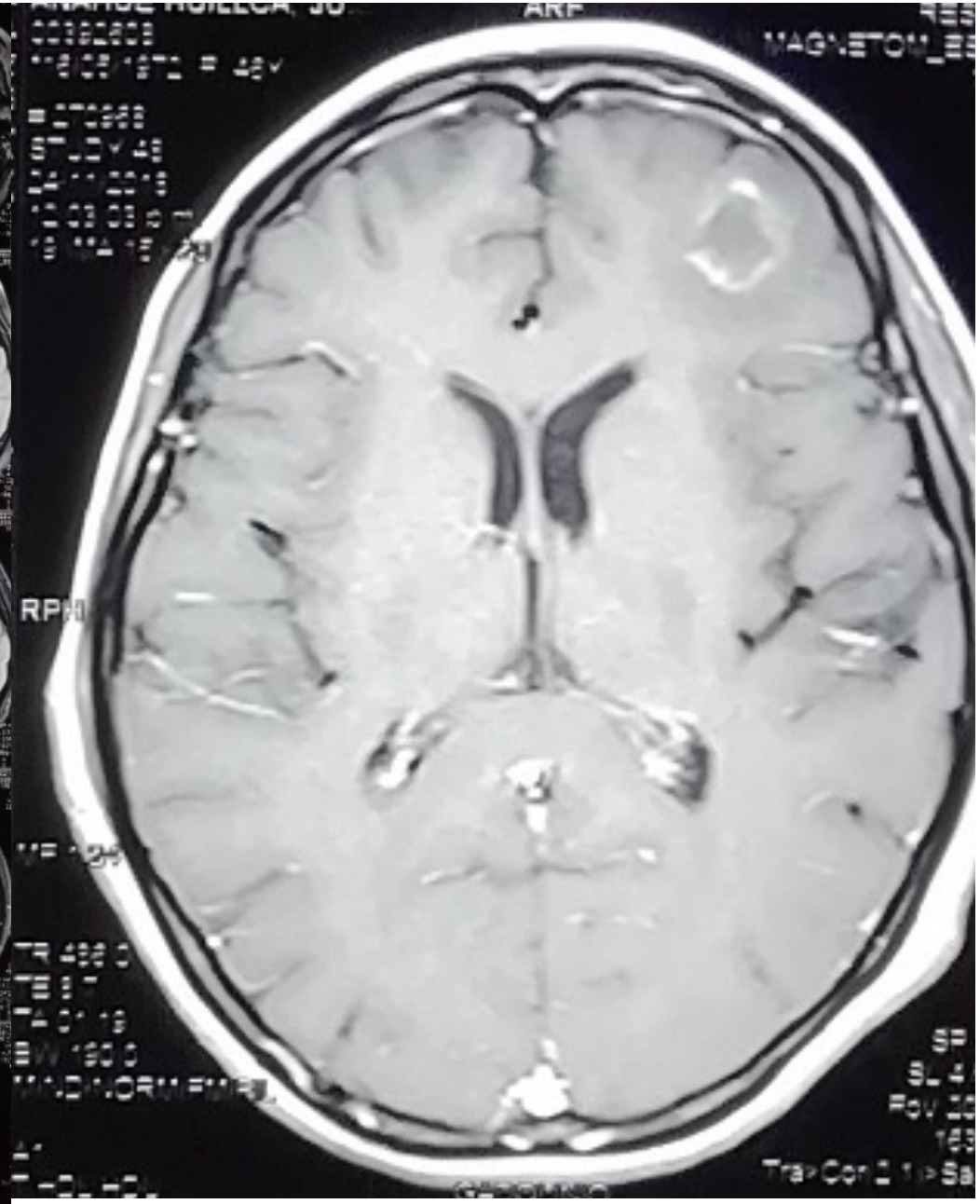

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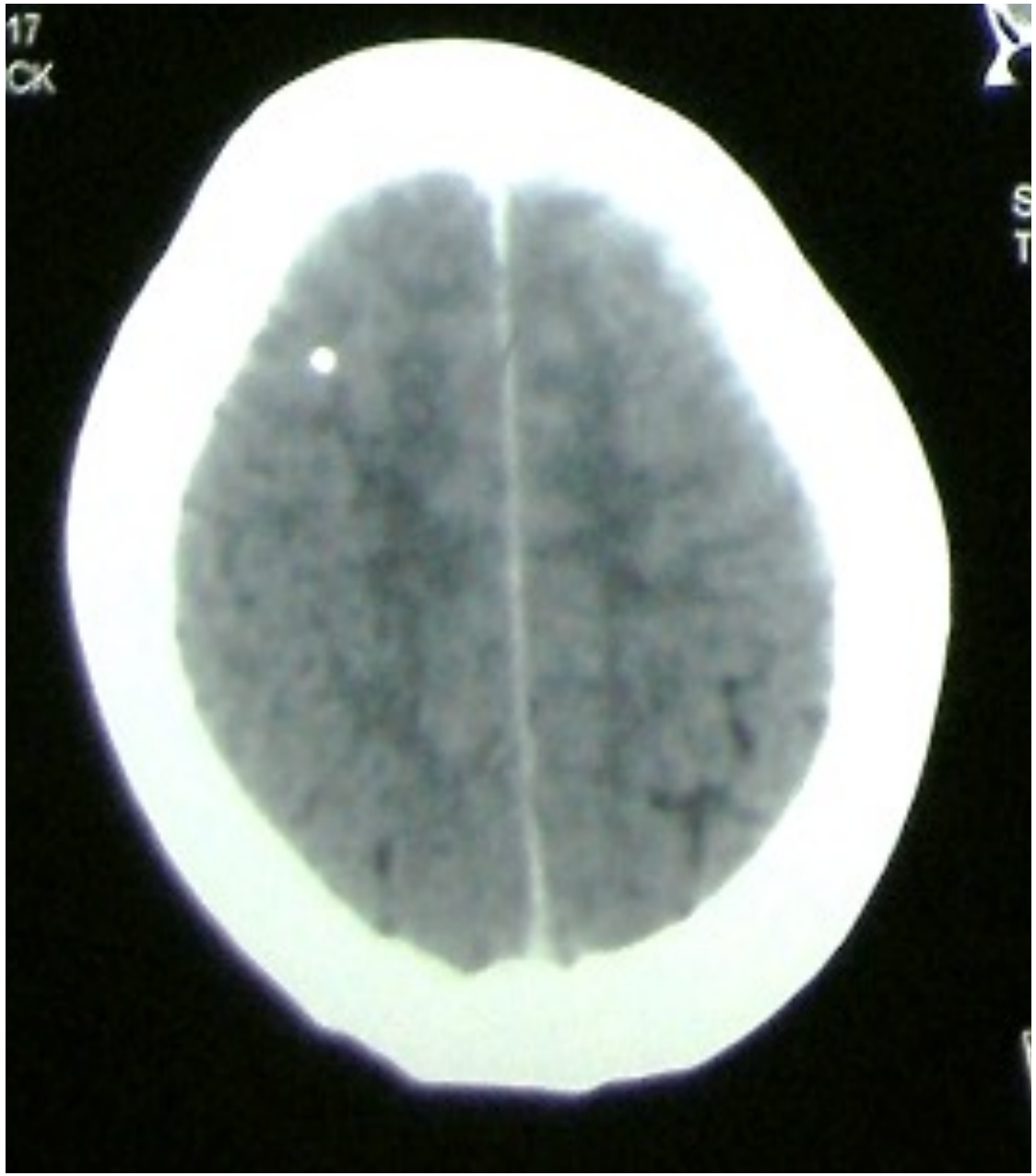
