THE TROPICAL MEDICINE NOMENCLATURE FOR COVID-19

Remigius Okea, MD MPH FAAFP FAAPCR

Research Director American Academy of Primary Care Research

Introduction

The Wuhan Respiratory Coronavirus Pandemic (WuRCoP), aka COVID-19 is changing the way we look at diseases, blunting along its paths the geographical partitioning of diseases as either tropical or non-tropical. The world has seen these signs coming with the SARS-CoV epidemic of 2002 – 2003[1,2,3] that also was unbound by geography and in 2012 with the MERS-CoV [4,35,36] epidemic we learnt, again, that tropical-like diseases can exist and even originate from any part of the world and behave in the same in any human population. In 2014 Ebola Virus Disease (EVD) ravaged West African, first of such outbreak in that part of Africa since our recollection of human history. That Ebola epidemic showed a clear demonstration that geographical quarantine of disease is no longer a dependable option for the world to control potential pandemics. Ebola spread to West Africa and the rest of the world unexpectedly in 2014 to 2015 [5,6,7] and never before then spread this wide. A world currently intertwined by tight webs around all countries, defied of geography and with humans acting as quantum matter, moving all over that web, these emerging diseases are redefining what we call tropical disease. There is no bound anymore. Humans cannot separate from one another in the virus world, these viral nano particles as self-replicating machines do not tell the difference between people, between places and between geography. Coronavirus cannot tell the difference between race and ethnicity, between rich and poor, and between young and old. This then brings me to the subject matter of this paper, Tropical Medicine. Experience gathered studying tropical diseases is become a veritable tool that we can implore in the fight against pandemics caused by viral machines such as WuCoP aka COVID-19.

The Tropical Medicine Approach to Disease Nomenclature

In tropical medicine we name diseases to reflect their origin, their mode of transmission, their causative agents, and their geographical reach. This approach on nomenclature in tropical medicine ultimately describes the full impact of a disease on the human individual, the human society, and at the same time uncover mode of transmission and by extension the methods of prevention of the disease. In the case of SARS-CoV[1,2,3] its name describes the presentation of the disease, its' mode of transmission. The Middle East Respiratory Syndrome (MERS-CoV) [4] on the other hand describes the origin of the disease, its respiratory nature, and the nature of the causative agent (Coronavirus). The Spanish Flu Pandemic of 1918 to 1920 [8,9,11] was correctly named reflecting the epicenter of the disease at the time, the causative agent and mode of transmission, and tells the geographical spread of the disease, a pandemic. Philadelphia Yellow Fever Epidemic of 1793 [11] was also rightfully named reflecting the origin, the clinical presentation and the geographical spread of the disease at the time.

Other examples of disease nomenclature in tropical medicine, in recent times, reflecting the origin or place of discovery includes Lassa fever, was named after a village in Northern Nigeria called Lassa;[15,16] West Nile Virus (1937), was named after the West Nile River area in Uganda;[17] Coxsackievirus (1948), was named after the town of Coxsackie in New York;[18,19] Marburg Virus (1967), was named after the town of Marburg in Germany; [20,21] Hendra Virus (1994), was named after the town of Hendra near Brisbane in Australia.[22,23]

Ebola virus was named after Ebola River, a river near the town of Yambuku there the virus was initially identified.[24,25] Ross River virus was named after the Ross River in Northern Queensland in Australia,[26] just like Machupo virus (the Bolivian hemorrhagic fever or "black typhus") was named after a Bolivian river, Machupo.[27] Zika virus was named after the Ziika forest in Uganda in 1947.[28,29,30]

In contrast with these pattern of nomenclature in tropical medicine, the current pandemic has lacked appropriate naming and thus the world has lost appreciation of its origin, its mode of transmission, its causative agent(s) and the magnitude of its geographic penetrance in human population. Thus to reflect all these domain expressions of this virus, we shall henceforth name it as the Wuhan Respiratory Coronavirus Pandemic (WuCoP or WuRCoP), aka COVID-19. In the next paragraphs we shall focus on this tropical medicine nomenclature for this pandemic and review existing data that supports each aspect of the name.

