Exercise and COVID-19
What's the Connection?

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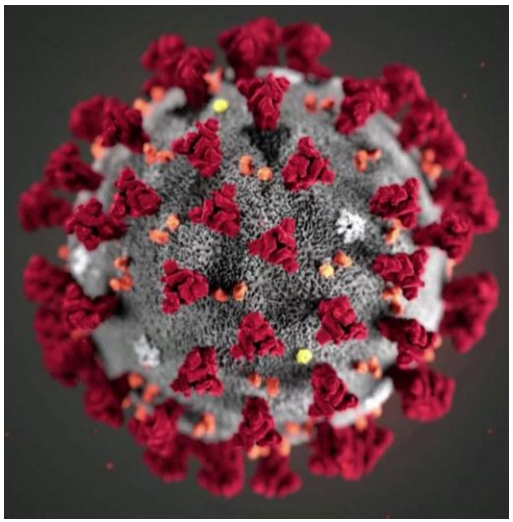
Conflict of Interest Disclosure

Robert Sallis

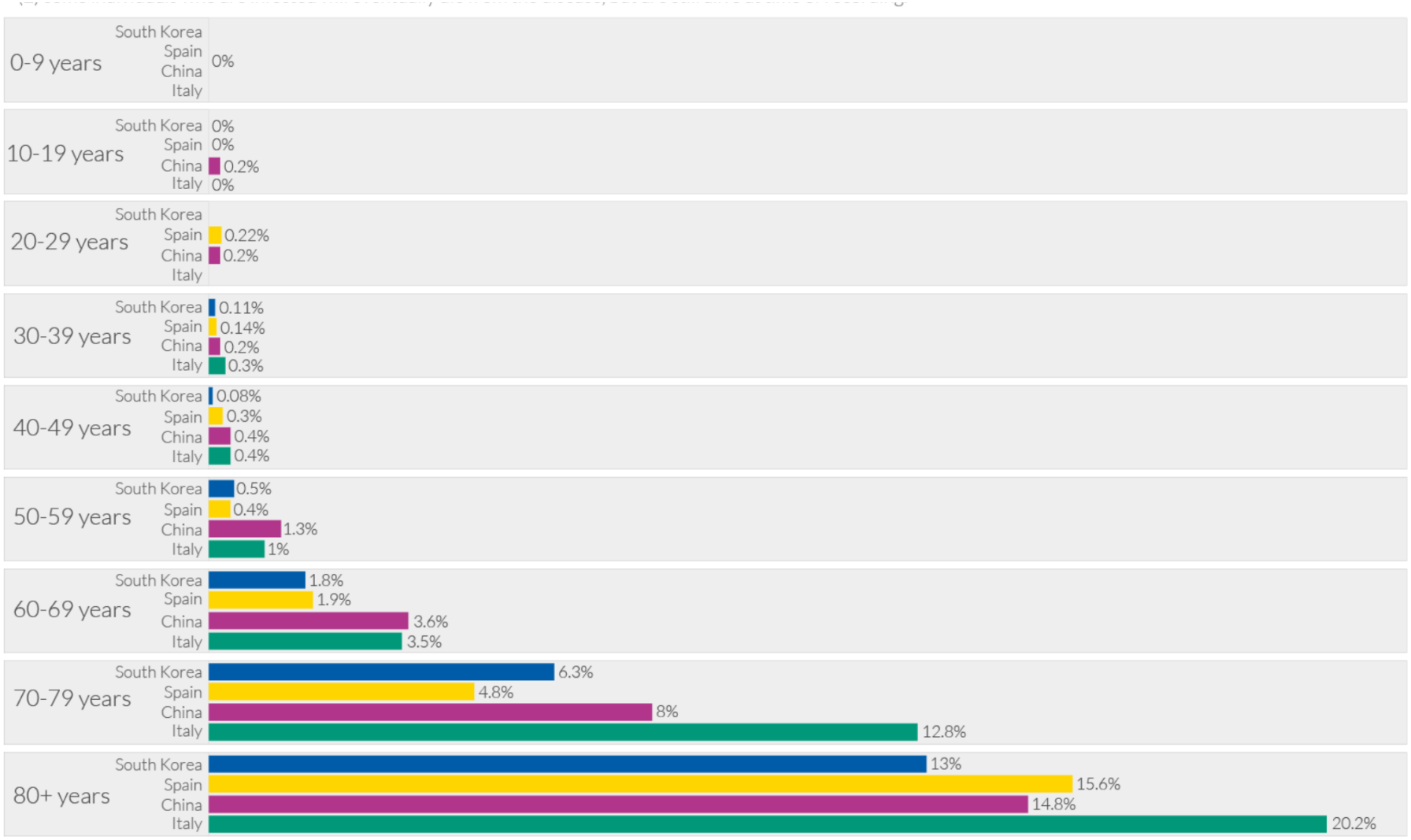
- Has no actual or potential conflict of interest in relation to this presentation
- Will be discussing the use an off-label and unapproved drug called Exercise in this presentation

