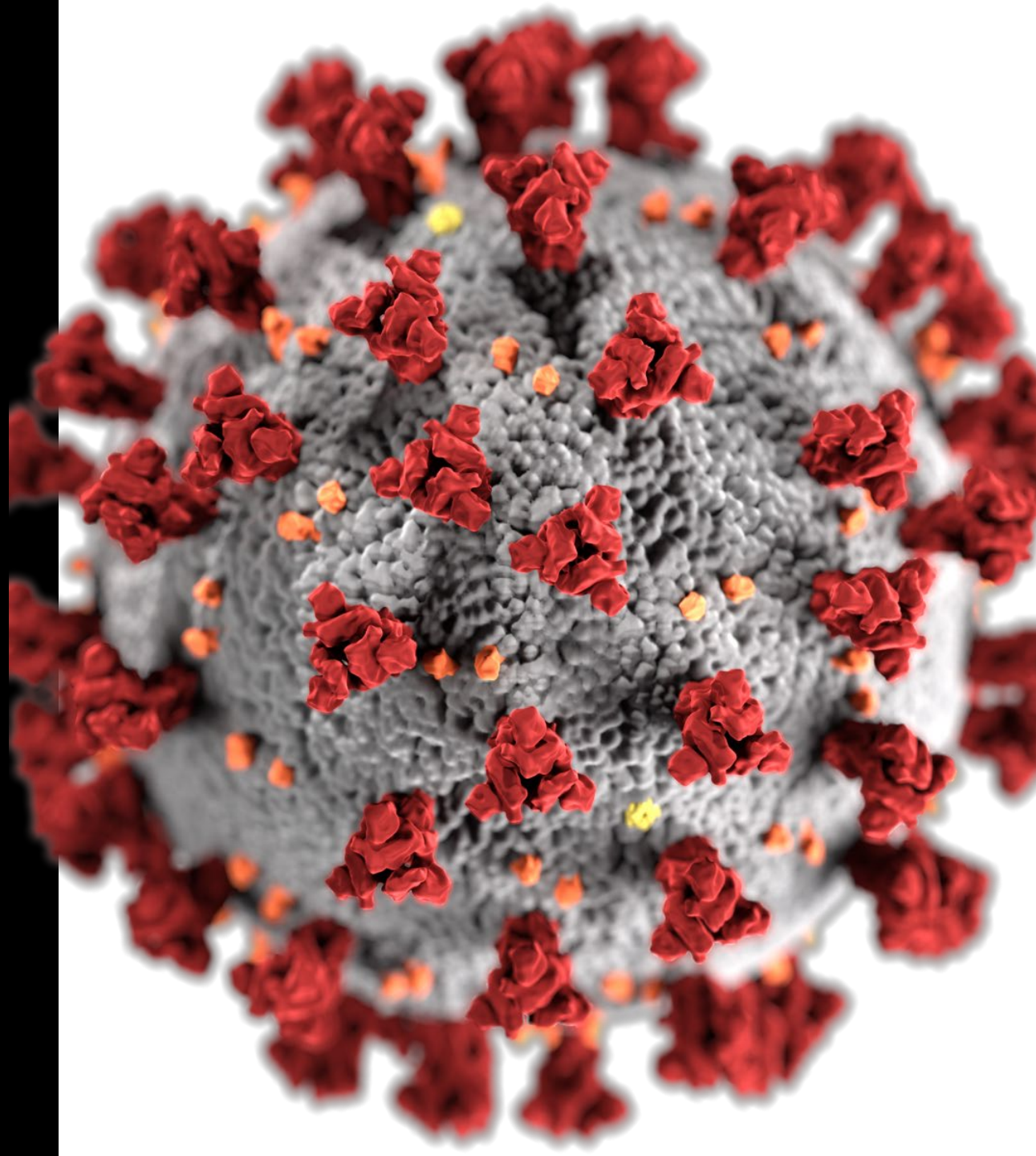
SARS-CoV-2, in Persons Living With HIV

Celestine N. Wanjalla, M.D. Ph.D.

SE AETC

July 22nd, 2020



Disclosures

I have no disclosures

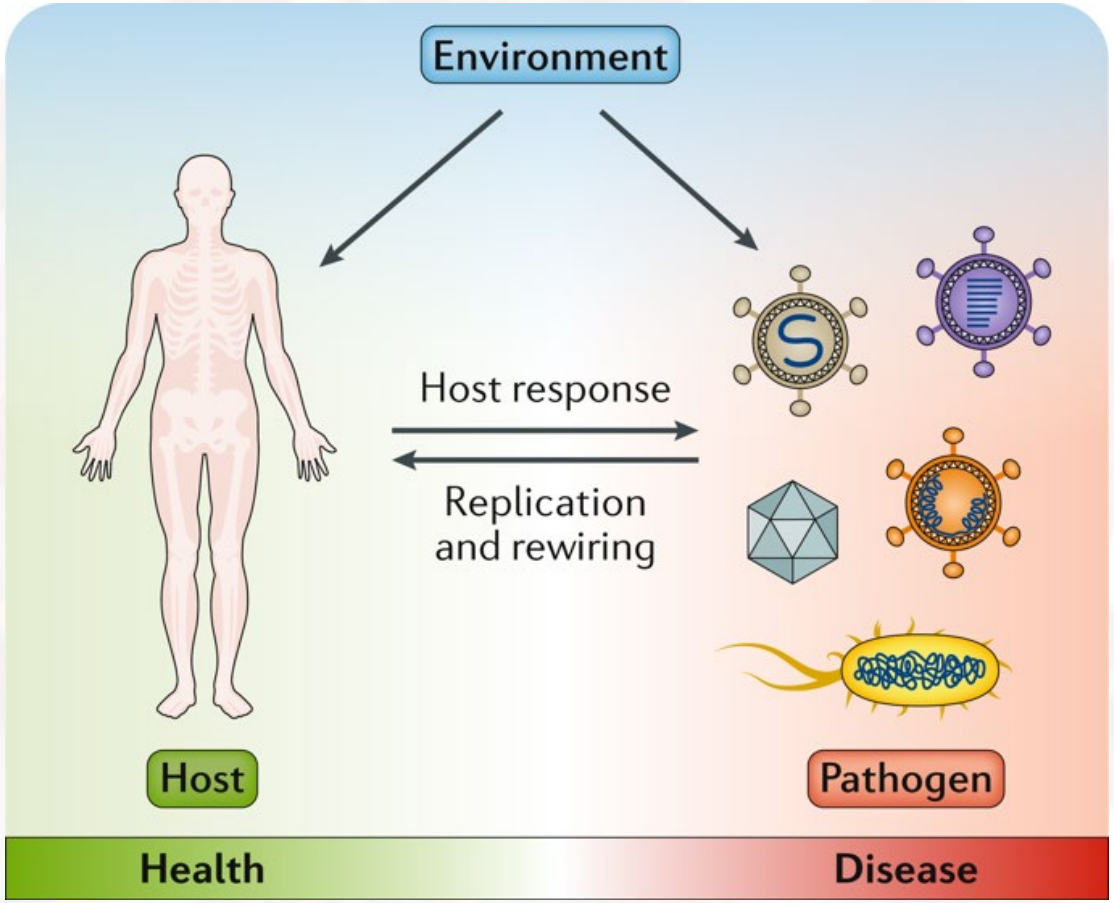
Key points

- Persons Living with HIV infected with SARS-CoV2 have similar symptoms as HIV-negative persons
- There is a fine balance between the host and pathogen response
- Severe COVID-19 is a manifestation immune imbalance
- Lymphopenia predicts severe disease even in persons living with HIV
- There has been no evidence to suggest that HIV-positive are at higher risk of mortality than HIV-negative individuals
- Remdesivir can be given along with ART therapies
- Possible role of ART in SARS-CoV2

Outline

- SARS-CoV2 and the immune system
- Sum of consecutive cases of COVID-19 in PLWH from different published case reports/series
  - Comorbidities
  - CD4 counts and viral load
  - Outcomes
  - Long-term sequelae
  - Mental health
  - ART: To switch or not to switch?
- ART and SARS-CoV2
  - What about patients on PrEP?
- Vaccines
  - Moderna
- Future studies

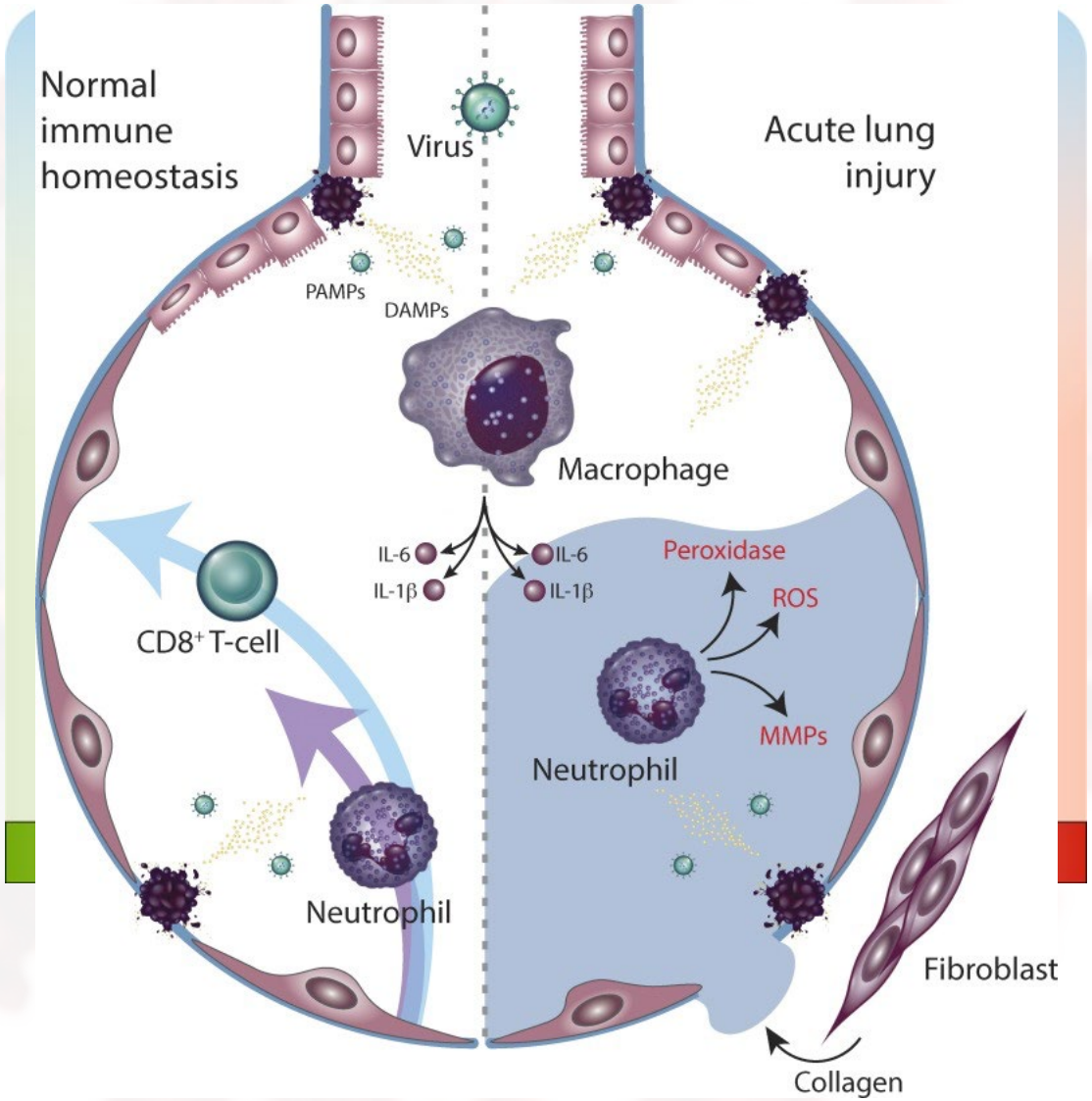
Intricate relationships between the host and pathogen dictate the outcome of infections



Eckhardt, M., Hultquist et. al.. *Nat Rev Genet* (2020)

SARS-CoV-2 immune responses and clinical outcomes

Discharged from the Emergency room

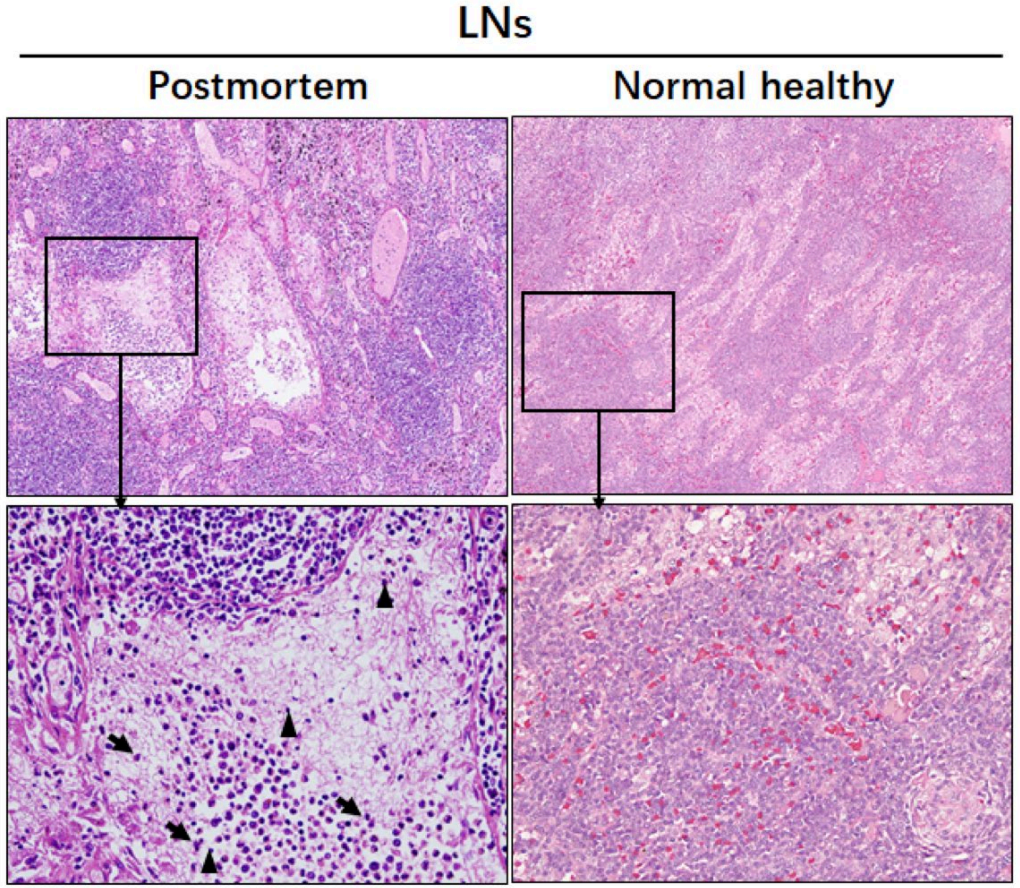


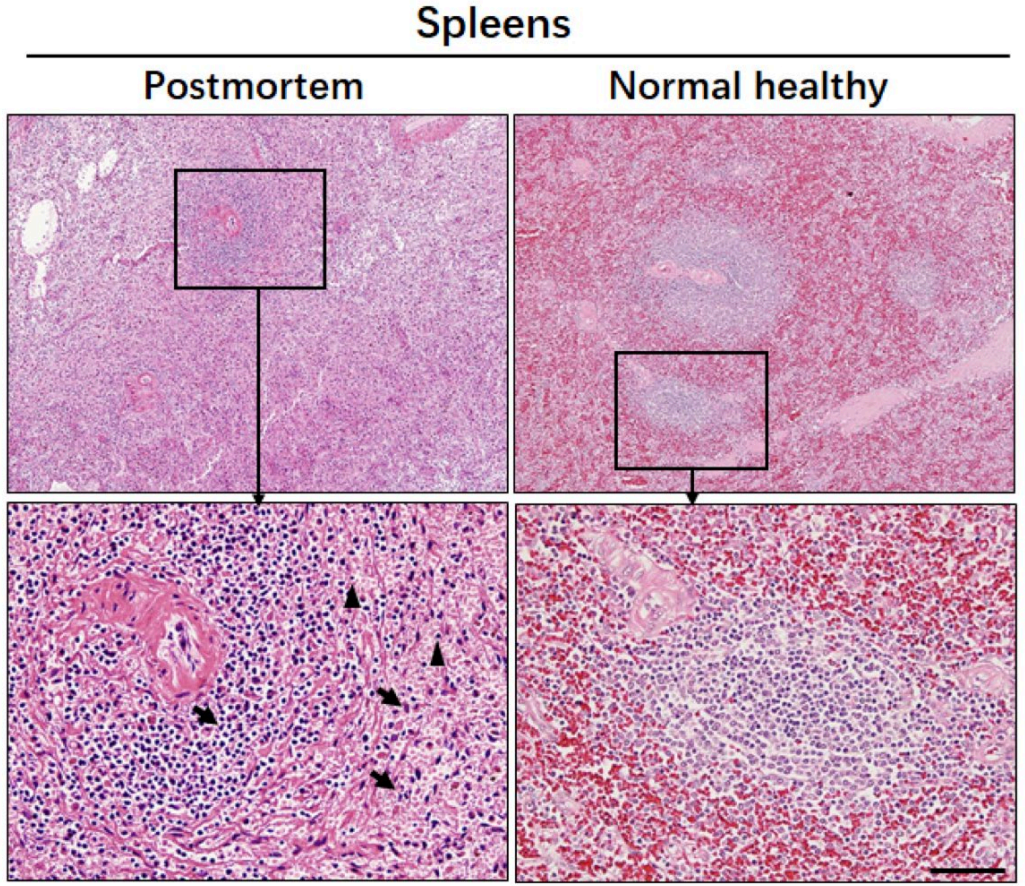
Intubated Patient

Eckhardt, M., Hultquist et. al.. *Nat Rev Genet* (2020)