The Wuhan Origin

In November 17th 2019, a 55 ye ar old individual from Hubei province of China accounts for the earliest known case of the Wuhan Respiratory Coronavirus Pandemic (WuCoP).[13] Wuhan is in Hubei province of China. Some Chinese doctors at Jinyintan Hospital in Wuhan China began to diagnose and treat several earlier cases of WuCoP by Dec 1st 2019.[14] From Wuhan China cases spread to the rest of the world.[12]

On 20 January 2020, National Focal Point (NFP) for Republic of Korea reported the first case of novel coronavirus in the Republic of Korea to WHO.[12] Also by this date China had 278 cases, Thailand 2 cases, Japan 1 case, and Republic of Korea 1 case was reported, however according to WHO the cases from Thailand, Japan, and Korea were all traced back Wuhan China.[12]

Therefore Wuhan will stand as the origin of the virus.[8,10,11,12,13]

From epidemiological point of view we need to study the environmental conditions and specie interaction in Wuhan that enabled this virus to spillover to human population. This understanding is necessary to prevent the next pandemic coming out of China.

The Respiratory Symptoms and Mode of Transmission

Patients with WuRCoP may present with fever, cough and fatigue, shortness of breath, chest tightness and respiratory failure.[31] The symptoms can range from mild disease to acute severe cardiorespiratory failure within 2 to 14 days of exposure to the virus. Sore throat, runny nose, body aches, headache, vomiting, diarrhea, loss of taste and loss of smell may also be presentations of the disease.[32] Some have also called the Coronavirus a great imitator of symptoms.[32]

The WuRCoP has found a way to infect humans efficiently making its transmission at times innocuous. First the virus has found a way to infect people even before its initial victims become symptomatic, second it found a way to survive on surfaces hiding as a contagion that finds victims that touch such surfaces, and thirdly studies are still ongoing on aerosolized viral particles to understand the physical factors driving its infective mechanisms. At this time it is clear that respiratory inoculation and viral implantation by touching the mucus membranes of the eyes, the nose and the mouth might be other ways the virus gets into the body.[32] Preventive methods therefore have dwelt on disinfection of surfaces, hand washing, sanitizing and hygiene,

personal protective wears and covers, and social distancing. These measures though necessary may be insufficient, however, to fight off this pandemic. More need to be done.

The Coronavirus Origin

The WuRCoP becomes the 3rd Betacoronavirus identified to cause severe disease in humans. The other 2 are SARS-CoV (in 2002) and MERS-CoV (in 2012).[33]

Phylogenetic classification puts WuRCoP in the subfamily of Coronaviruses named Coronavirinea which belongs to the family of Coronaviridea. Within the subfamily of Coronavirinea, there are 4 genera: Alphacoronaviruses, Betacoronaviruses, Deltacoronaviruses and Gammacoronaviruses. The Alphacoronaviruses and betacoronaviruses infect only mammals while the gammacoronaviruses and deltacoronaviruses infect birds, but some of them can also infect mammals.[33]

The three highly pathogenic coronaviruses, WuRCoP, SARS-CoV and MERS-CoV, cause severe respiratory syndrome in humans, and the other four human coronaviruses (HCoV-NL63, HCoV-229E, HCoV-OC43 and HKU1) induce only mild upper respiratory diseases in immunocompetent hosts, although some of them can cause severe infections in infants, young children and elderly individuals.[33,34]

Many of these viruses have been isolated from bats, pigs and potentially some other animals that serve as reservoir from which spillover or innocuous infection to human population may occur.[33]We are yet to understand the environmental and genetic permutations that cause the viral mutations that lead to these spillover infections to humans.