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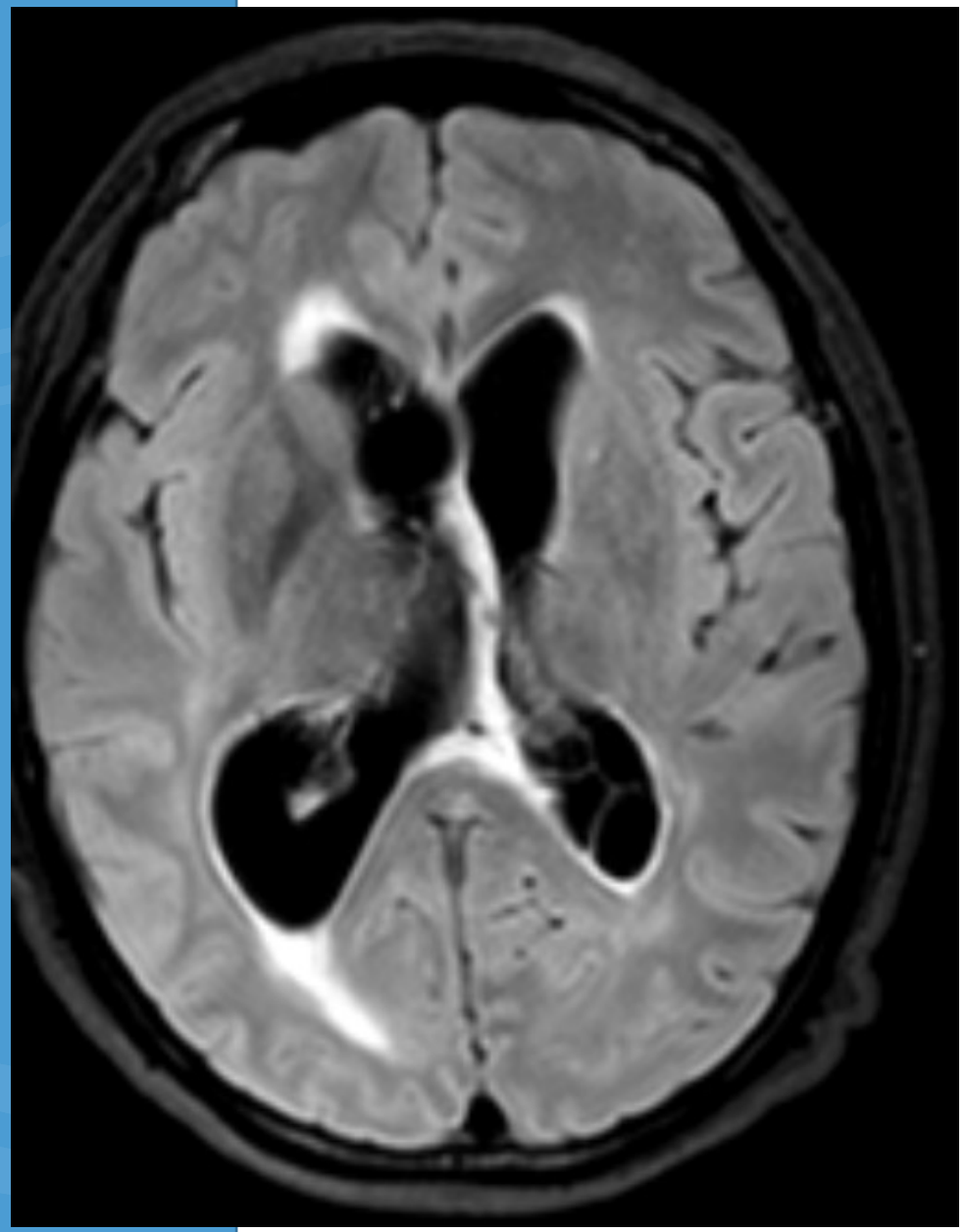