Coronavirus Disease 2019

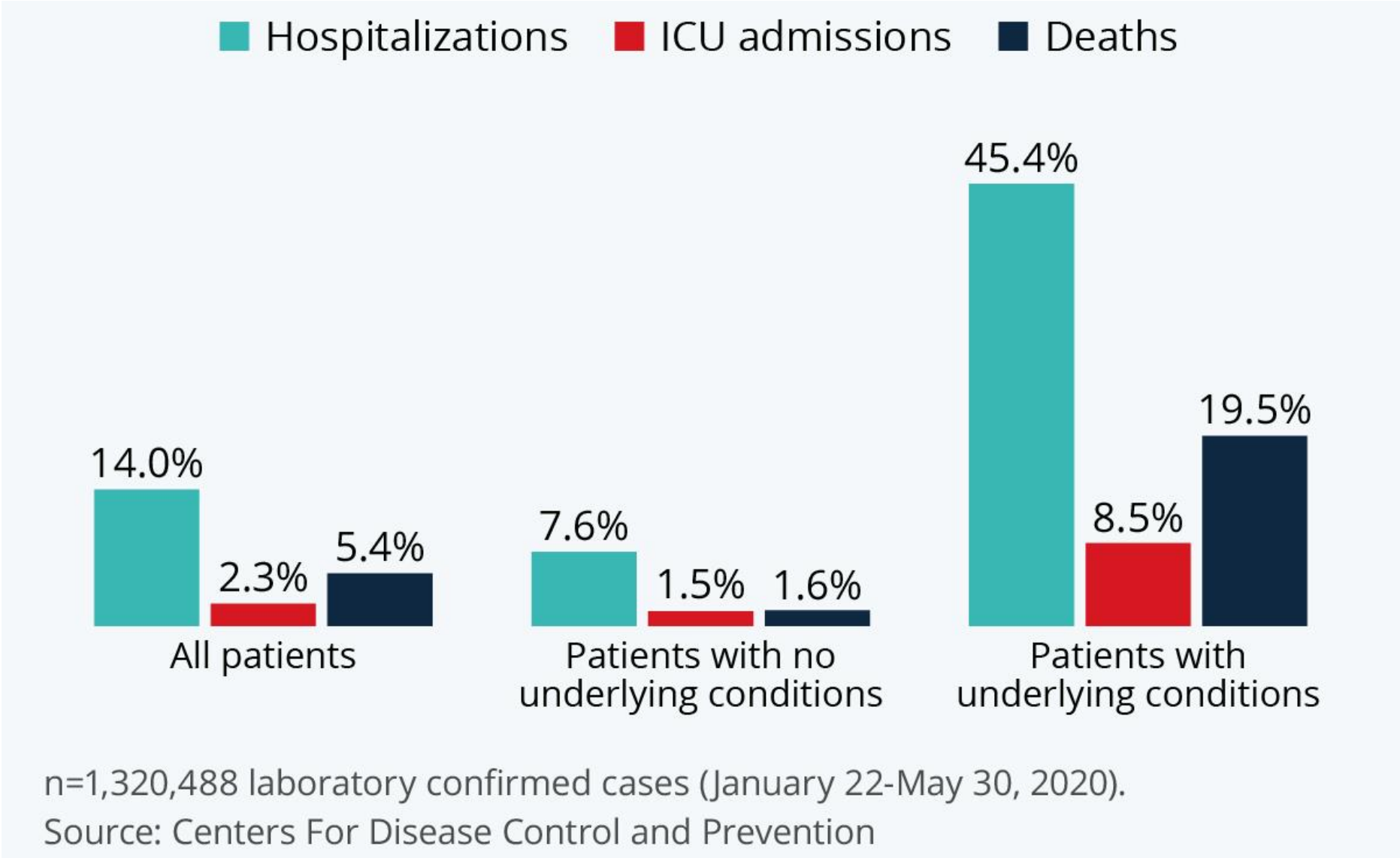
- Pandemic has dominated nearly every aspect of the life.
- Poor outcomes from COVID-19 have been associated with:
  - Increasing age
  - Ethnic minority populations
  - More deprived populations
  - Chronic disease
- Public Health mitigation efforts almost entirely focused on lockdown (masking, distancing, cleaning) and vaccination.