The 21st Century Pandemic

Despite the advances in medical sciences and technology, and at the time of this paper, this virus has caused disease in 210 countries around the world in a very short time making it one of the most widely spread pandemic in the history of man. More widely spread than the Spanish flu of 1920, the Philadelphia Yellow Fever of 1793, the Flu pandemic (1968), the Asian Flu (1956 – 1958), the 6th Cholera pandemic (1910 – 1911), the Russian Flu (1889 – 1890), the "Black Death" Bubonic Plague (1346 – 1359), and the Plague of Justinian (541 – 542).[8,9,10] Part of the reason for its wide distribution can be credited to the ease with which people can travel around from place to place. One can say that our human development and technology has worked to the favor this virus. Thus we have amplified viral transmission in the spatial rim, we have become the vehicle through which the virus travels to jump-start another production factory in humans in another part of the world. This is a novel virus indeed.

The Summary

For a virus that originated from Wuhan (Wu), that causes infection through respiratory pathway and cause respiratory disease (R), comes from the subfamily of Coronavirinea (Co) and spread so fast and so wide around the world in a pandemic (P) fashion; is henceforth named the **Wuhan Respiratory Coronavirus Pandemic (WuRCoP or WuCoP)** aka COVID-19.

Now that we have named the virus clinically and correctly, we have demystified everything about the disease, and therefore we shall proceed with the clinical ways to stop its spread and save lives. Experience from tropical medicine is needed in the fight against **WuCoP**.

About the Author

Remigius Okea, MD MPH, FAAFP, FAAPCR

Family and Emergency Medicine physician in Texas, USA

Research director at American Academy of Primary Care Research

Pioneer Member of the American Society for Nanomedicine

Prior to practice in the USA he spent over 10 years working with the United Nations and various non-profit organizations in Africa and South East Asia treating Tropical Diseases.

REFERENCES

1. The chronology of the 2002-2003 SARS mini pandemic.

   David Geffen School of Medicine at UCLA and Mattel Children's Hospital at UCLA, University of California at Los Angeles, Los Angeles, CA, USA. jcherry@mednet.ucla.edu. Paediatr Respir Rev. 2004 Dec;5(4):262-9.

2. Molecular epidemiology of the novel coronavirus that causes severe acute respiratory syndrome.

   Guan Y, Peiris JS, Zheng B, Poon LL, Chan KH, Zeng FY, Chan CW, Chan MN, Chen JD, Chow KY, Hon CC, Hui KH, Li J, Li VY, Wang Y, Leung SW, Yuen KY, Leung FC. Lancet. 2004 Jan 10;363(9403):99-104.

3. Overview on SARS in Asia and the world.Lam WK, Zhong NS, Tan WC Respirology. 2003 Nov;8 Suppl:S2-5.

4. Middle East respiratory syndrome coronavirus (MERS-CoV) - Surveillance and testing in North England from 2012 to 2019.

   Farooq HZ, Davies E, Ahmad S, Machin N, Hesketh L, Guiver M, Turner AJ. Int J Infect Dis. 2020 Jan 28;93:237-244. doi: 10.1016/j.ijid.2020.01.043. [Epub ahead of print]

5. Contact tracing performance during the Ebola epidemic in Liberia, 2014-2015.

   Swanson KC, Altare C, Wesseh CS, Nyenswah T, Ahmed T, Eyal N, Hamblion EL, Lessler J, Peters DH, Altmann M. PLoS Negl Trop Dis. 2018 Sep 12;12(9):e0006762. doi: 10.1371/journal.pntd.0006762. eCollection 2018 Sep.

6. Responses to spread of.Ebola virus disease epidemic in West Africa: A review.

   Ayede A, Osinusi K, Falade AG. Afr J Med Med Sci. 2016 Jun;45(2):119-134.

7. Ebola virus disease in West Africa--the first 9 months of the epidemic and forward projections.
   WHO Ebola Response Team, Aylward B, Barboza P, Bawo L, Bertherat E. N Engl J Med. 2014 Oct 16;371(16):1481-95. doi: 10.1056/NEJMoa1411100. Epub 2014 Sep 22.