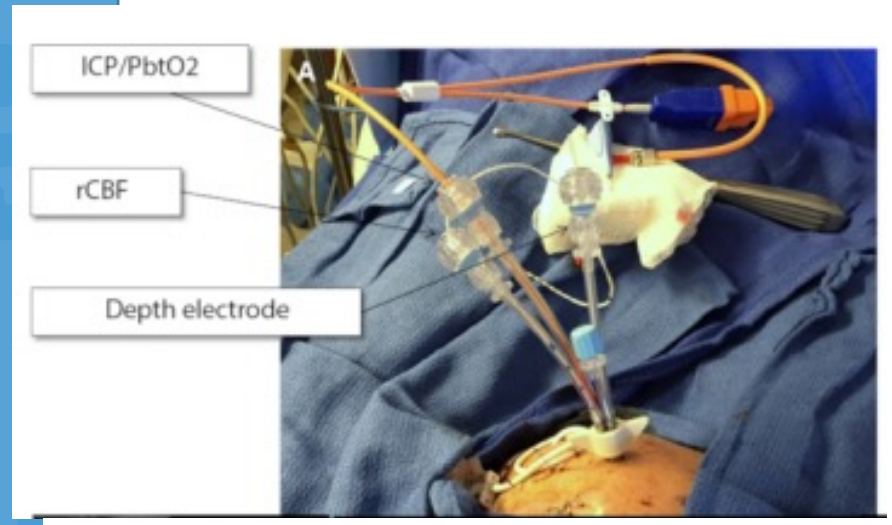
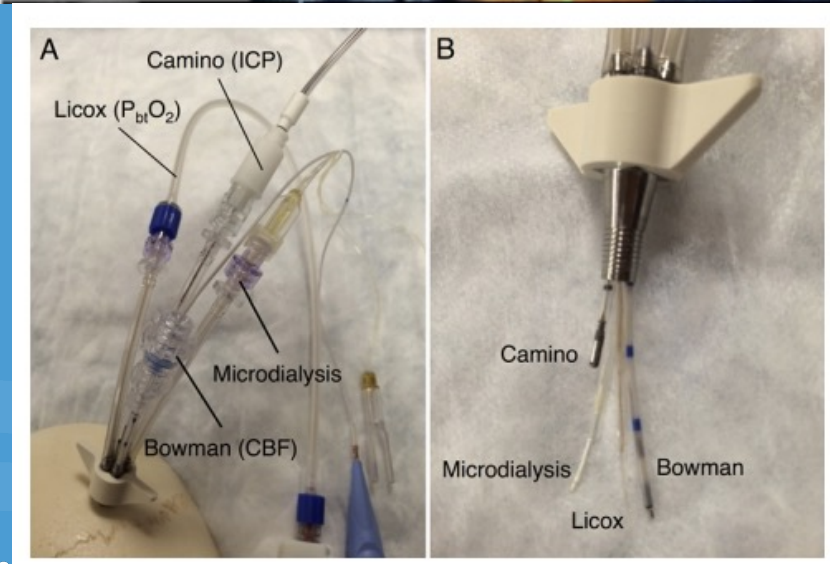
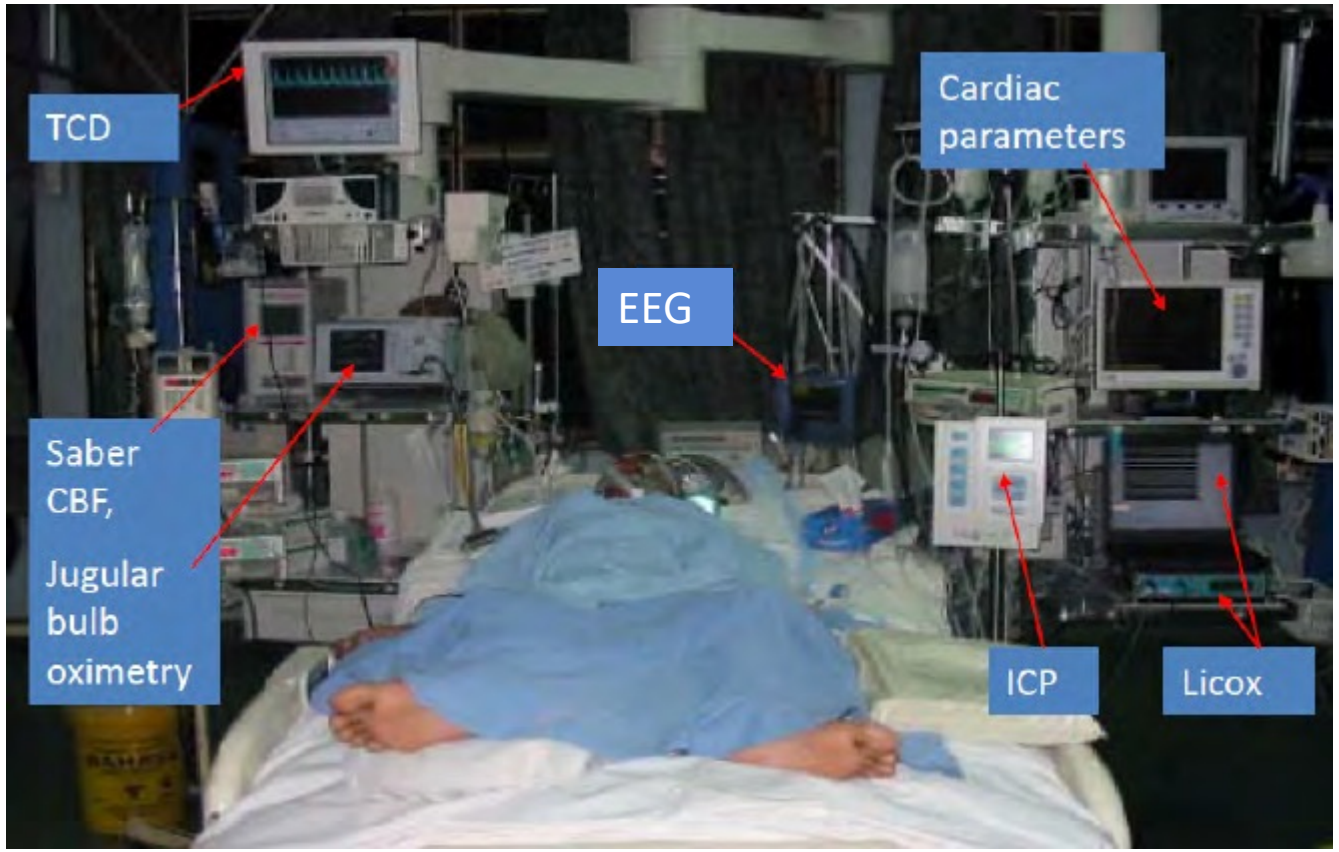