Age is Biggest Risk Factor for Dying



Underlying Conditions 2nd



n=1,320,488 laboratory confirmed cases (January 22-May 30, 2020).
Source: Centers For Disease Control and Prevention

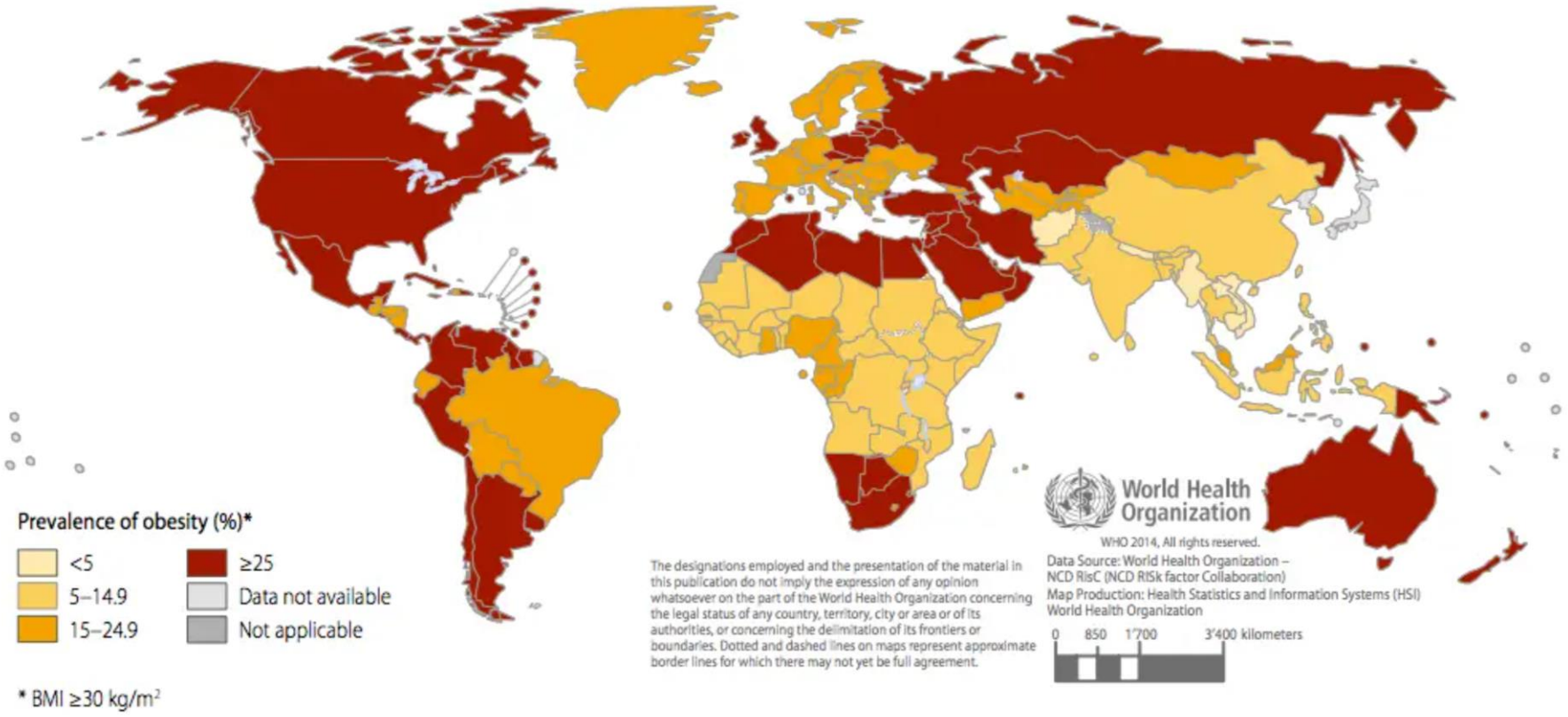
CDC Risks for Severe COVID

- Age >65 and especially >80 years (in nursing home)
- Obesity (BMI 30-40)
- Severe Obesity (BMI ≥ 40 kg/m2)
- Cancer
- Chronic kidney disease
- COPD
- Heart Disease
- Immunocompromised state (HIV, transplant, chronic steroids)
- Sickle cell disease
- Smoking
- Type 2 diabetes mellitus