SARS-CoV-2 induces lymphocyte cell death

March 31sr, 2020



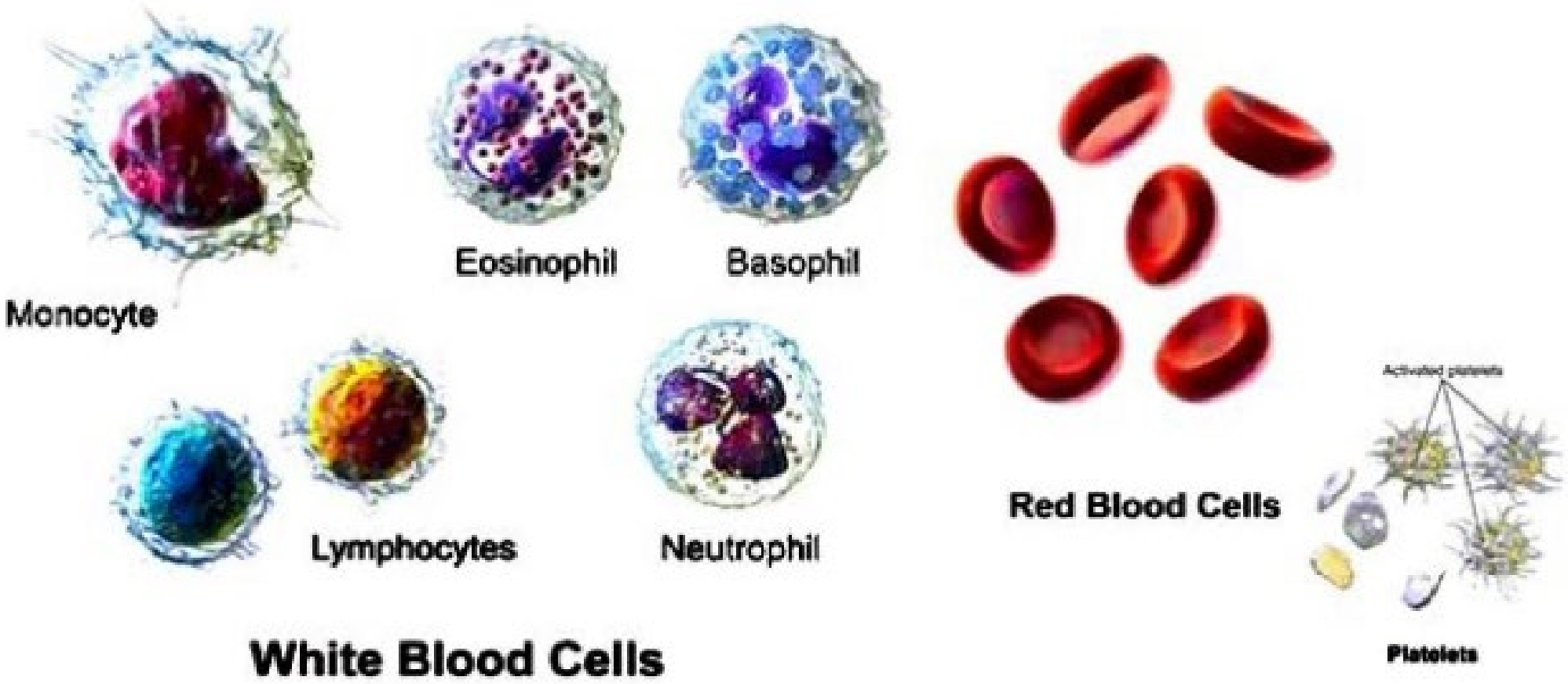


VANDERBILT UNIVERSITY MEDICAL CENTER

Yongwen, Chen et.al. The Novel Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Directly Decimates Human Spleens and Lymph Nodes. MedRXiV. April 2020

Lymphopenia in five-randomly selected individuals that died of COVID-19

March 28th, 2020



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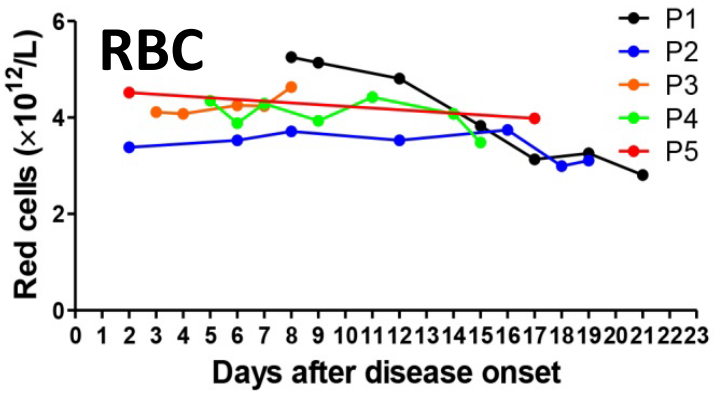

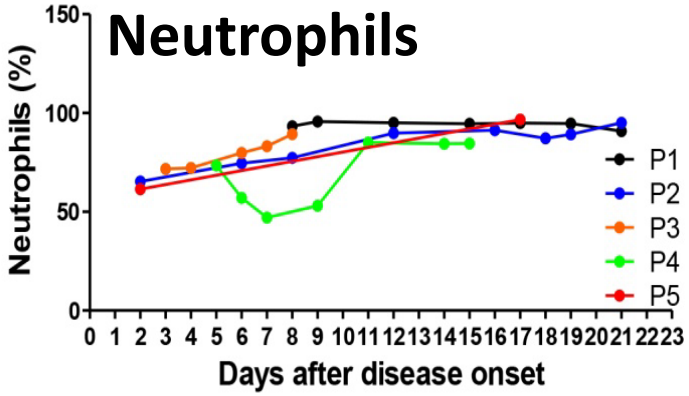

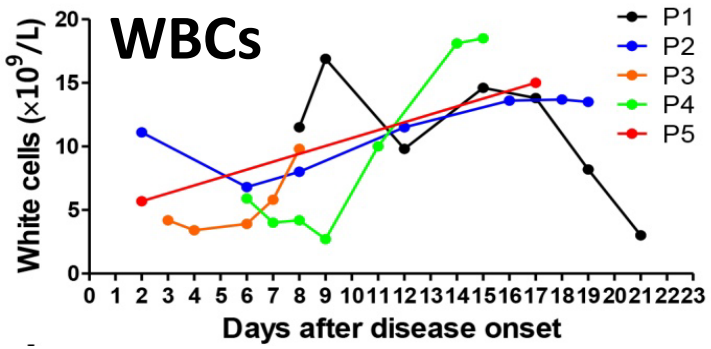

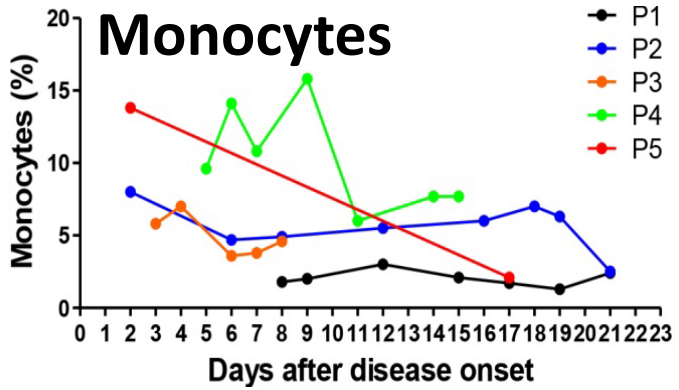

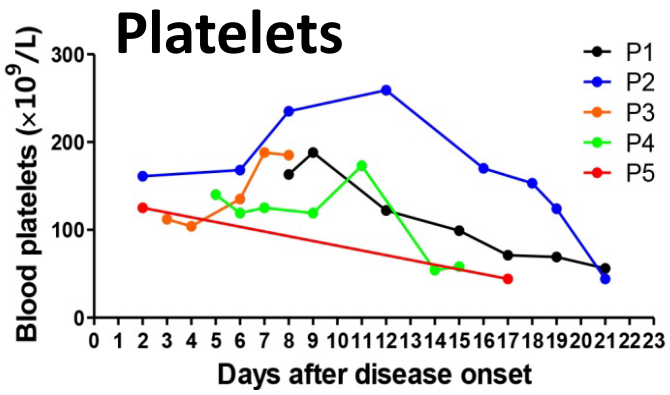

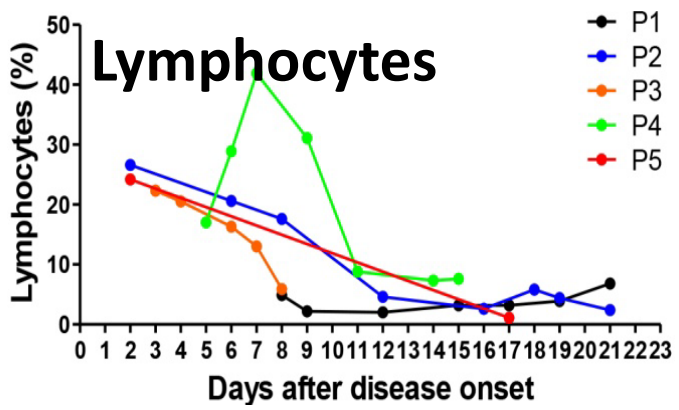

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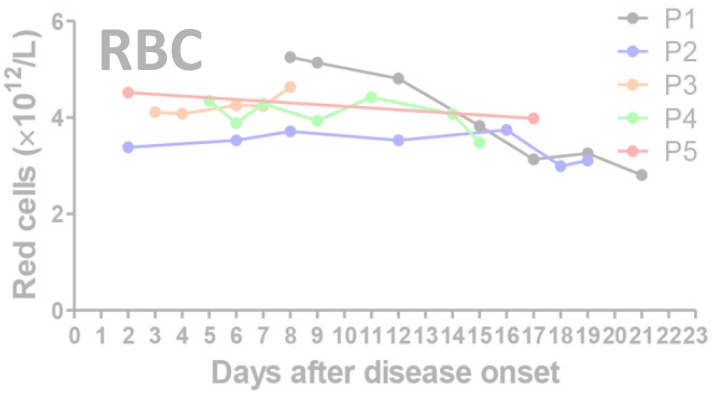