Neurocritical care in USA…







Medicine in USA…

RESEARCH ARTICLE Open Access

Why clinicians overtest: development of a thematic framework

Justin H. Lam*, Kristen Pickles, Fiona F. Stanaway† and Katy J. L. Bell†

Lam *et al. BMC Health Services Research* (2020) 20:1011
https://doi.org/10.1186/s12913-020-05844-9

Inappropriate laboratory testing in internal medicine inpatients: Prevalence, causes and interventions

B.E.L. Vrijsen[a,*], C.A. Naaktgeboren[b], L.M. Vos[a], W.W. van Solinge[c], H.A.H. Kaasjager[a], M.J. ten Berg[c]

[a] *University Medical Center Utrecht, Department of Internal Medicine, Utrecht, the Netherlands*
[b] *Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht University, Utrecht, the Netherlands*
[c] *University Medical Center Utrecht, Laboratory of Clinical Chemistry and Haematology, Utrecht, the Netherlands*

Annals of Medicine and Surgery 51 (2020) 48–53

Increasing Out-of-Pocket Costs for Neurologic Care for Privately Insured Patients

Chloe E. Hill, MD, MS, Evan L. Reynolds, PhD, James F. Burke, MD, MS, Mousumi Banerjee, PhD, Kevin A. Kerber, MD, MS, Brandon Magliocco, MS, Gregory J. Esper, MD, MBA, Lesli E. Skolarus, MD, MS, and Brian C. Callaghan, MD, MS

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Neurology® 2021;96:e322-e332. doi:10.1212/WNL.0000000000011278

Why Bidirectional Exchange?

- Strengthen ethical partnership
- Allow for education of global workforce
- Empower trainees to be agents of change at their home institutions
- Improve training and opportunities at hosting institutions

Carving a path to global neurology

Carving the path to a global neurology career

Global Health Program for Fellows and Scholars

NIH Fogarty International Center

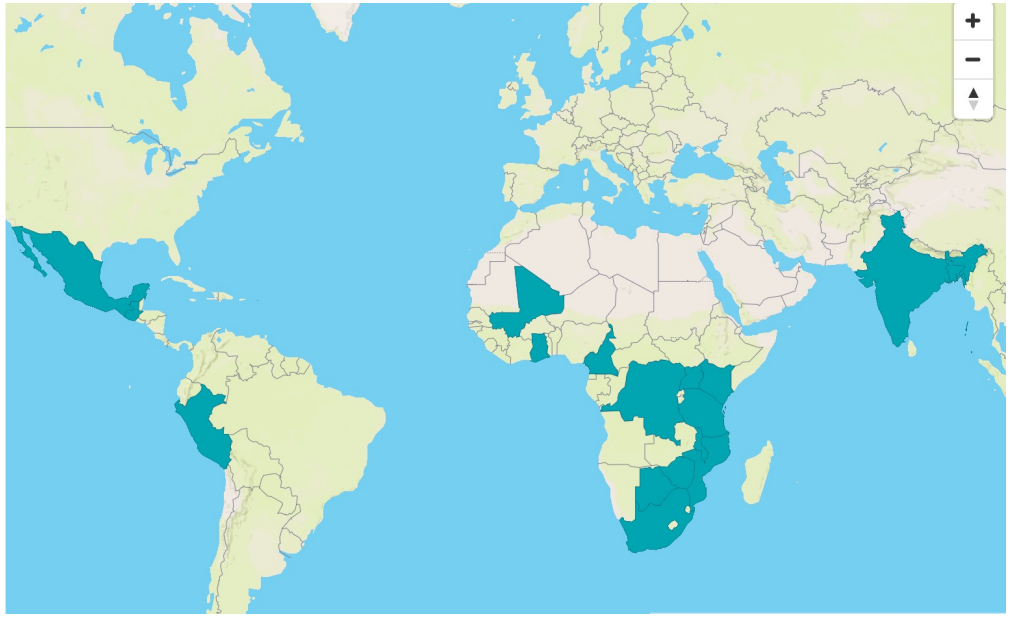
UNIVERSITY OF CALIFORNIA Global Health Institute

UJMT Fogarty Global Health Fellowship

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

Applications for the 2021-2022 cycle are now closed. Check back in September 2021 for next year's application cycle. Thank you!