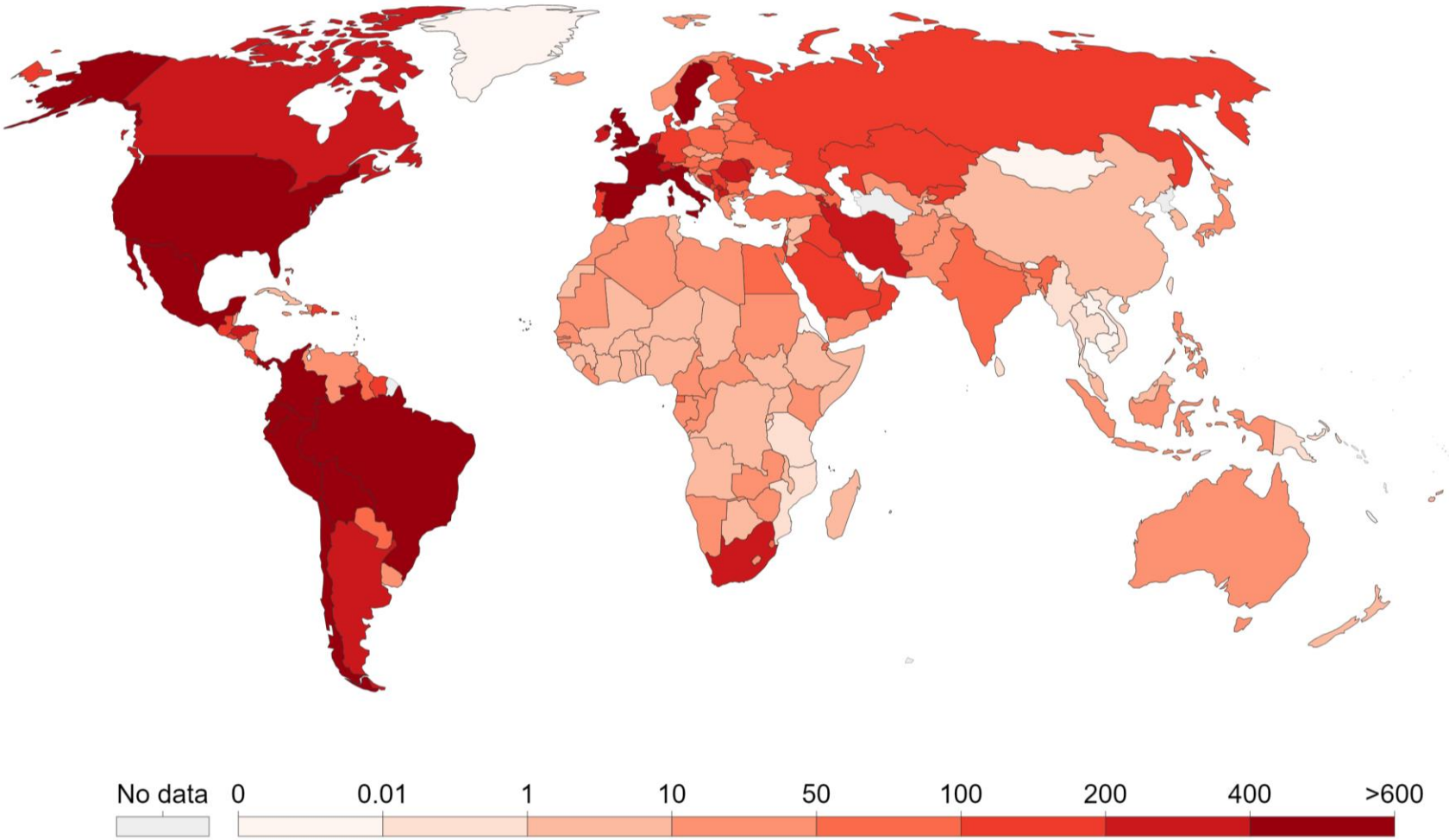
Diseases of an Unhealthy Lifestyle

- Age >65 and especially >80 years (in nursing home)
- Obesity (BMI 30-40)
- Severe Obesity (BMI ≥ 40 kg/m2)
- Cancer
- Chronic kidney disease
- COPD
- Heart Disease
- Immunocompromised state (HIV, transplant, chronic steroids)
- Sickle cell disease
- Smoking
- Type 2 diabetes mellitus