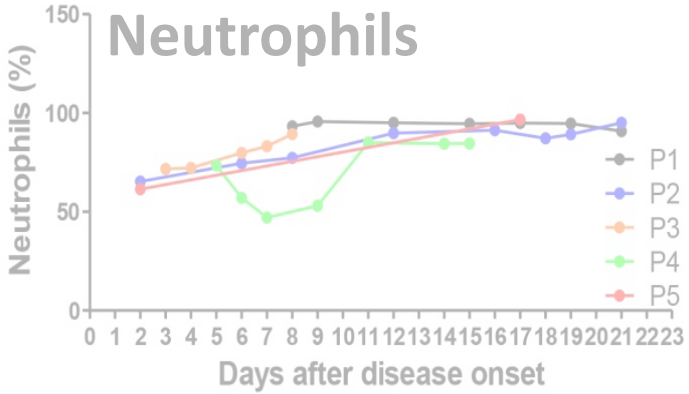

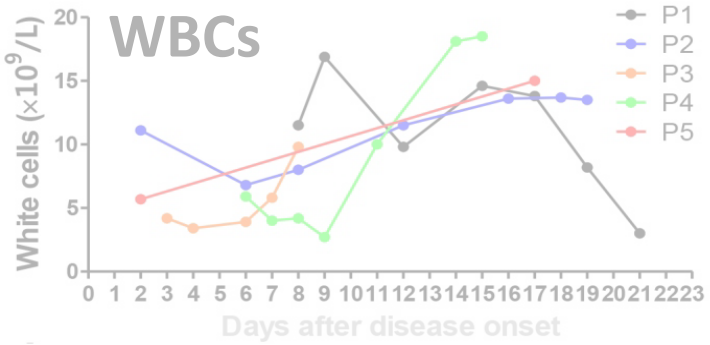

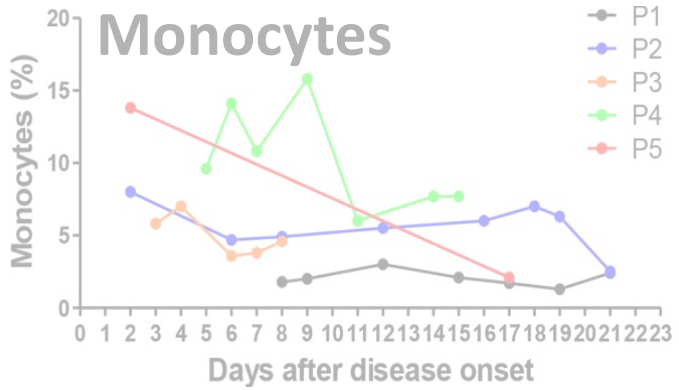

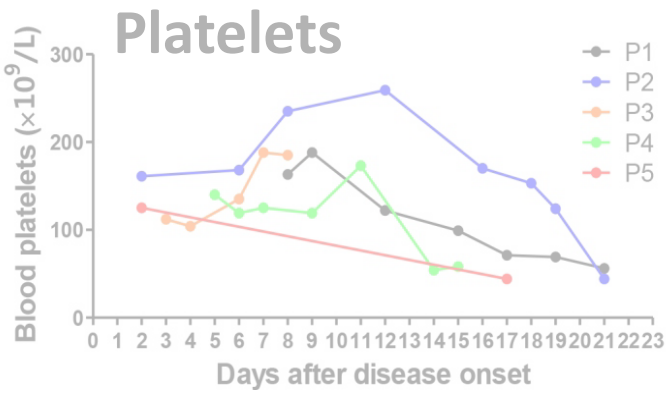

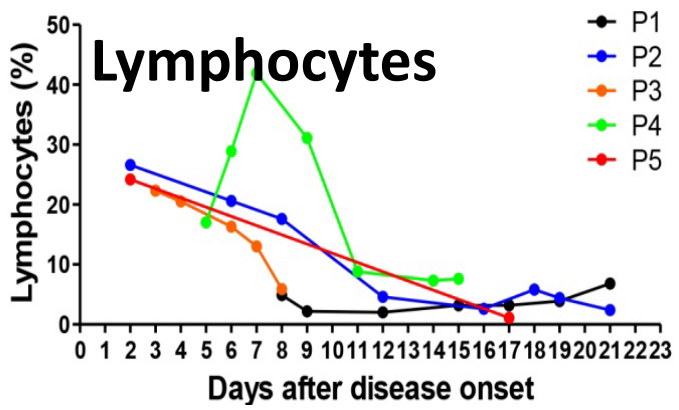

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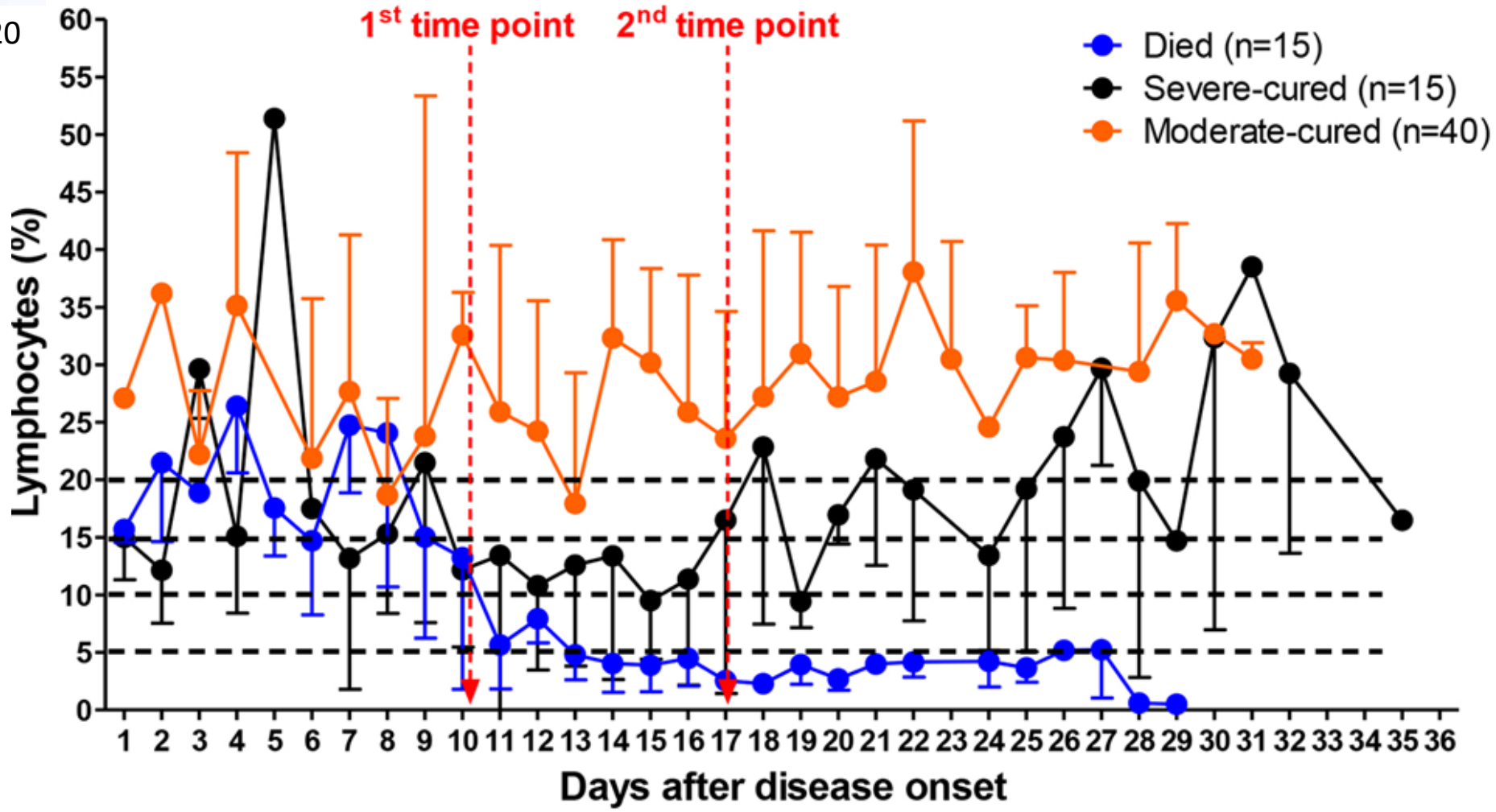
March 28th, 2020

Lymphopenia predicts disease severity of COVID-19



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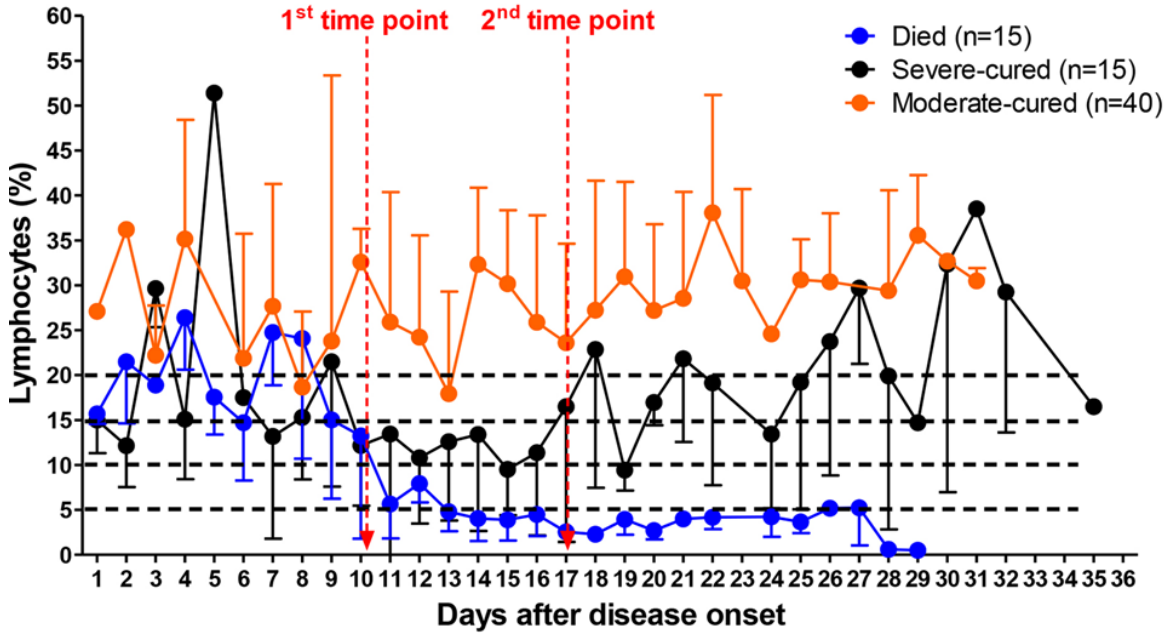

LYM%

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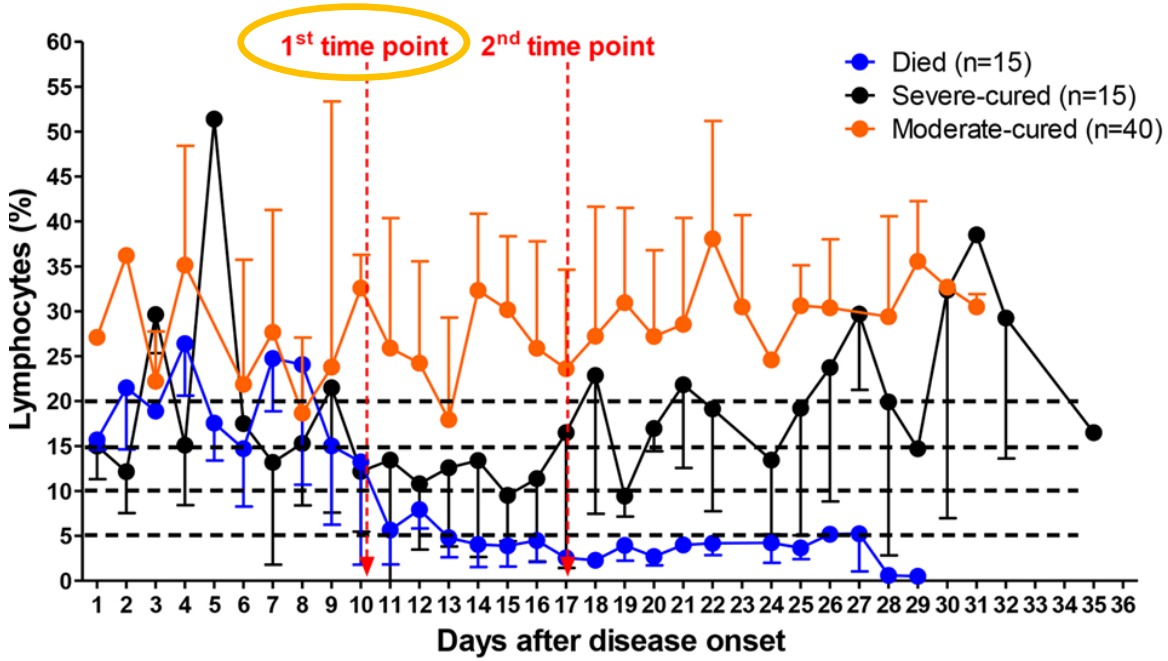

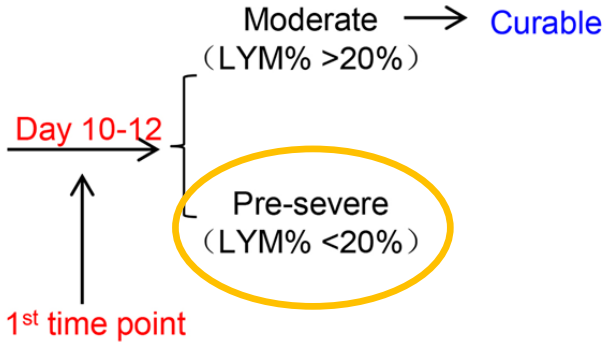

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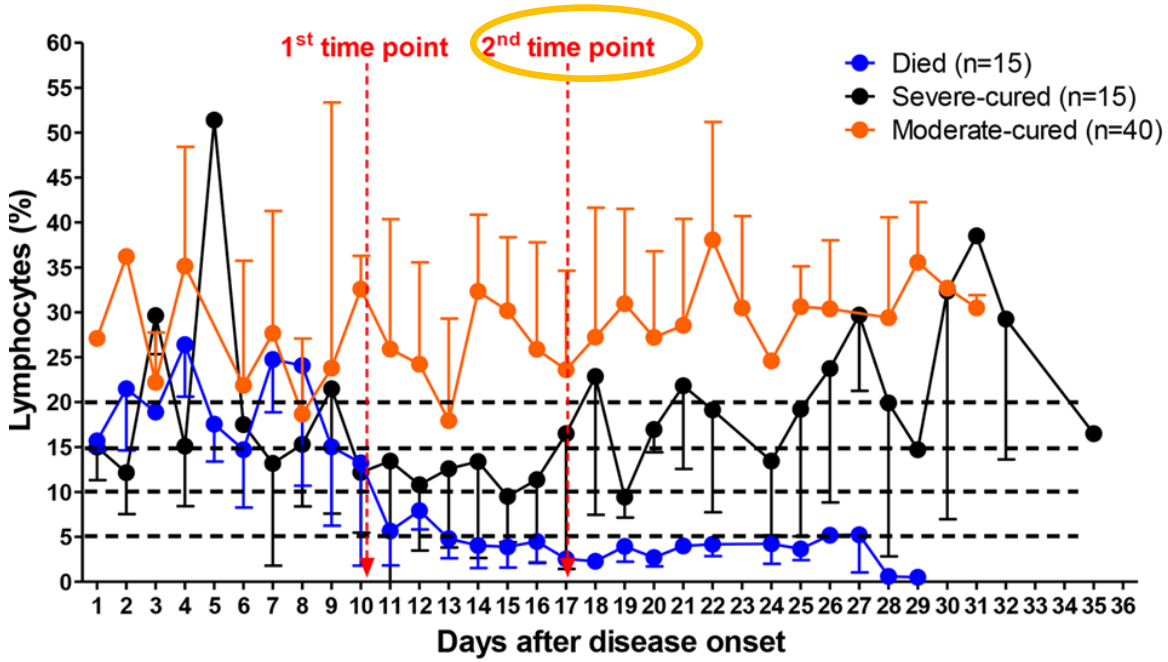

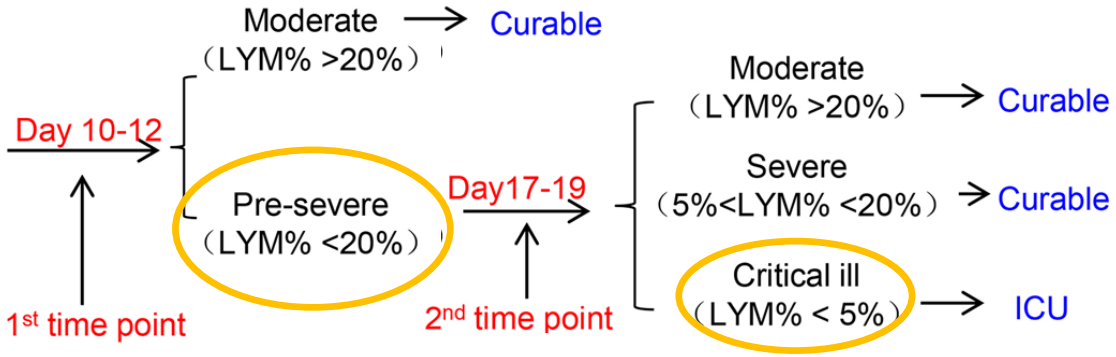

LYM%

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Tan, L., Wang, Q., Zhang, D. *et al*. *Sig Transduct Target Ther* **5,** 33 (2020)

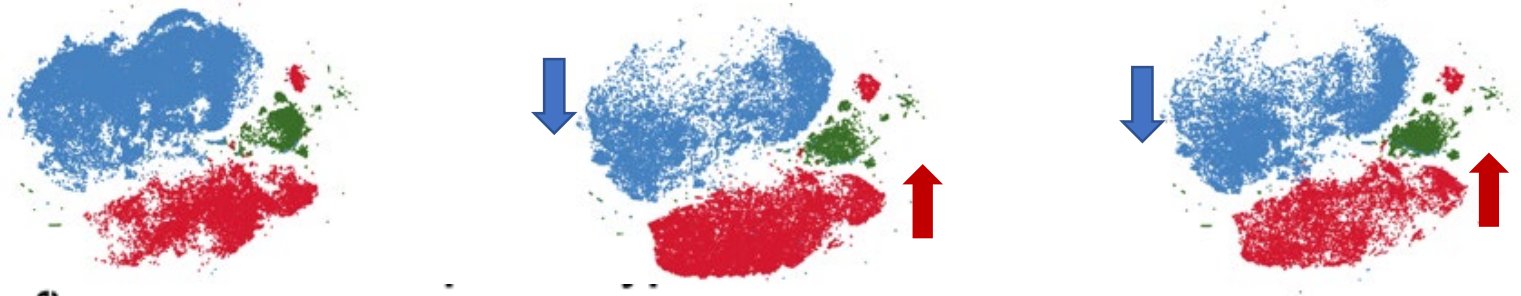
COVID-19 patients have decreased NK cells, CD4 and CD8 T cells and increased myeloid cells in peripheral blood

March 28th, 2020

Healthy controls (n=5)
Median age (55yrs)

Early Recovery Stage (n=5)
Median age (58yrs)

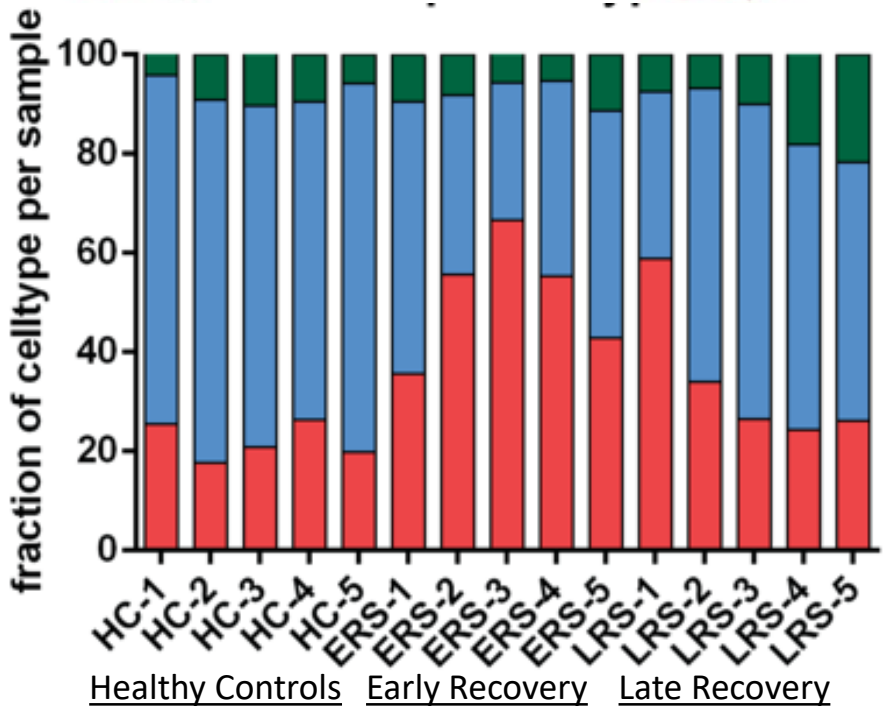
Late Recovery Stage (n=5)
Median age (49yrs)