- Supports a 12-month, mentored research fellowship for investigators in HIC and LMIC
- Many training sites available



Peru

Fellowship Mentors:

Dr. Patricia Garcia Cayetano Heredia

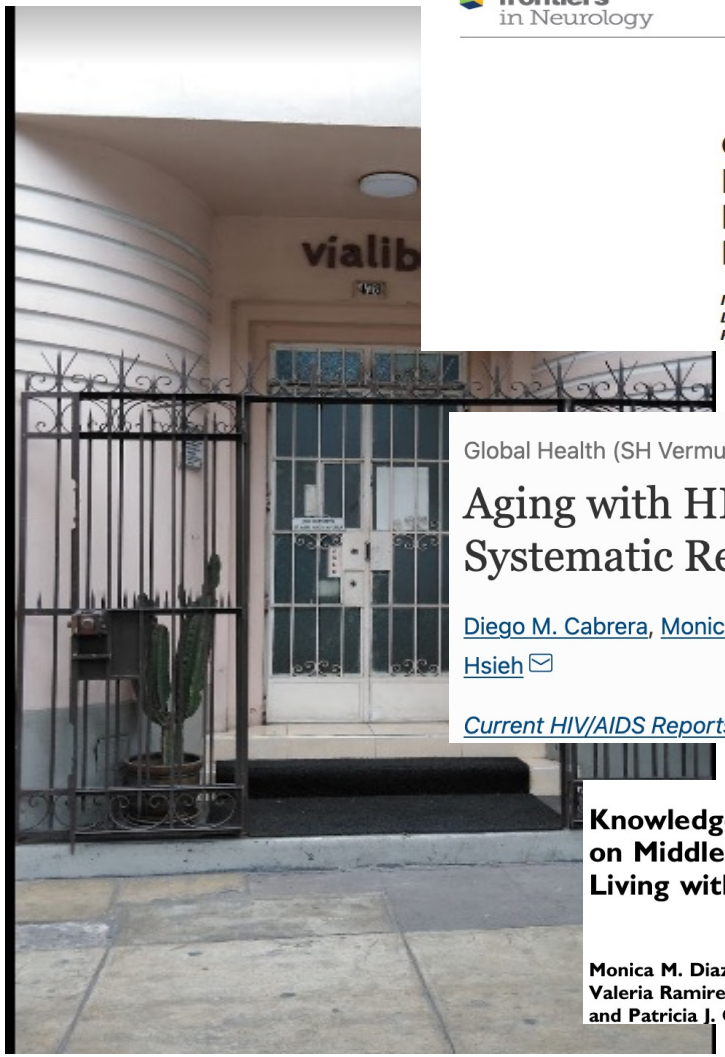
Dr. Serggio Lanata UCSF

UNC SCHOOL OF MEDICINE

UNC/UPCH Research Efforts in Peru

HIV-associated neurocognitive disorder in older Peruvians

vialibre



frontiers in Neurology

ORIGINAL RESEARCH
published: 17 June 2021
doi: 10.3389/fneur.2021.629257

Characterization of HIV-Associated Neurocognitive Impairment in Middle-Aged and Older Persons With HIV in Lima, Peru

*Monica M. Diaz[1,2,3], Marcela Gil Zacarías[4], Patricia Sotolongo[5], María F. Sanes[4], Donald J. Franklin[6,7], María J. Marquine[6,7], Mariana Cherner[6,7], Cesar Cárcamo[3], Ronald J. Ellis[6,8], Serggio Lanata[9,10] and Patricia J. García[3,11]**

HIV+ Peruvian patients

ce of cognitive impairment
impairment

Global Health (SH Vermund, Section Editor) | Published: 05 January 2021

Aging with HIV in Latin America and the Caribbean: a Systematic Review

Diego M. Cabrera, Monica M. Diaz, Alyssa Grimshaw, Justina Salvatierra, Patricia J. Garcia & Evelyn Hsieh

Current HIV/AIDS Reports **18**, 1–47 (2021) | Cite this article

Knowledge and Impact of COVID-19 on Middle-Aged and Older People Living with HIV in Lima, Peru

Journal of the International Association of Providers of AIDS Care
Volume 20: 1-8

DOI: 10.1177/23259582211056760
journals.sagepub.com/home/jia
SAGE

Monica M. Diaz[1,2,*], Diego M. Cabrera[2,3,*], Marcela Gil-Zacarias[2], Valeria Ramirez[2], Manuel Saavedra[2], Cesar Cárcamo[2], Evelyn Hsieh[3], and Patricia J. Garcia[2]

Characterization of non-traumatic spinal cord disorders in Lima, Peru

- U.S. mentor on Fogarty fellowship application- applied this year
- Characterize the the population with **non-traumatic spinal cord disorders** living across 4 hospitals of Lima, Peru.
- Ongoing study …

Dr. Cristoper Alarcon Ruiz
Post-medical graduate
Universidad Científica del Sur (Lima,Peru)

COVID-19 related cognitive impairment in Peru

- Co-mentor on current Fogarty fellowship
- Characterize the burden of cognitive impairment ("brain fog") after COVID-19 infection in Lima, Peru
- Ongoing study …