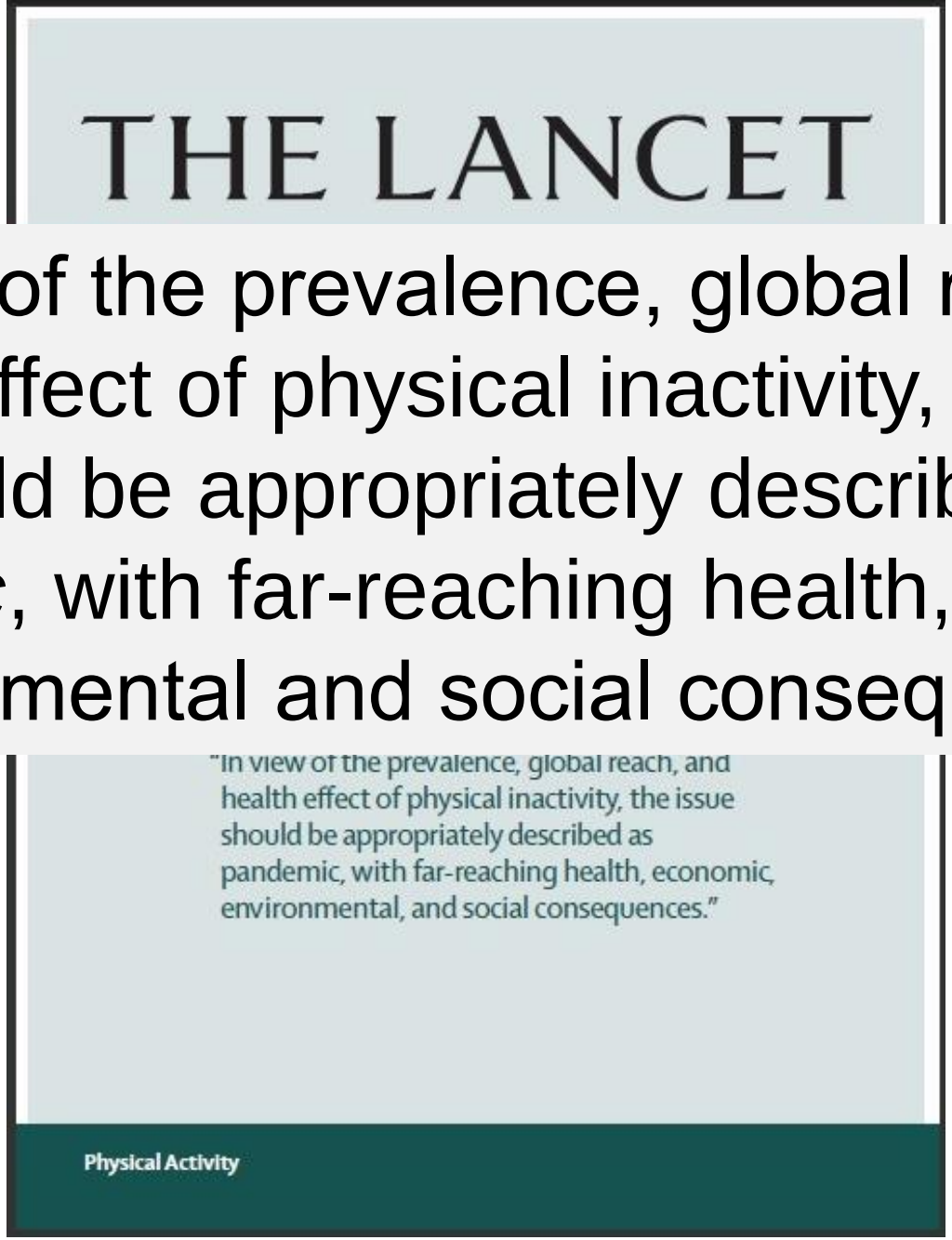
Worldwide Prevalence of Obesity



Worldwide Prevalence of COVID Deaths



Source: European CDC – Situation Update Worldwide – Last updated 9 September, 13:35 (London time)
OurWorldInData.org/coronavirus • CC BY



"In view of the prevalence, global reach and health effect of physical inactivity, the issue should be appropriately described as *Pandemic*, with far-reaching health, economic, environmental and social consequences."