Days since negative SARS-CoV-2 PCR testing

>> If < 7 days, Early Recovery (ERS)

>> If > 14 days, Late Recovery (LRS)



B cells
NK and T cells (lymphocytes)
Myeloid cells

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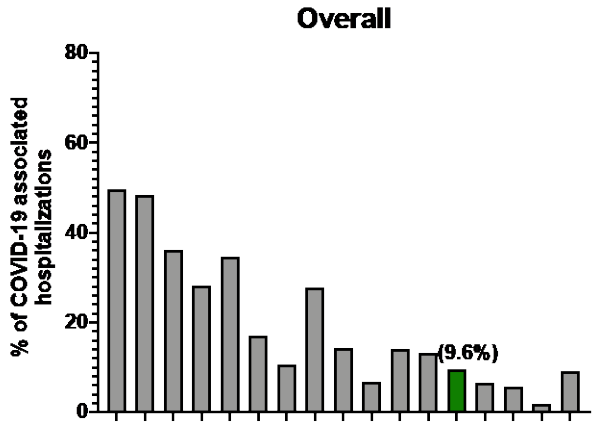
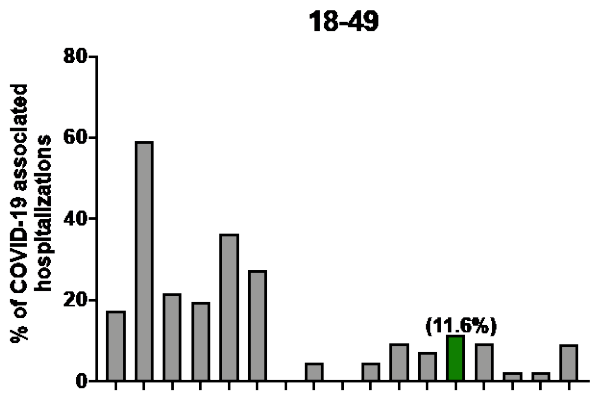
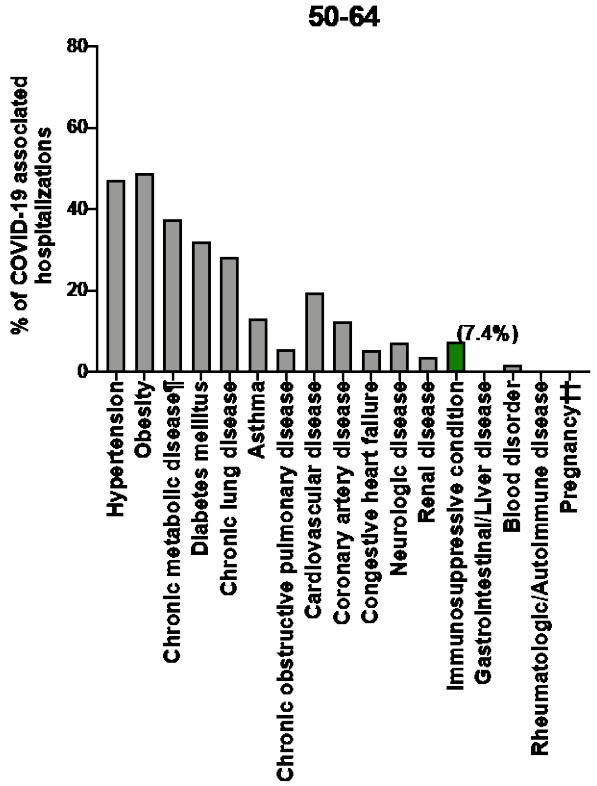
Wen, W., Su, W., Tang, H. *et al*. *Cell Discov*, 31 (2020)

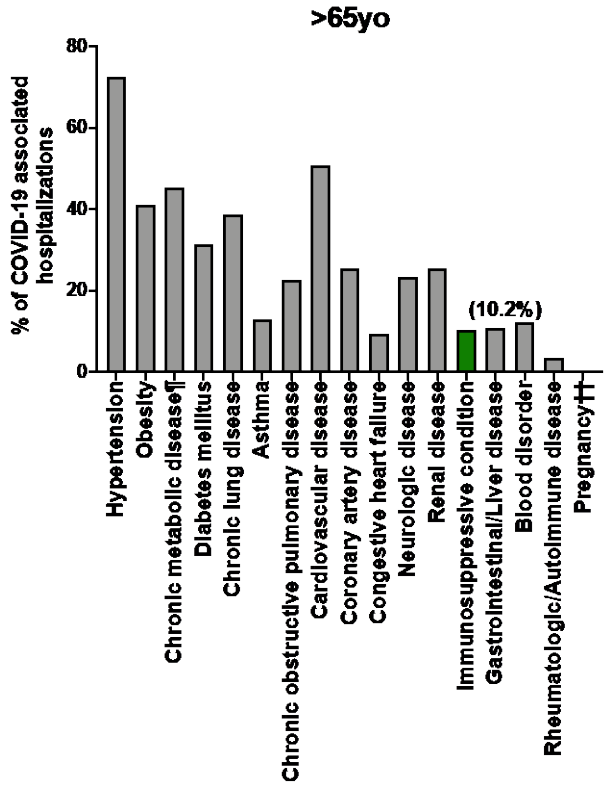
What proportion of COVID-19 patients requiring hospitalization are immune suppressed?

March 28th, 2020









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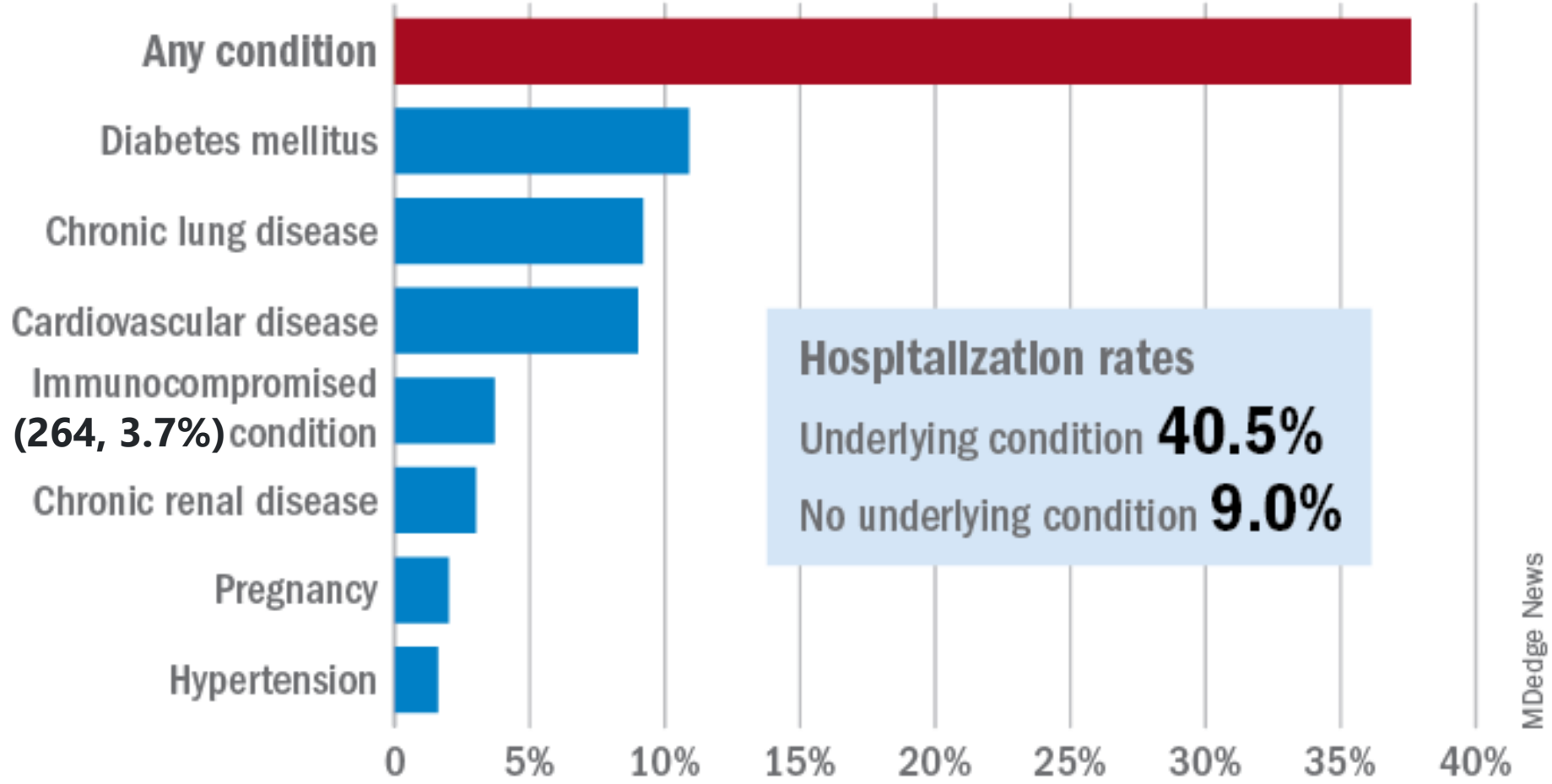
Garg S, Kim L, Whitaker M, et al. Hospitalization Rates and Characteristics of Patients Hospitalized with Laboratory-Confirmed Coronavirus Disease 2019 — COVID-NET, 14 States, March 1–30, 2020. MMWR Morb Mortal Wkly Rep 2020;69:458–464

3.7% of hospitalized patients in the USA of COVID-19 patients had an immunocompromised condition

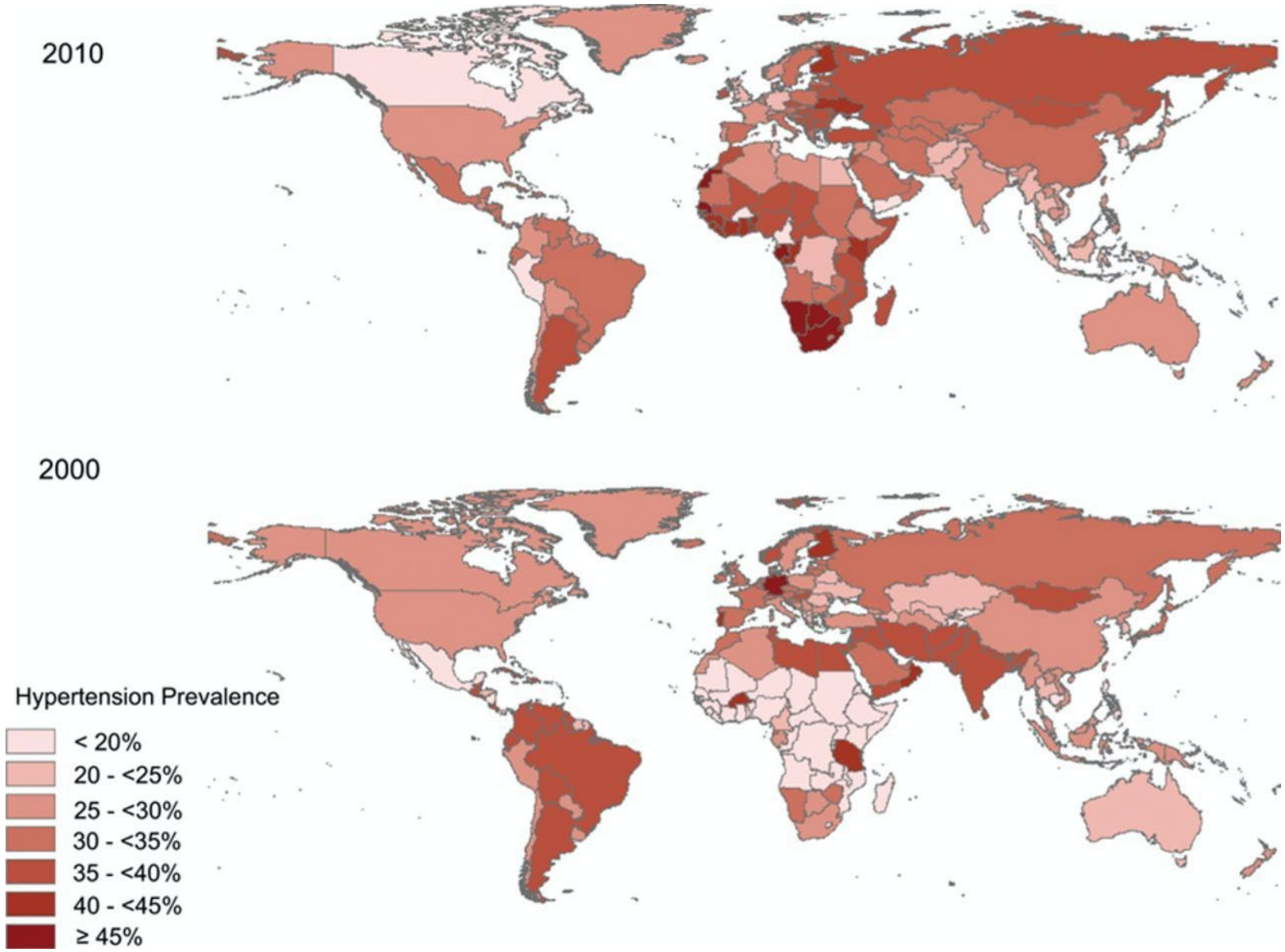
March 28th, 2020



Note: Data on underlying health conditions/risk factors were available for 7,162 (5.8%) of the 122,653 COVID-19 cases reported to the CDC as of March 28.

Source: MMWR. 2020 Mar 31;69[early release]:1-5

Worldwide age- and sex-standardized prevalence of hypertension in adults 20 years and older by country.



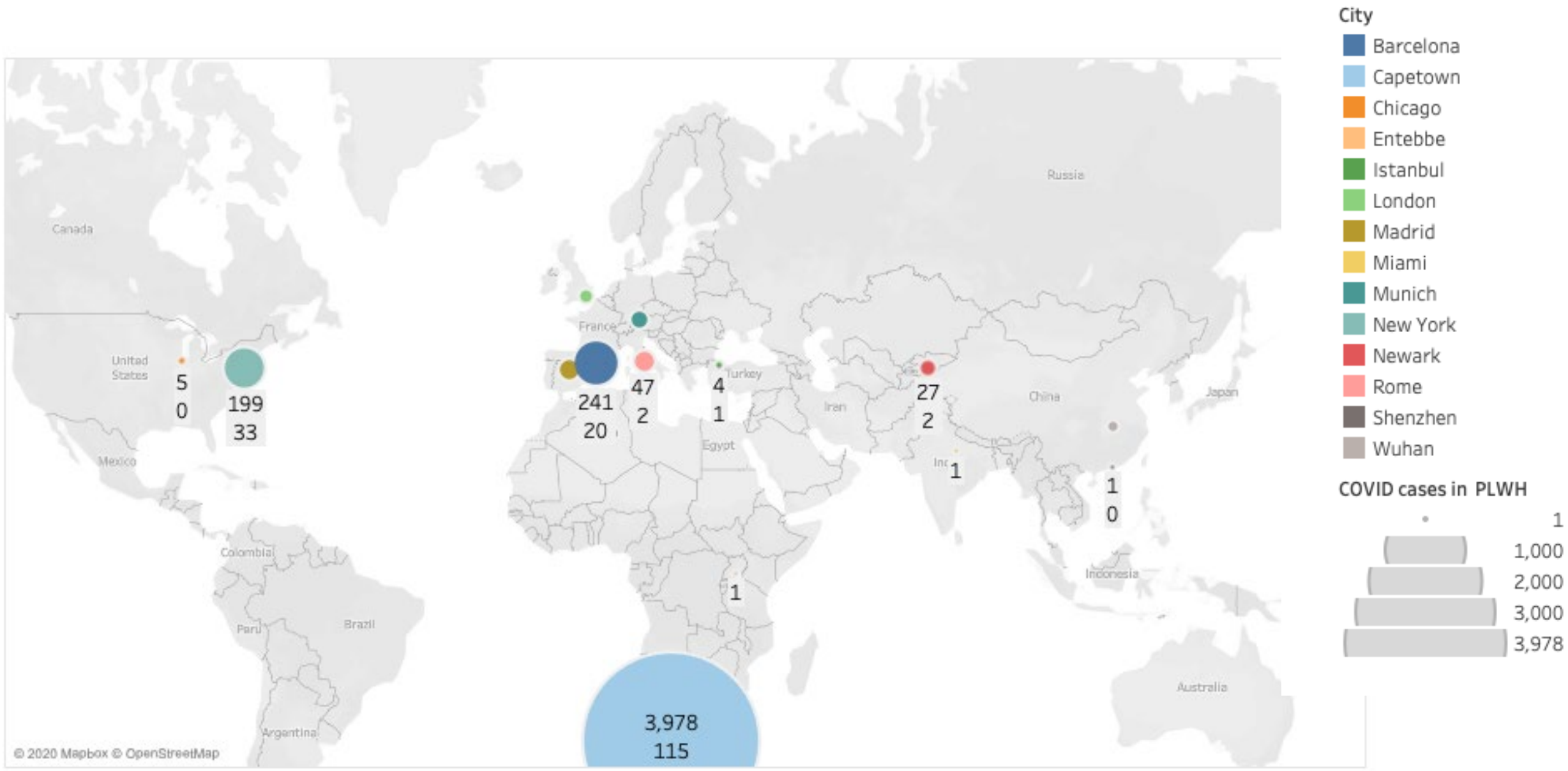
Mills. KT Circulation 2016

Outline

- SARS-CoV2 and the immune system
- Sum of consecutive cases of COVID-19 in PLWH from different published case reports/series
  - Comorbidities
  - CD4 counts and viral load
  - Long-term sequelae
  - Mental health
  - ART: To switch or not to switch?
- ART and SARS-CoV2
  - What about patients on PrEP?
- Vaccines
  - Moderna
- Future studies

What do we know about COVID-19 in Persons Living with HIV?