Dr. Hanalise Huff
Pediatric neurologist
Harvard Medical School

Stroke in the setting of COVID-19 infection among patients attending a public hospital in Lima, Peru

Monica M. Diaz[1,2], Ana P. Ramos[1,3], Mireya A. Cuba[1,3], Katy Icumina[1,3], Jimmy Palacios-García[1,3], Mellany Tuesta[1,3], José A. Bernaola[1,3], Etbert Pizarro[1,3], Yhofre F. Barboza[1,3], Nestor E. Najar[1,3], Hugo F. Umeres[1,3]

[1]Neurology Investigation Unit, Universidad Peruana Cayetano Heredia (Lima, Peru); [2]Department of Neurology, University of North Carolina at Chapel Hill School of Medicine (Chapel Hill, NC, USA); [3]Department of Neurology, Hospital Cayetano Heredia (Lima, Peru)

Introduction

- In Peru, nearly 1.5 million people infected by SARS-CoV-2 with nearly 50,000 reported deaths as of March 2021.[1,2]
- Neurologic complications of COVID-19 are more common in patients with severe COVID-19 infection.[3]
- Stroke is one of the most common comorbidities in patients with severe COVID-19.[4]
- Stroke mechanisms in COVID-19 infection include: hypercoagulability, hypoxemia, or increased inflammation[5]
- Few studies from Latin America have reported the prevalence of neurological syndromes, including stroke, with COVID-19.

Objectives

In an urban public hospital of Lima, Peru we sought:

- Prevalence of stroke
- Characterize demographics, imaging findings and stroke symptoms associated with COVID-19

Figure 1. Study site.

Methods

- Prospective cohort study of patients presenting to a public tertiary care hospital in **Lima, Peru** (Hospital Cayetano Heredia) between May and October 2020.
- ***Inclusion Criteria:***
  - Adults age>=18 years
  - Positive COVID-19 test (IgG serology or PCR)
  - Neurological syndrome by clinical symptomatology, neurological examination and/or neuroimaging within 14 days of positive COVID-19 test
  - Provide verbal consent (next-of-kin if patient did not have capacity)
- ***Study Procedures-*** The following data were collected on all participants: Demographic, clinical, laboratory testing (CBC, CMP, D-dimer), neuroimaging (MRI or CT)
  - All participants underwent complete neurological evaluation performed by a study neurologist
  - 1-month follow-up data on clinical status was obtained by phone after hospital discharge
- ***Statistical analysis:*** Descriptive statistics were performed to characterize the cohort.

Results

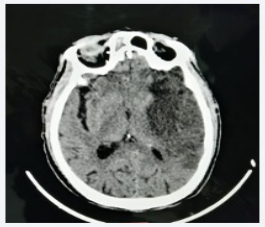


Figure 2. Large Left MCA infarct with COVID IgG+. *83M with PMH hypertension presented with right hemiplegia, COVID IgG+ with large left MCA territory ischemic infarct.*

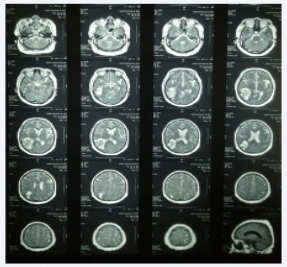


Figure 3. Post-infectious hemorrhagic infarct after suspected Guillain Barre. *44F previously health presented with subacute flaccid quadriplegia and b/l facial paralysis, COVID serology+, Guillain Barre syndrome suspected. Strength improved and 1.5 months into hospitalization, developed left-sided weakness, found right parieto-occipital hemorrhage. Malignancy and ischemic stroke work-up were unrevealing.*

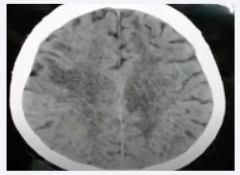


Figure 4. Bilateral ischemic infarcts with COVID PCR+, no respiratory symptoms. *55M hx ERDS, COVID PCR+, presented with altered mental status, L-sided weakness, dysarthria x 1 day.*

- **40 participants** met inclusion criteria
  - 29 (72.5%) had a **stroke** (nearly all ischemic)
    - 21/29 (72.4%) confirmed on neuroimaging
    - 8/29 (27.6%) had high clinical suspicion but no neuroimaging available
  - Nearly 90% of participants had COVID serology only
    - *SARS-CoV-2 PCR testing largely unavailable in public hospitals in Lima*
- Nearly half had **no COVID-related respiratory symptoms**
- Only **2 patients were hospitalized in the ICU** (due to lack of available ICU beds)
- **About one-third of stroke patients died during hospitalization**
- An additional 2 patients died after hospital discharge at 1-month follow-up.

Results

	Participants with stroke (n=29)
	Median [IQR], Mean (SD), or n (%)
Demographic Variables	
Age (years)	62.3 (14.0)
Sex (% female)	15 (51.7%)
SARS-CoV-2 serological (IgG) test	26 (89.7%)*
COVID respiratory symptoms	14 (48.3%)
Severe pneumonia on Chest X-ray	9/19 (47.4%)*
Median hospitalization time (days)	14 [7, 26]
Stroke Imaging findings & Symptoms	
Ischemic infarct	25/27 (92.6%)
Large or multiple territory infarct	11/27 (40.7%)
Focal motor deficit	25 (86.2%)
Focal sensory deficit	8 (27.6%)
Headache	10 (34.5%)
Vertigo	4 (13.8%)
Altered mental status	19 (65.5%)
Ataxia	8 (27.6%)
Seizure	7 (24.1%)
Hypogeusia	5 (17.2%)
Hyposmia	7 (24.1%)
Visual disturbance	5 (17.2%)
Clinical Outcomes	
In-hospital mortality	10 (34.5%)
Admitted to ICU	2 (6.9%)