8. Understanding dynamics of pandemics

Akin L, Gözel MG. Turk J Med Sci. 2020 Apr 21;50(SI-1):515-519. doi: 10.3906/sag-2004-133.

9. The 1918 "Spanish Flu" Pandemic in the Ottoman Capital, Istanbul.

   Temel MK. Can Bull Med Hist. 2020 Mar 20:e356052019. doi: 10.3138/cbmh.356-052019. [Epub ahead of print]

10. Systematic Review of Important Viral Diseases in Africa in Light of the 'One Health' Concept.
    Chauhan RP, Dessie ZG, Noreddin A, El Zowalaty ME. Pathogens. 2020 Apr 20;9(4). pii: E301. doi: 10.3390/pathogens9040301.

11. Ten Worst Pandemic in History: https://www.mphonline.org/worst-pandemics-in-history/

    Date Accessed: 04/26/2020

12. WHO COVID-19: (https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200121-sitrep-1-2019-ncov.pdf?sfvrsn=20a99c10_4)

    Date Accessed: 04/26/2020

13. First Confirmed COVID-19 Case:
    https://www.scmp.com/news/china/society/article/3074991/coronavirus-chinas-first-confirmed-covid-19-case-traced-back

    Date Accessed: 04/26/2020

14. Clinical features of patient infected with 2019 novel Coronavirus in Wuhan, China

    Prof. Chaolin Huang, MD; Yeming Wang, MD; Prof. Xingwang Li, MD; Prof. Lili Ren, PhD; The Lancet: Vol 395, issue 10223, P497 – 506, February 15, 2020

15. Phylogeography of Lassa Virus in Nigeria.

    Ehichioya DU, Dellicour S, Pahlmann M, Rieger T, Oestereich L, Becker-Ziaja B, Cadar D, Ighodalo Y, Olokor T, Omomoh E, et al. J Virol. 2019 Oct 15;93(21). pii: e00929-19. doi: 10.1128/JVI.00929-19. Print 2019 Nov 1.

16. A Historical Look at the First Reported Cases of Lassa Fever: IgG Antibodies 40 Years After Acute Infection.
    Nell Bond, John S. Schieffelin, Lina M. Moses, Andrew J. Bennett, and Daniel G. Bausch· Am J Trop Med Hyg. 2013 Feb 6; 88(2): 241–244.

17. West Nile virus - Where did it come from and where might it go?

    B Lynn Johnston, MD FRCPC and John M Conly, MD FRCPC Can J Infect Dis. 2000 Jul-Aug; 11(4): 175–178.

18. Etymologia: Coxsackievirus
    Ronnie Henry, Centers for Disease Control and Prevention, 1600 Clifton Rd NE, Mailstop E03, Atlanta, GA 30333, USA; Emerg Infect Dis. 2012 Nov; 18(11): 1871.

19. Coxsackievirus A6: a new emerging pathogen causing hand, foot and mouth disease outbreaks worldwide.
Bian L, Wang Y, Yao X, Mao Q, Xu M, Liang Z.. Expert Rev Anti Infect Ther. 2015;13(9):1061-71. doi: 10.1586/14787210.2015.1058156. Epub 2015 Jun

20. CDC Marburg: https://www.cdc.gov/vhf/marburg/index.html

    Date Accessed: 04/26/2020

21. Forty-Five Years of Marburg Virus Research

    Kristina Brauburger, Adam J. Hume, Elke Mühlberger, and Judith Olejnik: Viruses. 2012 Oct; 4(10): 1878–1927.

22. CDC Hendra virus: https://www.cdc.gov/vhf/hendra/index.html

    Date Accessed: 04/26/2020

23. The Exceptionally Large Genome of Hendra Virus: Support for Creation of a New Genus within the Family *Paramyxoviridae*
Lin-Fa Wang, Meng Yu, Eric Hansson, L. Ian Pritchard, Brian Shiell, Wojtek P. Michalski, and Bryan T. Eaton. J Virol. 2000 Nov; 74(21): 9972–9979.