Published Case Reports of COVID-19 in Persons Living with HIV

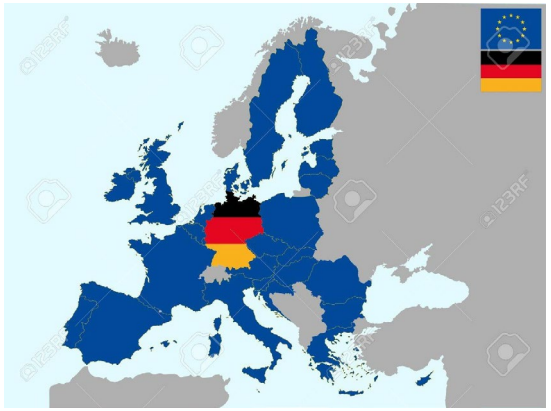


Published Case Reports of COVID-19 in Persons Living with HIV

Country	Author	Conclusion	COVID cases in PLWH	Deaths
China	Guo W et al. Lancet 2020	PWH have similar risk as the general population	8	1
	Wu, Q et al. J Med Virol 2020	New Diagnosis of HIV during Pandemic	2	0
	Zhu F et al. J Med Virol. 2020	PWH are vulnerable	1	0
	Zhao, J et al. CID 2020	Negative PCR tests in patients, suggest that PLWH exposed to the virus may be symptomatic but test negative	1	0
Germany	Haerter G etl al. MedRxiv 20..	76% of PWH have mild disease	33	3
Italy	Gervasoni C et al. CID 2020	PWH not a greater risk	47	2
South Africa	Davies MA et al. MedRXIV 2..	2-fold increased risk of death from COVID-19 in PLWH irrespective of viral suppression, similar increase in patients with TB. Persons on T..	3,978	115
Spain	Amo JD Annals of Internl Me..	Risk of COVID-19 diagnosis was lower in the HIV-positive population	236	20
	Vizcarra P et.al. Lancet 2020	Lower CD4 has higher risk of complication	51	2
	Blanco J et al. Lancet HIV 20..	Recognize new diagnosis of HIV	5	0
Turkey	Aydin OA at al. J Med Virol 2..	Measured SARS-CoV2 antibodies before discharge, present in 2/4 pts tested, patient with comorbidities had worse outcomes	4	1
Uganda	Baluku, J et al. J Med Virol 2..	Importance of paying attention to COVID-19 mimics in low income areas	1	
United Kingdom	Child K. et al CID 2020	Hospitalized patients had low median CD4/ substancial morbidity	18	5
USA	Sigel K. et al. CID 2020	Risk of severe disease comparable to the general populaton	88	18
	Richardson, S et al. JAMA 20..	0.8% of total patients in this series had HIV	43	
	Shalev N et al. CID 2020	7/8 deceased were receiving tenofovir prodrug at time of death 4> 65yo and 4 patients between age 50 and 65	31	8
	Okoh A et al. JAIDS 2020	Patients that died were elderly with multiple comorbidities	27	2
	Karmen-Tuoh, S et al. JAIDS ..	No difference in clinical presentation, course including thrombotic events and myocardial infarction	21	
	Suwanwongse K. et. al. J Me..	Hospital in South Bronx, known for poverty. Patients with low CD4 had a higher mortality rate. HIV-related T cell suppression does not ap..	9	7
	Ridgway JS et al. AIDS Patie..	All survived, 1/5 presented with tachycardia, test positive 3 days later	5	0
	Patel RH et al. J Med Virol 2..	Speculate on possible benefit on ART on COVID19, hence less severe disease	1	
	Argenziano MG et al. BMJ 20..	Age, BMI and HIV or renal disease associated with death		
	Goyal P et al NEJM 2020	None	7	

Higher risk Lower risk Similar risk

There is no evidence to suggest that persons Living with HIV are at higher risk of infection with COVID-19



March and April 2020

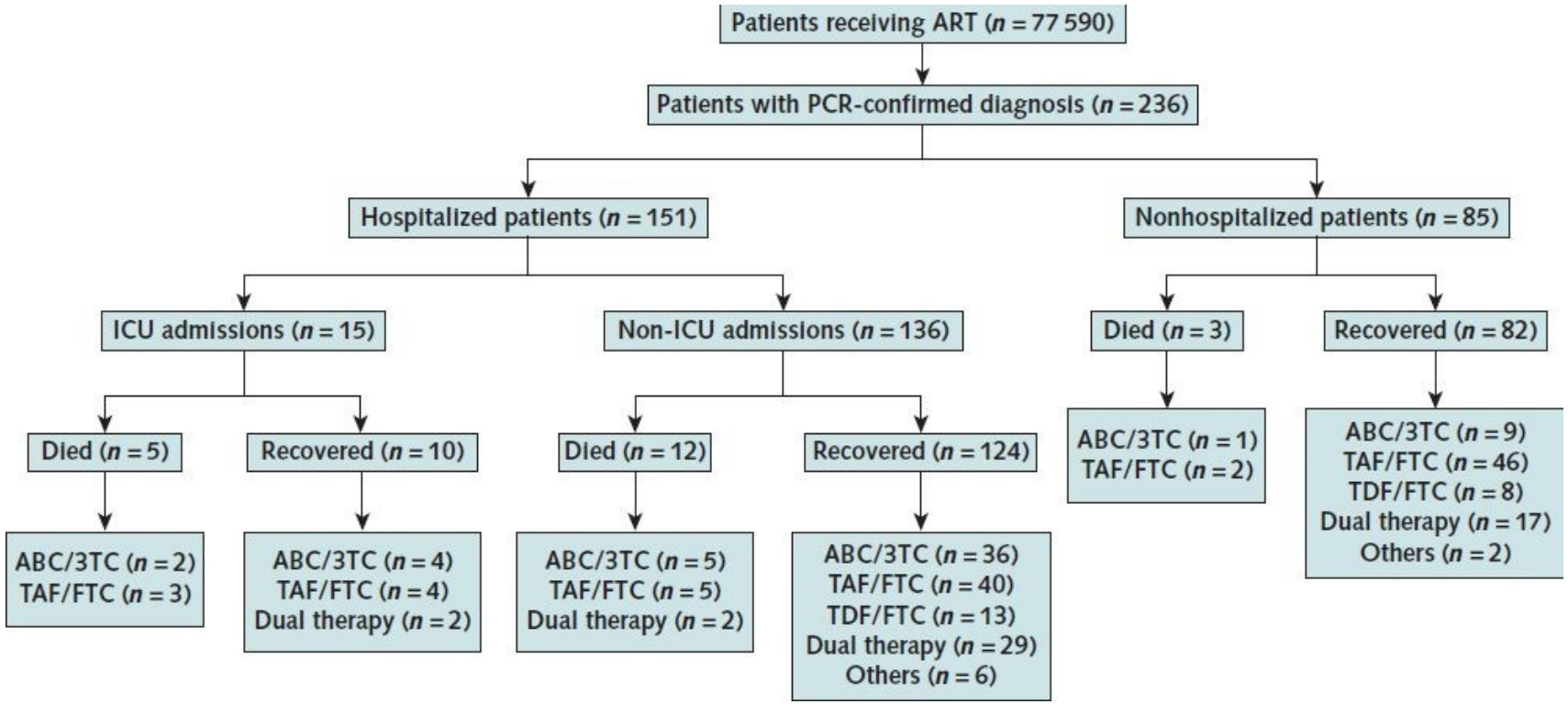
- Thirty-three PLWH diagnosed with COVID-19. 30 male and 3 females, with 7 (21%) inpatient and 26 (79%) outpatient. PLWH did not have increased morbidity or mortality in this large group.

Härter G, Spinner CD, Roider J, et al. *Infection.* 2020

The risk for COVID-19 diagnosis was lower in the HIV-positive population (30.0 per 10 000) than in the general population (41.7 per 10 000)

SPAIN

June 26, 2020
February 1 – April 15th, 2020



Julia del Amo, MD, PhD et. al. Annals of Internal Medicine 2020

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SPAIN

June 26, 2020
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Table 1. Characteristics of PCR-Confirmed COVID-19 Diagnoses, Hospital Admissions, ICU Admissions, and Deaths Among 77 590 HIV-Positive Persons Receiving ART, 1 February to 15 April 2020, Spain

Characteristics	HIV-Positive Persons Receiving ART, *n (%)**	COVID-19 Diagnoses, *n (%)*	COVID-19 Hospital Admissions, *n (%)*	COVID-19 ICU Admissions, *n (%)*	COVID-19 Deaths, *n (%)*
Total	77 590	236	151	15	20
Sex					
M	58 120 (75)	204 (86)	136 (90)	12 (80)	16 (80)
Women	19 470 (25)	32 (14)	15 (10)	3 (20)	4 (20)
Age, *y*					
20–39	14 506 (19)	41 (18)	15 (10)	1 (7)	0
40–49	19 373 (25)	54 (23)	39 (26)	1 (7)	2 (10)
50–59	32 321 (42)	85 (36)	54 (36)	7 (47)	7 (35)
60–69	8762 (11)	34 (14)	24 (16)	4 (26)	4 (20)
70–79	2628 (3)	22 (9)	19 (12)	2 (13)	7 (35)
NRTI					
TDF/FTC	12 395 (16)	21 (9)	13 (9)	0	0
TAF/FTC	25 570 (33)	100 (42)	52 (34)	7 (46)	10 (50)
ABC/3TC	20 105 (26)	57 (24)	47 (31)	6 (40)	8 (40)
Other regimens	19 520 (25)	58 (25)	39 (26)	2 (14)	2 (10)
Third drug					
NNRTI	15 733 (21)	36 (15)	24 (16)	4 (27)	5 (25)
Protease inhibitor	14 267 (19)	34 (15)	27 (18)	3 (20)	5 (25)
Integrase inhibitor	37 622 (50)	143 (60)	86 (57)	7 (47)	9 (45)
Other	9968 (10)	23 (10)	14 (9)	1 (6)	1 (5)

3TC = lamivudine; ABC = abacavir; ART = antiretroviral therapy; COVID-19 = coronavirus disease 2019; FTC = emtricitabine; ICU = intensive care unit; NNRTI = nonnucleoside reverse transcriptase inhibitor; NRTI = nucleos(t)ide reverse transcriptase inhibitor; PCR = polymerase chain reaction; TAF = tenofovir alafenamide; TDF = tenofovir disoproxil fumarate.
* Distribution derived from the 2019 National HIV Hospital Survey (13); counts are estimated from this distribution.

Julia del Amo, MD, PhD et. al. Annals of Internal Medicine 2020

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40–49	19 373 (25)	54 (23)	39 (26)	1 (7)	2 (10)
50–59	32 321 (42)	85 (36)	54 (36)	7 (47)	7 (35)
60–69	8762 (11)	34 (14)	24 (16)	4 (26)	4 (20)
70–79	2628 (3)	22 (9)	19 (12)	2 (13)	7 (35)
NRTI					
TDF/FTC	12 395 (16)	21 (9)	13 (9)	0	0
TAF/FTC	25 570 (33)	100 (42)	52 (34)	7 (46)	10 (50)
ABC/3TC	20 105 (26)	57 (24)	47 (31)	6 (40)	8 (40)
Other regimens	19 520 (25)	58 (25)	39 (26)	2 (14)	2 (10)
Third drug					
NNRTI	15 733 (21)	36 (15)	24 (16)	4 (27)	5 (25)
Protease inhibitor	14 267 (19)	34 (15)	27 (18)	3 (20)	5 (25)
Integrase inhibitor	37 622 (50)	143 (60)	86 (57)	7 (47)	9 (45)
Other	9968 (10)	23 (10)	14 (9)	1 (6)	1 (5)

3TC = lamivudine; ABC = abacavir; ART = antiretroviral therapy; COVID-19 = coronavirus disease 2019; FTC = emtricitabine; ICU = intensive care unit; NNRTI = nonnucleoside reverse transcriptase inhibitor; NRTI = nucleos(t)ide reverse transcriptase inhibitor; PCR = polymerase chain reaction; TAF = tenofovir alafenamide; TDF = tenofovir disoproxil fumarate.
* Distribution derived from the 2019 National HIV Hospital Survey (13); counts are estimated from this distribution.

Julia del Amo, MD, PhD et. al. Annals of Internal Medicine 2020

HIV was associated with a doubling of COVID-19 mortality risk

South Africa
July 3, 2020

	Public sector patients with HIV			Public sector patients without HIV		
	No diagnosed COVID-19 n=536,574	COVID-19 not deceased n=3,863	COVID-19 deceased n=115	No diagnosed COVID-19 n=2,902,050	COVID-19 not deceased n=17,820	COVID-19 deceased n=510
Sex						
female	356,356 (66%)	3,039 (79%)	62 (54%)	1,627,124 (56%)	11,877 (67%)	278 (55%)
male	180,218 (34%)	824 (21%)	53 (46%)	1,274,926 (44%)	5,943 (34%)	232 (45%)
Age						
20-39 years	310,551 (58%)	2,187 (57%)	17 (15%)	1,603,235 (55%)	9,453 (53%)	29 (6%)
40-49 years	147,344 (27%)	1,136 (29%)	28 (24%)	457,632 (16%)	3,379 (19%)	35 (7%)
50-59 years	59,345 (11%)	418 (11%)	40 (35%)	388,394 (13%)	2,809 (16%)	122 (24%)
60-69 years	15,856 (3%)	98 (3%)	21 (18%)	260,226 (9%)	1,325 (7%)	157 (31%)
≥70 years	3,473 (1%)	24 (1%)	9 (8%)	192,562 (7%)	854 (5%)	167 (33%)
Diabetes						
none	517,609 (96%)	3,491 (90%)	57 (50%)	2,659,479 (92%)	15,090 (85%)	196 (38%)
diabetes HbA1c <7%	3,493 (1%)	65 (2%)	8 (7%)	41,561 (1%)	426 (2%)	50 (10%)
diabetes HbA1c 7 - 8.9%	2,998 (1%)	77 (2%)	16 (14%)	44,213 (2%)	505 (3%)	78 (15%)
diabetes HbA1c ≥9%	4,562 (1%)	126 (3%)	25 (22%)	61,077 (2%)	960 (5%)	133 (26%)
diabetes no HbA1c measurement	7,912 (1%)	104 (3%)	9 (8%)	95,720 (3%)	839 (5%)	53 (10%)
Other non-communicable diseases						
hypertension	62,676 (12%)	692 (18%)	48 (42%)	501,232 (18%)	4,218 (24%)	314 (62%)
chronic kidney disease	6,348 (1%)	82 (2%)	21 (18%)	55,319 (2%)	412 (2%)	90 (18%)
chronic pulmonary disease / asthma	23,501 (4%)	218 (6%)	10 (9%)	169,086 (6%)	1,359 (8%)	74 (15%)
Tuberculosis						
previous tuberculosis	129,259 (24%)	864 (22%)	42 (37%)	157,630 (5%)	834 (5%)	45 (9%)
current tuberculosis	24,357 (5%)	172 (4%)	16 (14%)	29,895 (1%)	145 (1%)	10 (2%)