*Note: PCR testing was largely unavailable in public hospitals in Lima, Peru at the time of this study; Chest X-ray was obtained in 19 participants

Conclusions

- Limitations: Majority of participants did not have PCR testing as PCR was largely unavailable in public hospitals in Peru at the time of this study. This was a convenience sample of patients.
- **Large ischemic stroke, involving multiple vascular territories, was a common complication** among a small cohort of patients with neurological symptoms with COVID-19 infection.
- **Mortality rate (more than 30%) is high** in patients with acute stroke and COVID-19 infection in a public hospital in Lima, Peru likely due to **few ICU bed availability** and later presentation to the hospital.

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UNIVERSIDAD PERUANA CAYETANO HEREDIA

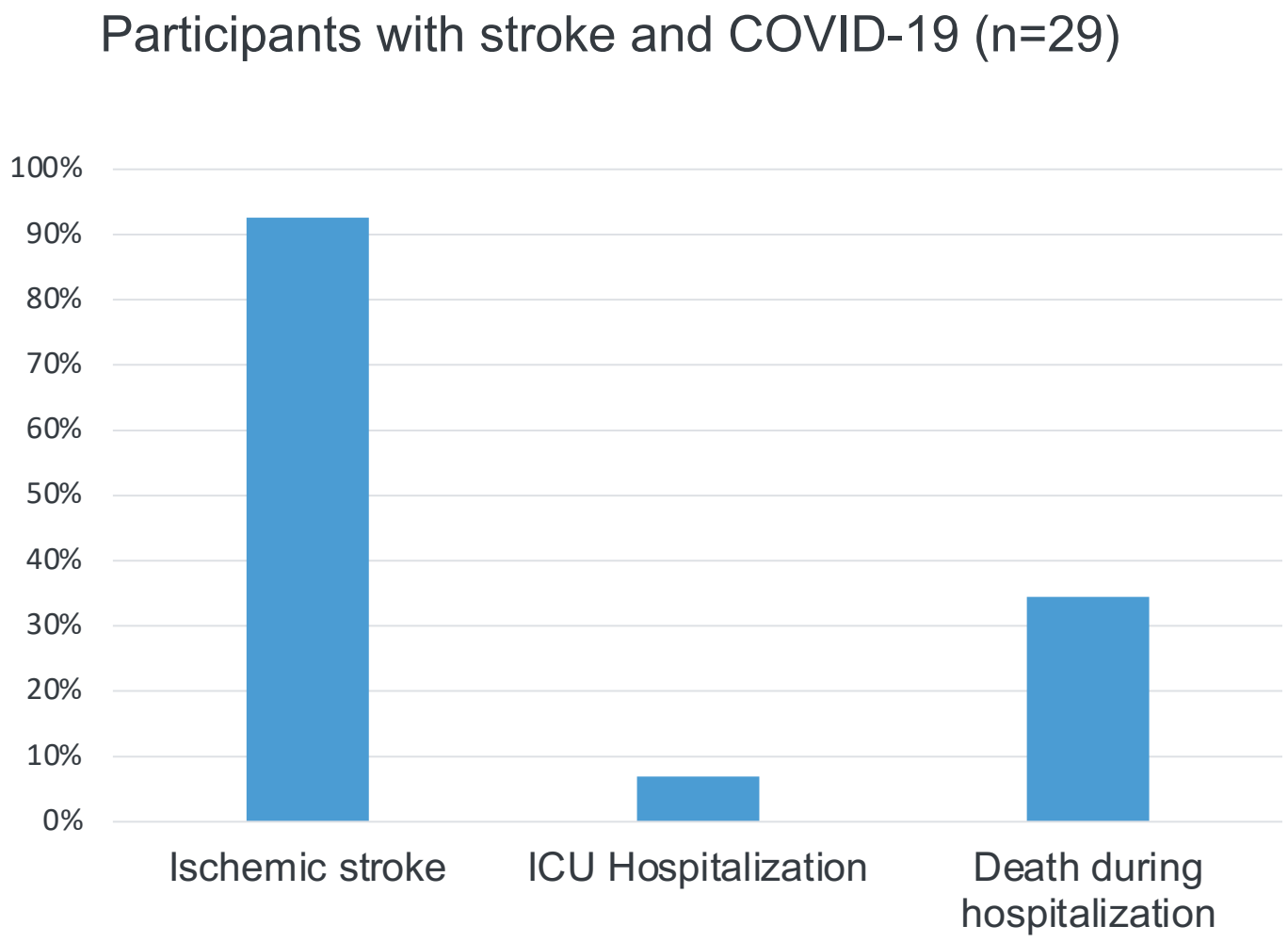
Dept of Neurology, Cayetano Heredia Hospital

Dr. Ana Ramos

UNC SCHOOL OF MEDICINE

Presented at AAN Annual meeting 2021

Stroke in the setting of COVID-19 infection among patients attending a public hospital in Lima, Peru



Presented at AAN Annual meeting 2021

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How can neurologists and trainees get involved in global health?