24. History of Ebola Virus Disease: https://www.cdc.gov/vhf/ebola/history/summaries.html

    Date Accessed: 04/26/2020

25. Etymologia: Ebola

    Ronnie Henry, Centers for Disease Control and Prevention, 1600 Clifton Rd NE, Mailstop E03, Atlanta, GA 30329-4027, USA: Emerg Infect Dis. 2015 Nov; 21(11): 1905.

26. Ross River Virus Transmission, Infection, and Disease: a Cross-Disciplinary Review
David Harley, Adrian Sleigh, and Scott Ritchie: Clin Microbiol Rev. 2001 Oct; 14(4): 909–932.
27. Epidemiology and Pathogenesis of Bolivian Hemorrhagic Fever
Michael Patterson, Ashley Grant, and Slobodan Paessler: Curr Opin Virol. 2014 Apr; 0: 82–90. Published online 2014 Mar 15.
28. WHO Zika virus: https://www.who.int/emergencies/zika-virus/timeline/en/

    Date Accessed: 04/26/2020

29. WHO: https://www.who.int/bulletin/volumes/94/9/16-171082/en/

    Date Accessed: 04/26/2020

30. Zika Virus: Origins, Pathological Action, and Treatment Strategies

    Kirill Gorshkov, Sergey A. Shiryaev, Sophie Fertel, Yi-Wen Lin, Chun-Teng Huang, Antonella Pinto, Chen Farhy, Alex Y. Strongin, Wei Zheng, and Alexey V. Terskikh: Front Microbiol. 2018; 9: 3252. Published online 2019 Jan 7.

31. Symptoms of Coronavirus. CDC: Coronavirus Disease 2019 (COVID-19)
https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html
Date Accessed: 04/26/2020

32. Mayo Clinic: COVID-19
https://www.mayoclinic.org/diseases-conditions/coronavirus/symptoms-causes/syc-20479963
Date Accessed: 04/26/2020

33. Origin and evolution of pathogenic coronaviruses

Jie Cui, Fang Li, and Zheng-Li Shi: Nat Rev Microbiol. 2019; 17(3): 181–192. Published online 2018 Dec 10

34. Coronaviruses: An Overview of Their Replication and Pathogenesis
Anthony R. Fehr and Stanley Perlman, M.D., Ph.D
Coronaviruses. 2015; 1282: 1–23. Published online 2015 Feb 12

35. WHO: Summary of probable SARS cases with onset of illness from 1 November 2002 to 31 July 2003. https://www.who.int/csr/sars/country/table2004_04_21/en/
Date accessed: January 19, 2020

36. WHO: Middle East respiratory syndrome coronavirus (MERS-CoV).
http://www.who.int/emergencies/mers-cov/en/
Date accessed: January 19, 2020

37. WHO: Novel coronavirus – China. http://www.who.int/csr/don/12-january-2020-novel-coronavirus-china/en/
Date accessed: April 26th, 2020

38. WHO: Novel coronavirus – Thailand (ex-China).http://www.who.int/csr/don/14-january-2020-novel-coronavirus-thailand/en/
Date accessed: April 26th, 2020

39. WHO: Novel coronavirus – Japan (ex-China).http://www.who.int/csr/don/17-january-2020-novel-coronavirus-japan-ex-china/en/
Date accessed: April 26th, 2020

40. WHO: Novel coronavirus – Republic of Korea (ex-China).http://www.who.int/csr/don/21-january-2020-novel-coronavirus-republic-of-korea-ex-china/en/
Date accessed: April 26th, 2020

41. CDC: First travel-related case of 2019 novel coronavirus detected in United States.
https://www.cdc.gov/media/releases/2020/p0121-novel-coronavirus-travel-case.html
Date accessed: April 26th, 2020