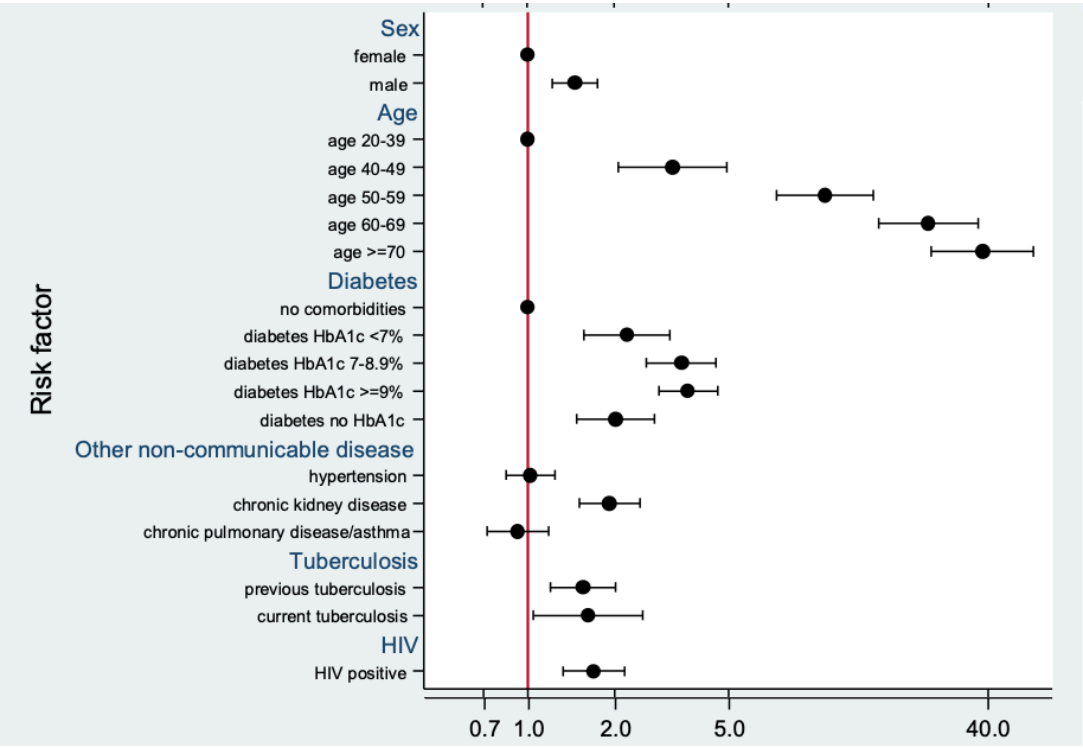
Note: Column percentages may add up to >100% due to rounding; HbA1c glycosylated haemoglobin

Davis MA. et al. MedRxiv 2020

Death in COVID-19 cases and hospitalized patients was increased in men and older persons

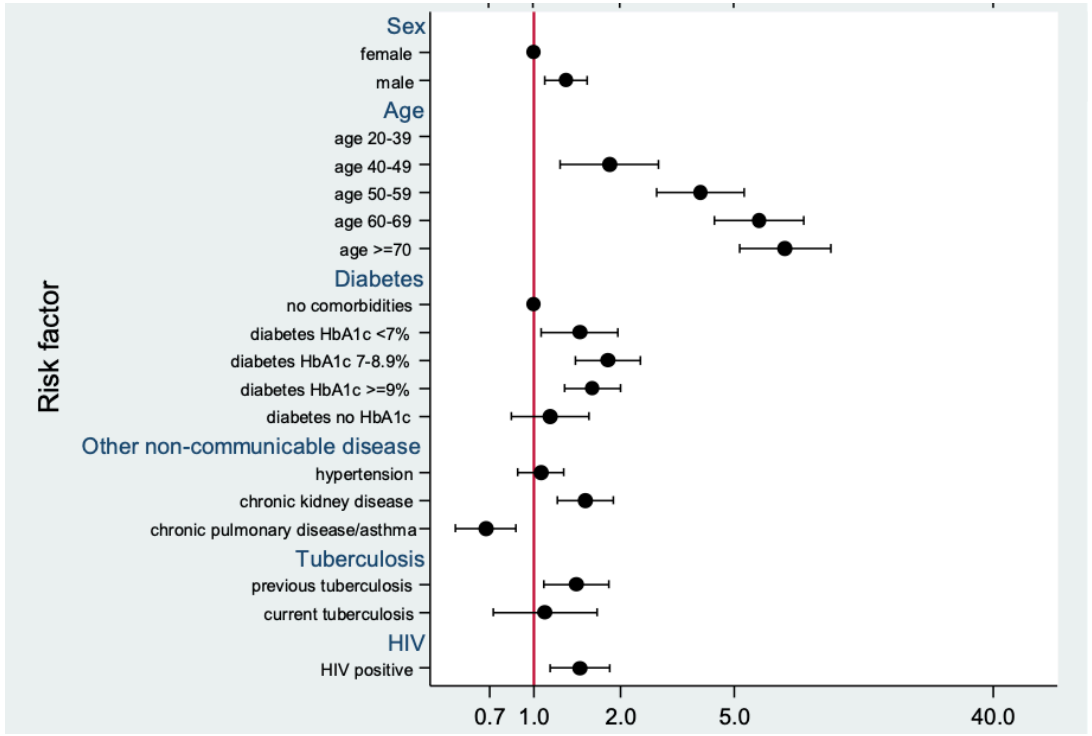
South Africa
July 3, 2020

All COVID-10 cases older than 20yrs before 6/1/2020 (n=15203)



Adjusted HR for COVID19 Death

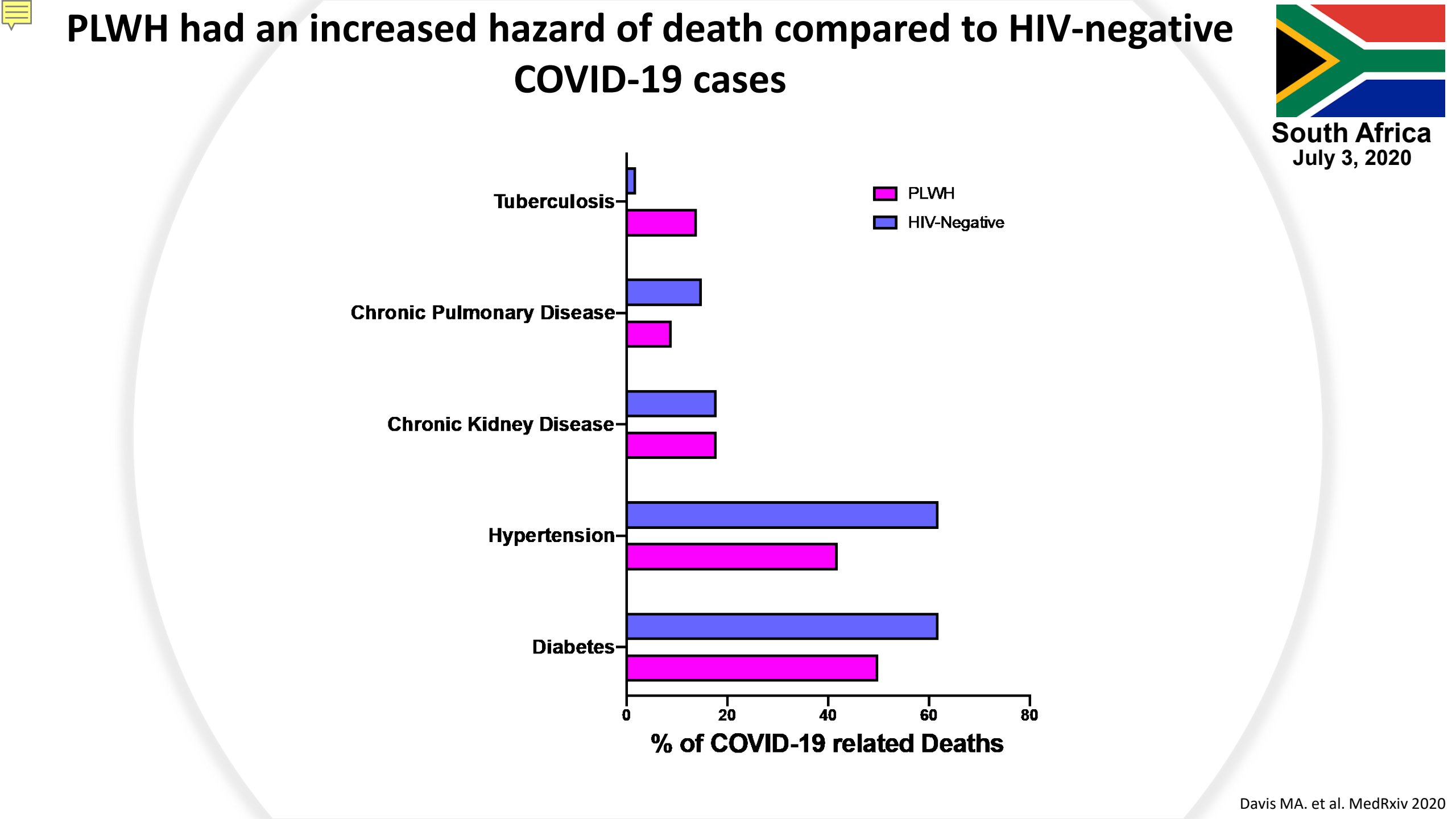
Hospitalized COVID-19 cases (n=2,978)



Adjusted HR for COVID19 Death

Davis MA. et al. MedRxiv 2020

PLWH had an increased hazard of death compared to HIV-negative COVID-19 cases



Davis MA. et al. MedRxiv 2020

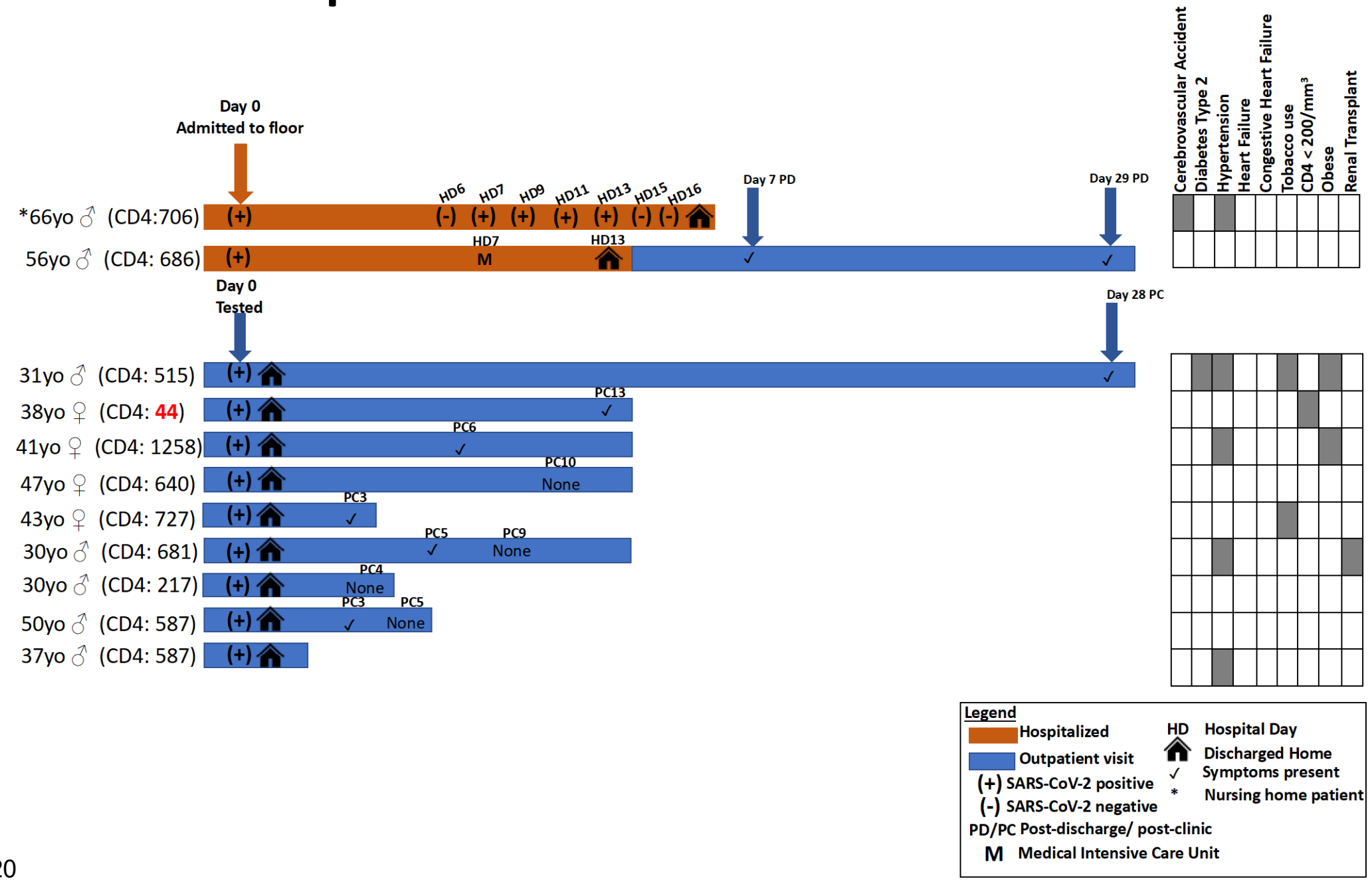
PLWH had an increased hazard of death compared to HIV-negative COVID-19 cases

South Africa
July 3, 2020

Description of data used in analysis	Including all COVID-19 cases diagnosed until study closure (9 June 2020)		
Certainty of evidence for comorbidities	All certainty		
	Adjusted HR	95% CI	p-value
Sex			
female	Ref		
male	1.47	1.25; 1.72	<0.001
Age			
20-39 years			
40-49 years	2.70	1.83; 3.98	<0.001
50-59 years	8.72	6.17; 12.31	<0.001
60-69 years	19.05	13.37; 27.13	<0.001
≥70 years	31.43	21.93; 45.05	<0.001
Diabetes			
none			
diabetes HbA1c <7%	2.54	1.89; 3.43	<0.001
diabetes HbA1c 7 - 8.9%	3.48	2.70; 4.48	<0.001
diabetes HbA1c ≥9%	3.96	3.19; 4.91	<0.001
diabetes no HbA1c measurement	2.07	1.55; 2.76	<0.001
Other non-communicable diseases			
hypertension	1.07	0.89; 1.27	0.488
chronic kidney disease	1.81	1.45; 2.25	<0.001
chronic pulmonary disease / asthma	0.83	0.66; 1.05	0.125
Tuberculosis			
never tuberculosis			
previous tuberculosis	1.53	1.20; 1.95	0.001
current tuberculosis	1.78	1.19; 2.66	0.005
HIV			
negative			
positive	1.75	1.40; 2.19	<0.001
VL <1000 copies/ml (last 15 mo) & ART script (last 6 mo)[$]	1.75	1.34; 2.29	<0.001
VL <1000 copies/ml (2yr to 15 mo prior) OR ART script (last 6 mo) & VL <1000 copies/ml >2yr prior	1.59	0.87; 2.92	0.135
VL ≥ 1000 copies/ml (last 15 mo) or CD4 <200 cells/µl (last 18 mo)	3.80	2.07; 6.95	<0.001
No VL (last 15 mo); CD4 ≥200 cells/µl or unknown (last 18 mo)	1.54	1.01; 2.33	0.042
ART in PLWH with script issued in last 12 months[¥]			
abacavir or zidovudine	Ref		
tenofovir	0.49	0.28; 0.86	0.0121
efavirenz	Ref		
lopinavir	0.76	0.33; 1.77	0.5271
atazanavir	0.76	0.23; 2.51	0.6540
dolutegravir	0.73	0.25; 2.15	0.5732