Overall Purpose:

- Create a community of neurologists and researchers working in global neurology
- Facilitate neurologic training of healthcare workers globally
- Serve as a resource for students and trainees at all levels interested in short-or long-term global neurology experiences

Neurology organizations with global health interests

Table 1 Neurology-specific organizations with global interest

Alliance for Stroke Awareness and Prevention Project	www.asapp.org
Alzheimer's Disease International	www.alz.co.uk/1066
Brigada Neurologica to the Ecuadorian Amazon Rain Forest	www.cien-ecuador.org
CLIDEP: Clinique d'Epilepsie de Port-au-Prince (French or Creole language skills required)	www.clidep.org
European Federation of Neurological Societies	www.efns.org
European Neurological Society	www.ensinfo.org
Global Health Section, American Academy of Neurology	www.aan.com/go/about/sections/global
Global NeuroCare	www.globalneurocare.org
Global neurology elective in Zambia; Beth Israel Deaconess Medical Center	e-mail Dr. Omar Siddiqi: osiddiqi@bidmc.harvard.edu
India Control Epilepsy	www.facebook.com/EpilepsyIndia
Infectious and tropical neurology rotation in Kenya, Uganda, and Morocco	e-mail Dr. David Renner: david.renner@hsc.utah.edu
International Brain Research Organization	www.ibro.org
International Bureau for Epilepsy	www.ibe-epilepsy.org
International Child Neurology Association	www.icnapedia.org
International League Against Epilepsy	www.ilae.org
Lifting the Burden	www.l-t-b.org
Movement Disorder Society Visiting Professor Program	www.movementdisorders.org/education/visiting/
Movement for Global Mental Health	www.globalmentalhealth.org
Neurology Capability Development, Oceania University of Medicine/ Samoa National Health Service	e-mail Drs. Viali Lameko or Logan McDaneld: viali.lameko@oum.edu.ws; Logan.mcdaneld@stmarygj.org
Neurology residency rotation in Ethiopia	www.globalneurocare.org
Neuropathic Pain Special Interest Group	www.neupsig.org
Tropical neurology rotation in India	e-mail Dr. Mamta Singh: mbsneuro@gmail.com
World Federation of Neurology	www.wfneurology.org
World Neurology Foundation	www.worldneurology.org
World Stroke Organization	www.world-stroke.org/

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Global Health in Neurology Rotation in Peru: UNC-UPCH exchange

Goals of Rotation

- To gain **hands-on experience of the practice of neurology** in global health settings
- To understand the **epidemiology, presentation, approach to diagnosis and treatment** of common neurological disorders in global health settings
- To understand the **social, political and economic forces within countries** and international relations that guide healthcare funding and delivery

Global Health in Neurology Rotation: UNC-UPCH

- Rotating Resident will work 2 weeks per rotation with the neurology consult team **(4 weeks total)**
- **<u>UNC Resident will rotate in</u>:**
  - **Neuroinfectious diseases** in the infectious disease department (Tropicales)
  - **Neurological emergencies** in ICU
  - **Stroke** in ER at Hospital Cayetano Heredia
  - Option to rotate in the **Neurogenetics clinic** at Hospital Mogrovejo (INCN)

UNIVERSIDAD PERUANA CAYETANO HEREDIA

Instituto Nacional de Ciencias Neurológicas

UNC DEPARTMENT OF NEUROLOGY

Dr. Jimmy Palacios
(Stroke)

Mario Cornejo, MD

(Neurogenetics, INCN)

Dr. Ana Ramos
(Neuro-ID/Neuroimmunology)

Dr. Omar Heredia
(NeuroICU)

Global Health in Neurology Rotation: UNC-UPCH

Structure of Rotation:

- Mornings: Attend UPCH neurology inpatient consult team rounds every morning
- Afternoons (3/week): carrying out the plan for the day with the team **neurology residents**
- Afternoons (2/week): shadow preceptors in **outpatient neurology clinics**
- Optional (Wednesdays): Outpatient neurogenetics clinic in the National Institute of Neurological Sciences

Global Health in Neurology Rotation: UNC-UPCH

Other Activities:

- Attend UPCH **neurology resident didactics** & case discussions
- **Give 2 Grand Rounds** presentations (in English) at UPCH & UNC neurology departments where residents & faculty from each institution will be invited.

Global Health in Neurology Rotation: UNC-UPCH

- **Pre-requisites for rotation:**
  - Contact Dr. Rubinos and Dr. Diaz at the beginning of the academic year
  - **At least a beginner's Spanish level**
  - Meet UNC resident travel requirements: https://www.med.unc.edu/oia/resident-travel-requirements/
- **After completion of rotation:**
  - Complete neurology rotation evaluation
  - Complete preceptor evaluation

Vision for the Future…
UNC Global Neurology Track

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Specific requirements would include:

- **PGY-2/3 into PGY-4 year, preferred**
- International clinical experiences: UPCH-UNC neurology rotation
- Global Health course (PUBH 710: Global Health Ethics; or PUBH 711: Critical Issues in Global Health; or
- Tropical Medicine Elective (offered through Gillings School of Global & Public Health)
- Present at a quarterly Global Neurology Journal Club
- Scholarly work: a manuscript prepared for journal submission.
  - Policy brief, case series, research project, or development of diagnosis or management guidelines for a global health setting
  - Attendance and preferably presentation of work at a conference with global perspective, such as the World Federation of Neurology or the American Academy of Neurology

Global Health in Neurology Rotation: UNC-UPCH

- **<u>UPCH Neurology Resident opportunities:</u>**
  - **4 weeks**
  - Rotate with UNC neurology consult and inpatient teams for 3 weeks
  - Shadow Dr. Diaz in neuroimmunology clinic or epilepsy, stroke or movement disorders clinics for 1 week
  - Give noon lecture to UNC residents on topic of choice
  - <u>Optional:</u> Become involved in a PI's research project

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