Davis MA. et al. MedRxiv 2020

Sequalae of COVID-19 in PLWH



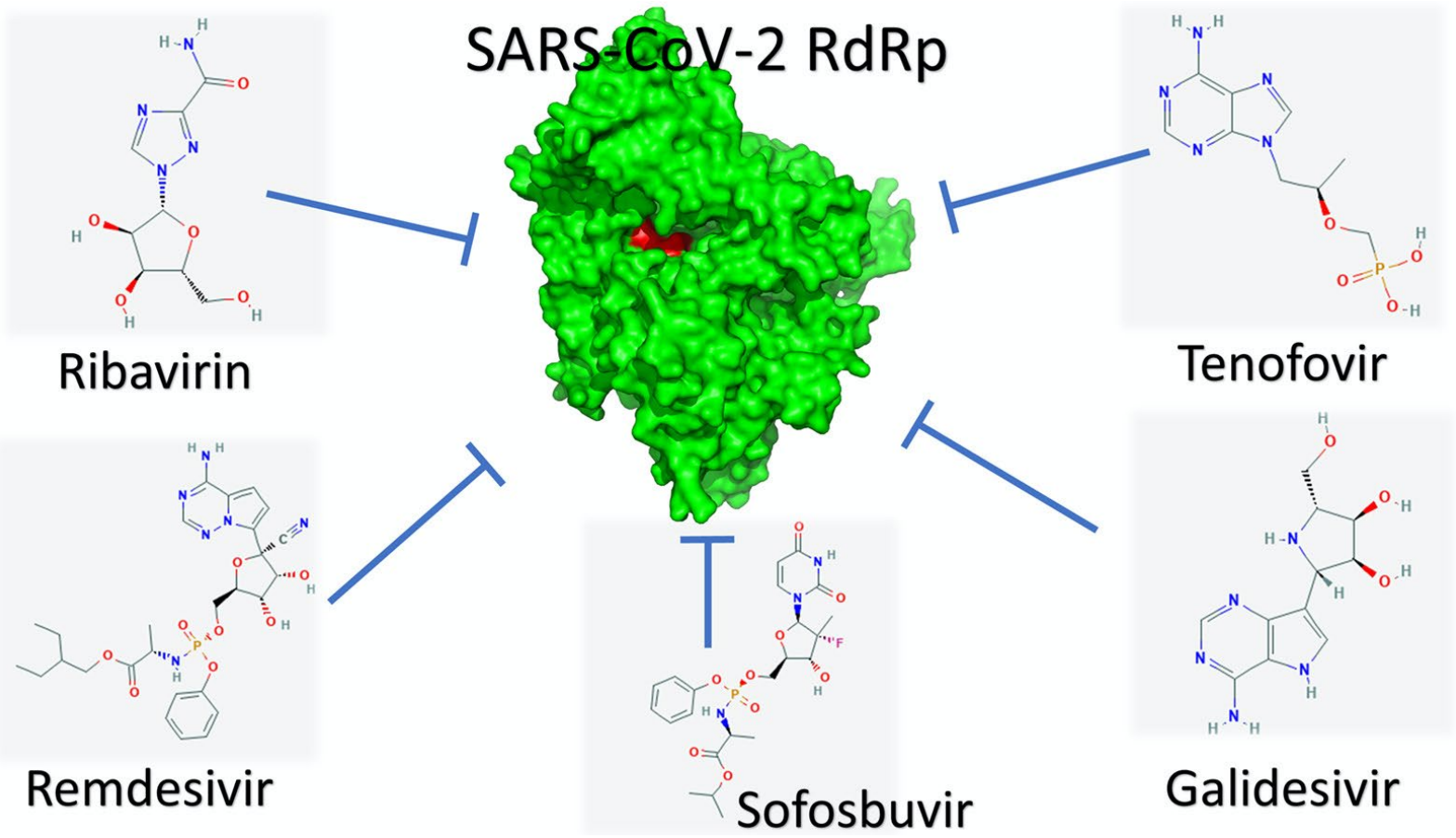
VANDERBILT UNIVERSITY MEDICAL CENTER

March and June 2020

Outline

- SARS-CoV2 and the immune system
- Sum of consecutive cases of COVID-19 in PLWH from different published case reports/series
  - Comorbidities
  - CD4 counts and viral load
  - Long-term sequelae
  - Mental health
  - ART: To switch or not to switch?
- ART and SARS-CoV2
  - What about patients on PrEP?
  - DHHS guidelines
- HIV Screening and care during the pandemic
- IDSA guidelines, Key points and Future studies

Ribavirin, Remdesivir, Sofosbuvir, Galidesivir, and Tenofovir against SARS-CoV-2 RNA dependent RNA polymerase: A molecular docking study



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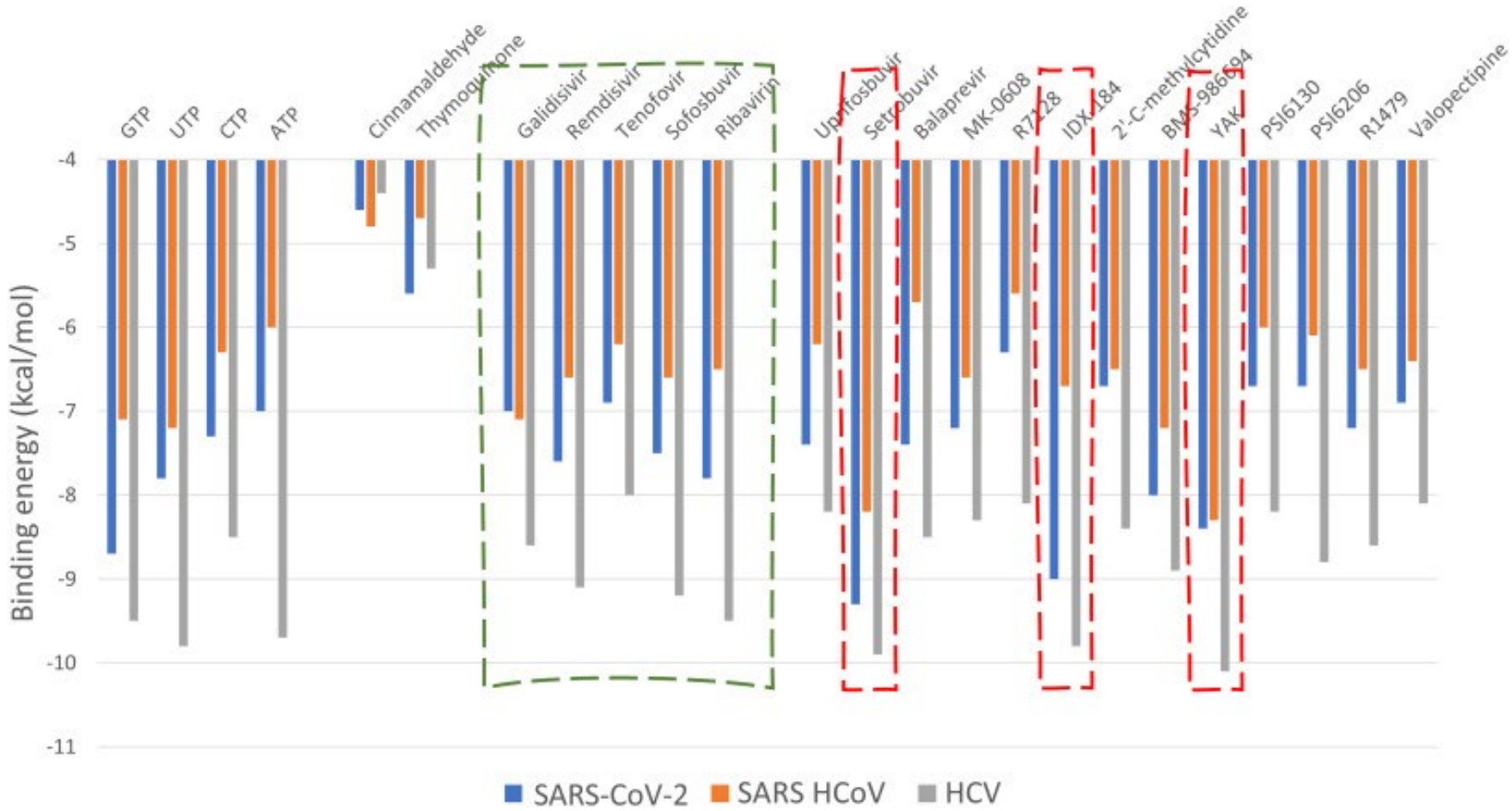
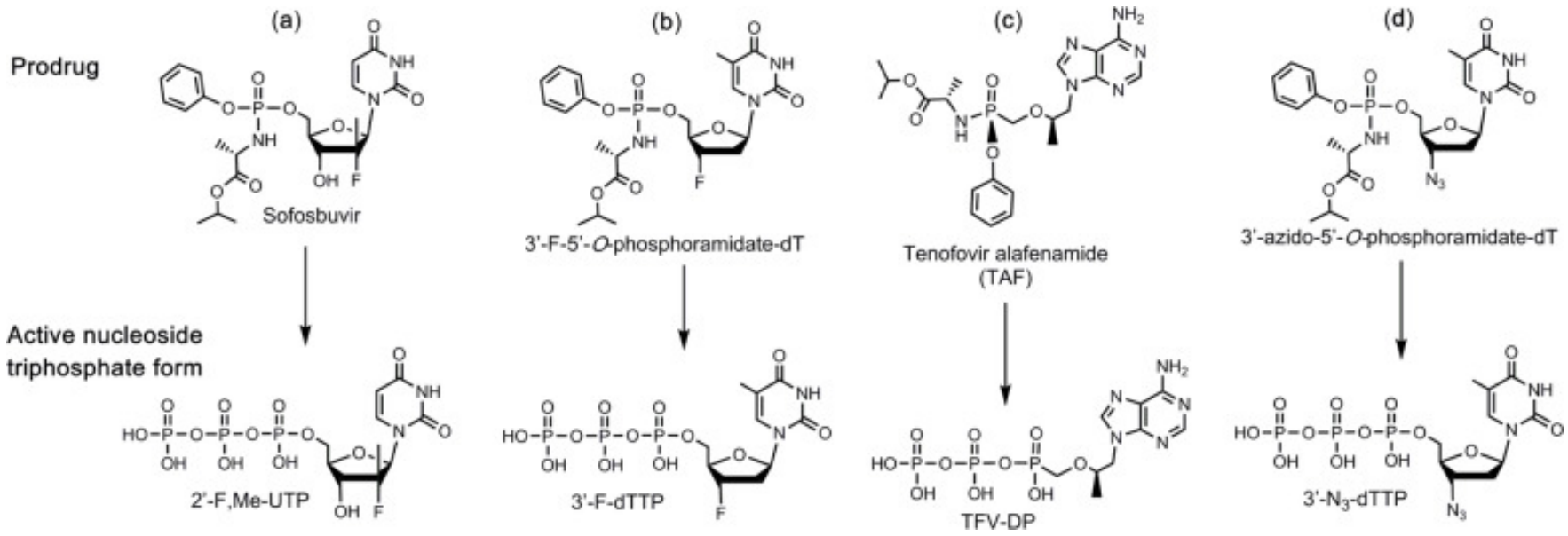


Abdo A.Elfiky. Life Sciences July 2020

Nucleotide analogues 2’-F,Me-UTP, 3’-F-dTTP, 3’-N3-dTTP, and TFV-DP are permanent terminators for the SARS-CoV-2 RdRp



Minchen Chien et. al. BioRXiV 2020

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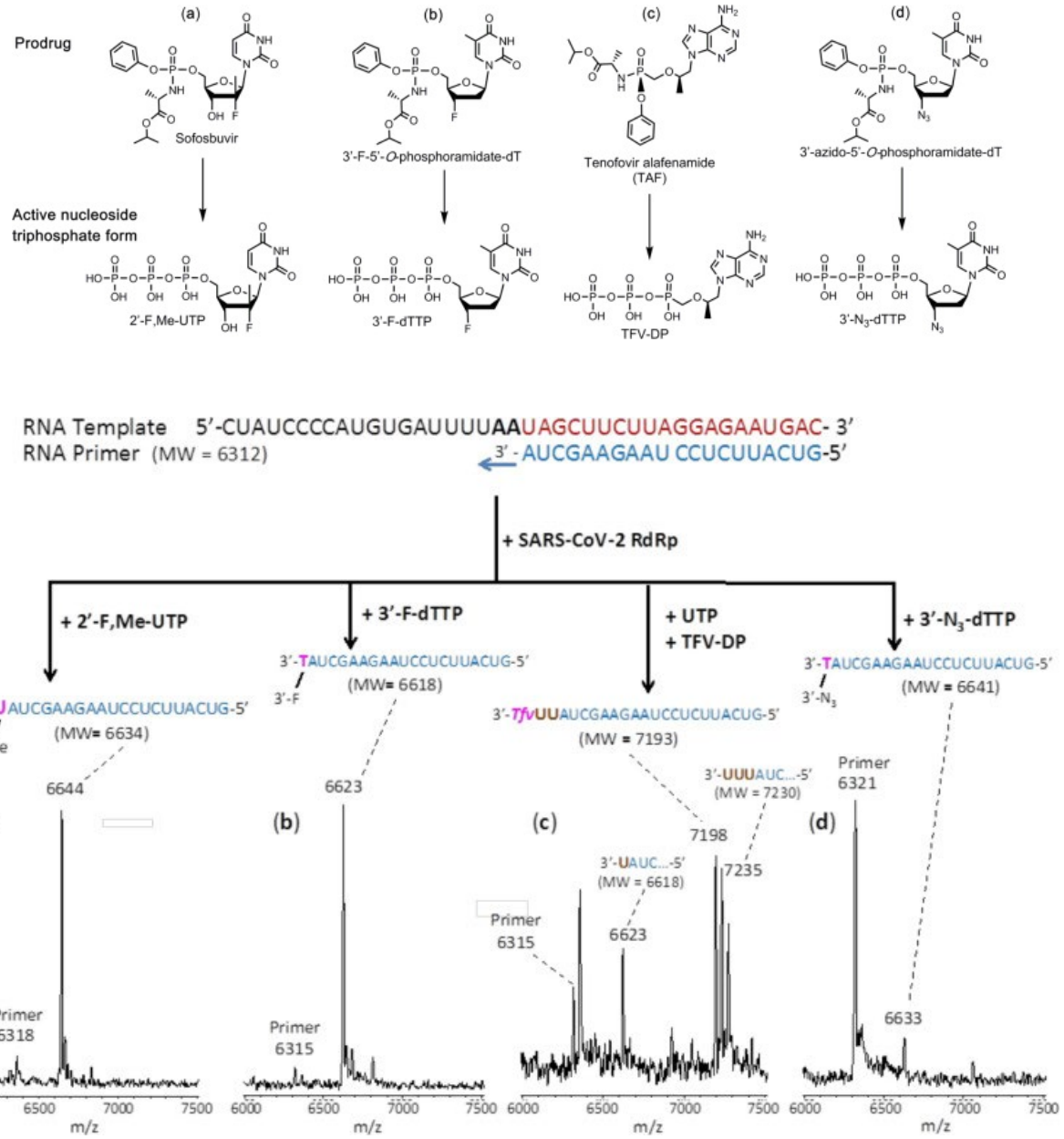

Minchen Chien et. al. BioRXiV 2020

DHHS Guidelines for PLWH

Accessed 7/21/ 2020
Updated June 19, 2020

- Individuals aged >60 years and those with diabetes, hypertension, cardiovascular disease, pulmonary disease, or obesity are at highest risk of life-threatening COVID-19, the illness caused by the virus known as SARS-CoV-2.
- The limited data currently available do not indicate that the disease course of COVID-19 in persons with HIV differs from that in persons without HIV. Before the advent of effective combination antiretroviral therapy (ART), advanced HIV infection (i.e., CD4 cell count <200/mm^3) was a risk factor for complications of other respiratory infections. Whether this is also true for COVID-19 is yet unknown.
- Some people with HIV have other comorbidities (e.g., cardiovascular disease, lung disease) that increase the risk for a more severe course of COVID-19 illness. Chronic smokers are also at risk of more severe disease.
- Thus, until more is known, additional caution for all persons with HIV, especially those with advanced HIV or poorly controlled HIV, is warranted.
- Every effort should be made to help persons with HIV maintain an adequate supply of ART and all other concomitant medications.
- Influenza and pneumococcal vaccinations should be kept up to date.

https://aidsinfo.nih.gov/guidelines/html/8/covid-19-and-persons-with-hiv--interim-guidance-/554/interim-guidance-for-covid-19-and-persons-with-hiv

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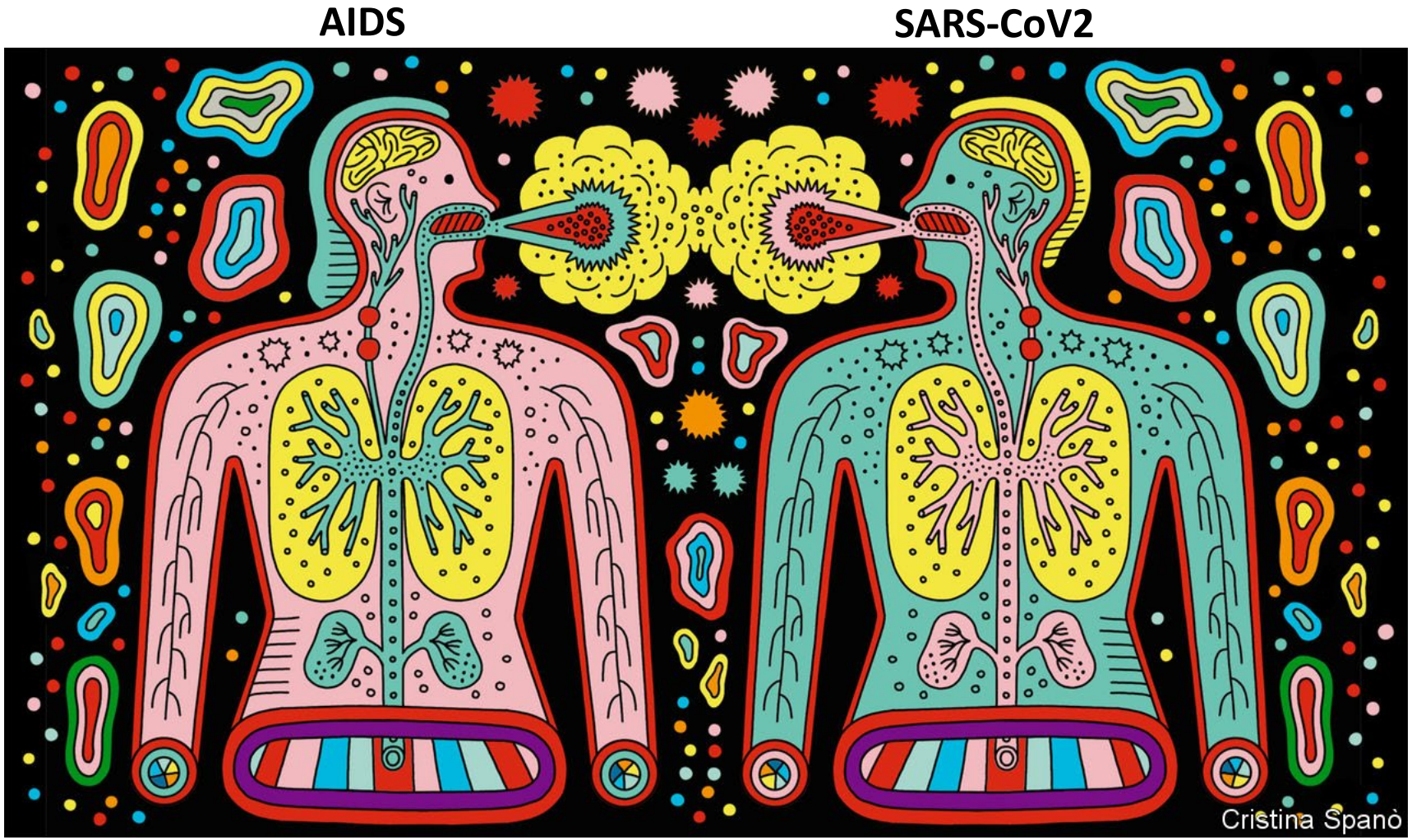
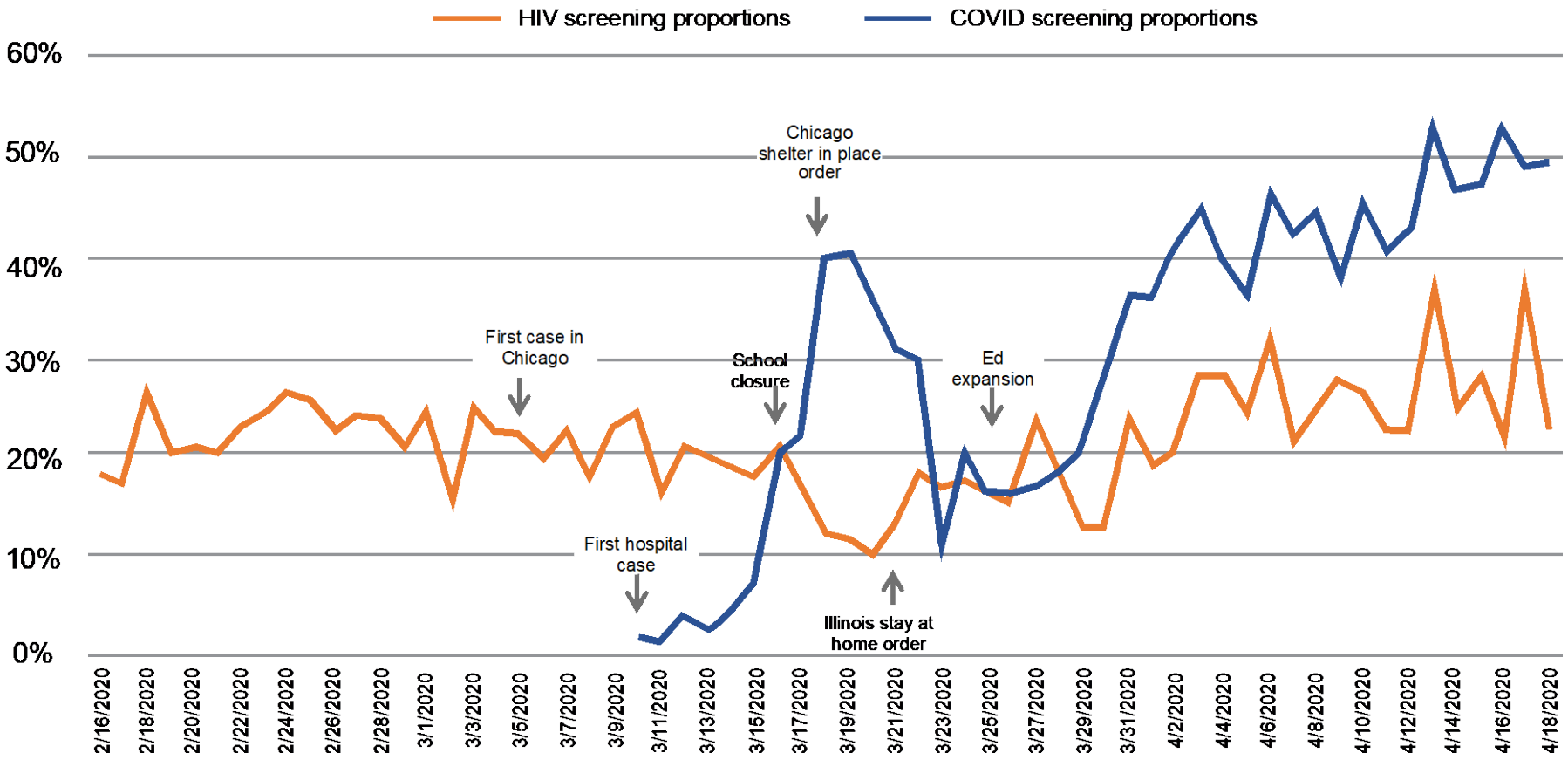
HIV Screening and care during the pandemic



https://www.economist.com/briefing/2020/06/06/how-sars-cov-2-causes-disease-and-death-in-covid-19. Art by Cristina Spano

Routine Screening for HIV in an Urban Emergency Department During the COVID-19 Pandemic



Stanford et al. AIDS and Behavior May 2020

Published Case Reports of COVID-19 in Persons Living with HIV

Country	Author	Conclusion	COVID cases in PLWH	Deaths
China	Guo W et al. Lancet 2020	PWH have similar risk as the general population	8	1
	Wu, Q et al. J Med Virol 2020	New Diagnosis of HIV during Pandemic	2	0
	Zhu F et al. J Med Virol. 2020	PWH are vulnerable	1	0
	Zhao, J et al. CID 2020	Negative PCR tests in patients, suggest that PLWH exposed to the virus may be symptomatic but test negative	1	0
Germany	Haerter G etl al. MedRxiv 20..	76% of PWH have mild disease	33	3
Italy	Gervasoni C et al. CID 2020	PWH not a greater risk	47	2
South Africa	Davies MA et al. MedRXIV 2..	2-fold increased risk of death from COVID-19 in PLWH irrespective of viral suppression, similar increase in patients with TB. Persons on T..	3,978	115
Spain	Amo JD Annals of Internl Me..	Risk of COVID-19 diagnosis was lower in the HIV-positive population	236	20
	Vizcarra P et.al. Lancet 2020	Lower CD4 has higher risk of complication	51	2
	Blanco J et al. Lancet HIV 20..	Recognize new diagnosis of HIV	5	0
Turkey	Aydin OA at al. J Med Virol 2..	Measured SARS-CoV2 antibodies before discharge, present in 2/4 pts tested, patient with comorbidities had worse outcomes	4	1
Uganda	Baluku, J et al. J Med Virol 2..	Importance of paying attention to COVID-19 mimics in low income areas	1	
United Kingdom	Child K. et al CID 2020	Hospitalized patients had low median CD4/ substancial morbidity	18	5
USA	Sigel K. et al. CID 2020	Risk of severe disease comparable to the general populaton	88	18
	Richardson, S et al. JAMA 20..	0.8% of total patients in this series had HIV	43	
	Shalev N et al. CID 2020	7/8 deceased were receiving tenofovir prodrug at time of death 4> 65yo and 4 patients between age 50 and 65	31	8
	Okoh A et al. JAIDS 2020	Patients that died were elderly with multiple comorbidities	27	2
	Karmen-Tuoh, S et al. JAIDS ..	No difference in clinical presentation, course including thrombotic events and myocardial infarction	21	
	Suwanwongse K. et. al. J Me..	Hospital in South Bronx, known for poverty. Patients with low CD4 had a higher mortality rate. HIV-related T cell suppression does not ap..	9	7
	Ridgway JS et al. AIDS Patie..	All survived, 1/5 presented with tachycardia, test positive 3 days later	5	0
	Patel RH et al. J Med Virol 2..	Speculate on possible benefit on ART on COVID19, hence less severe disease	1	
	Argenziano MG et al. BMJ 20..	Age, BMI and HIV or renal disease associated with death		
	Goyal P et al NEJM 2020	None	7	

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Infectious Diseases Society of America (IDSA) guidelines

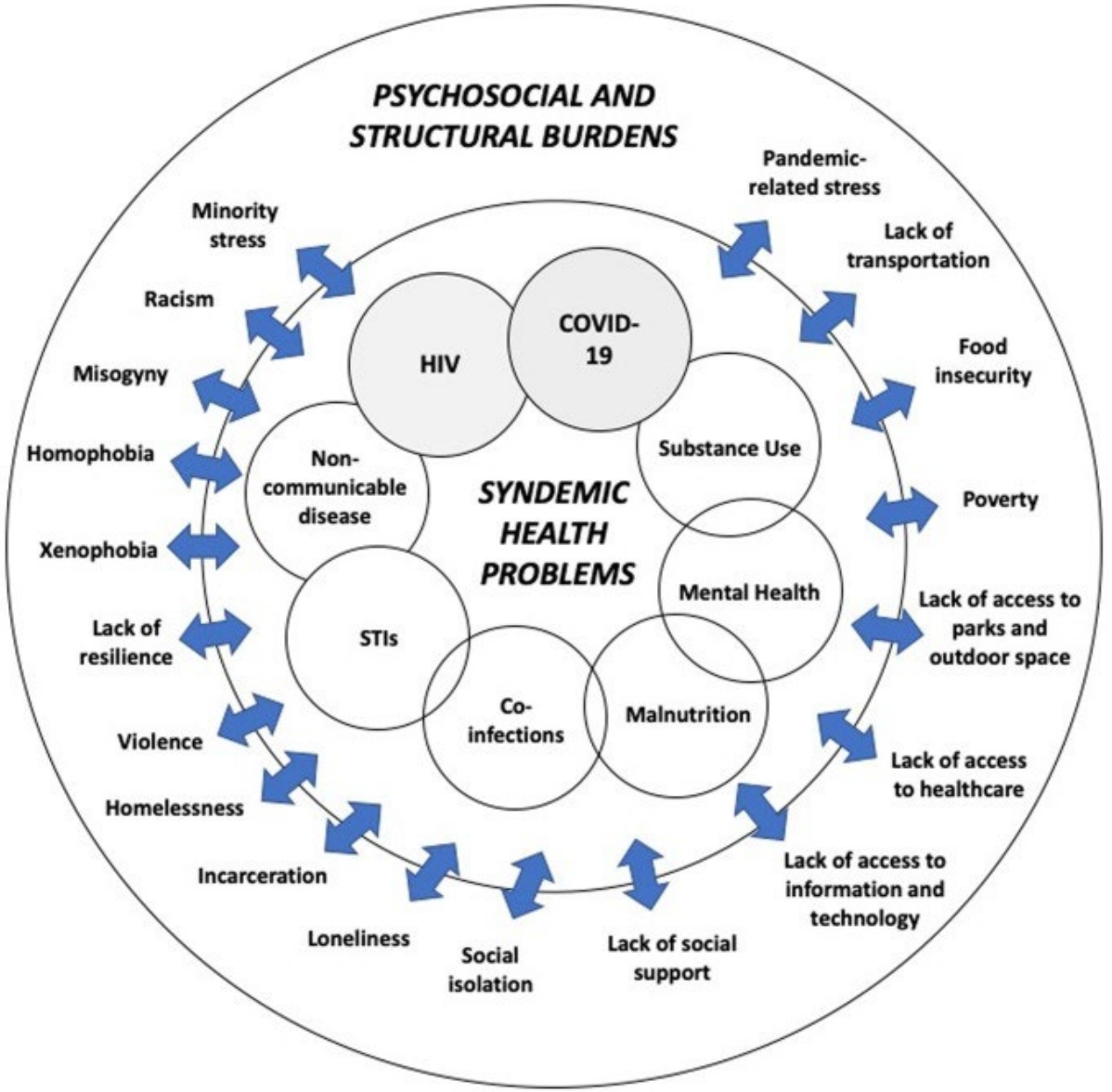
- Among patients with COVID-19, the IDSA guideline panel recommends **hydroxychloroquine/chloroquine only in the context of a clinical trial.** (Knowledge gap)
- Among patients with COVID-19, the IDSA guideline panel suggests **against hydroxychloroquine/chloroquine plus azithromycin outside of the context of a clinical trial.** (Conditional recommendation, very low certainty of evidence
- Among patients who have been admitted to the hospital with COVID-19, the IDSA guideline panel recommends the combination of **lopinavir/ritonavir only in the context of a clinical trial.** (Knowledge gap)

Steroids

- Among hospitalized patients with severe* COVID-19, the IDSA guideline panel suggests **glucocorticoids rather than no glucocorticoids**. (Conditional recommendation, Moderate certainty of evidence)
- Among hospitalized patients with COVID-19 **without hypoxemia requiring supplemental oxygen**, the IDSA guideline panel suggests **against the use of glucocorticoids.** (Conditional recommendation, Low certainty of evidence)
- Among hospitalized patients with severe* COVID-19, the IDSA panel suggests **remdesivir over no antiviral treatment.** (Conditional recommendation, Moderate certainty of evidence)
- Among patients with severe COVID-19 on **supplemental oxygen but not on mechanical ventilation or ECMO**, the IDSA panel suggests treatment with **five days of remdesivir rather than 10 days of remdesivir.** (Conditional recommendation, low certainty of evidence)

https://www.idsociety.org/COVID19guidelines *Published 6.25.2020*

A syndemic conceptualization of HIV & COVID-19 co-infection in people living with HIV



Shiau s et al. AIDS Behavior 2020

Key points

- Greater proportions of comorbidities in PLWH could account for differences in outcomes in different case reports
- Data points in PLWH with CD4 < 200 are sparse
- We not have enough evidence to justify switching ART due to COVID-19
- Severe COVID-19 is a manifestation immune imbalance, even in PLWH
- Lymphopenia predicts severe disease even in persons living with HIV
- Larger data points from well curated assays are needed to make conclusions about outcomes.
- Remdesivir can be given along with ART therapies, if patients have severe COVID-19
- Possible role of ART in SARS-CoV2 needs to be investigated. Consecutive cases or lack of reported in patients on PrEP might be helpful