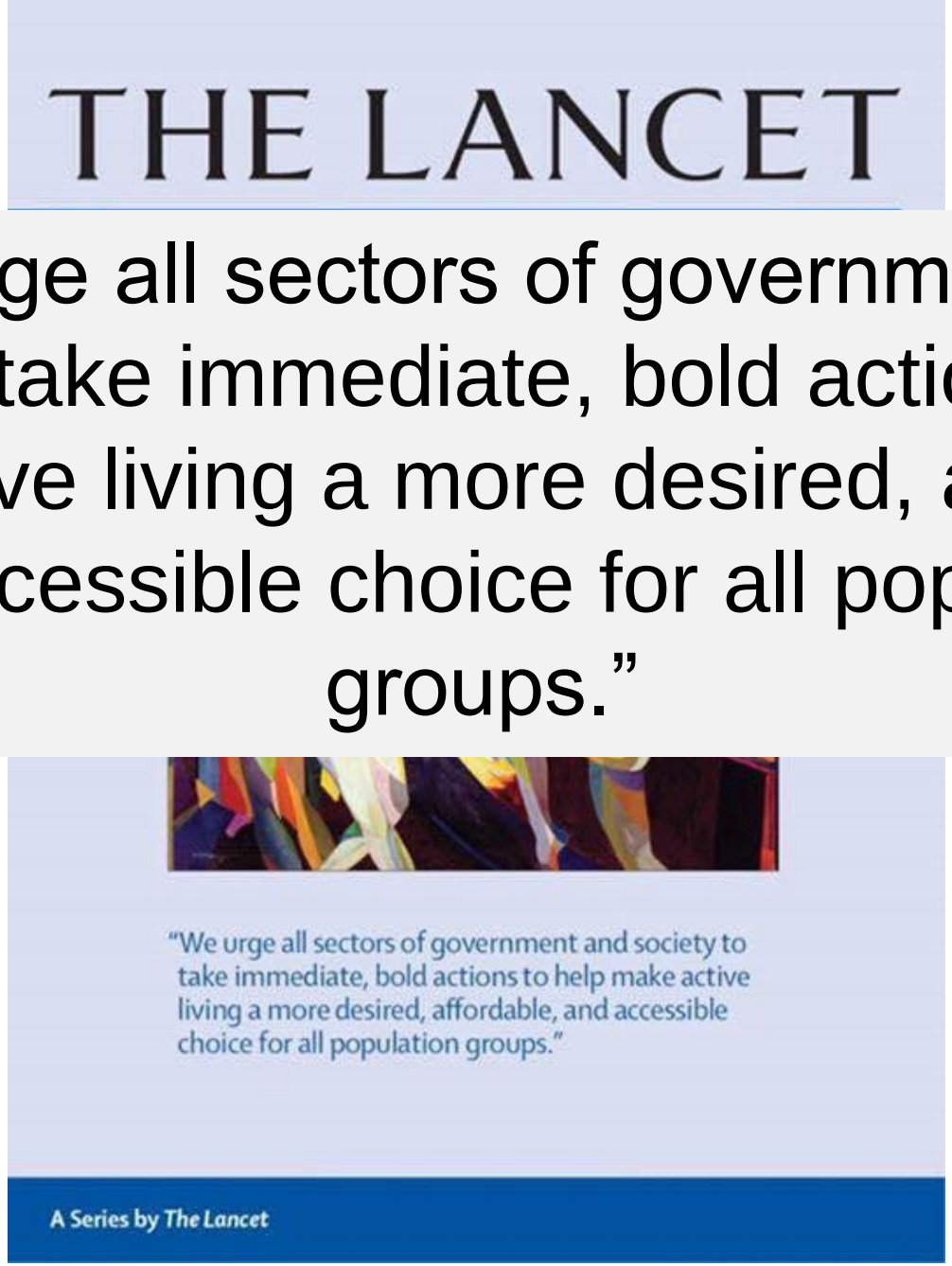
July 2012

Boris Lushniak, MD, MPH
Acting United States Surgeon General

U.S. Department of Health & Human Services
Office of the Surgeon General

ACSM Annual Meeting
Orlando, Florida; May 30, 2014

“We Urge all sectors of government and society to take immediate, bold actions to help make active living a more desired, affordable, and accessible choice for all population groups.”



July 2016

When Pandemics Collide

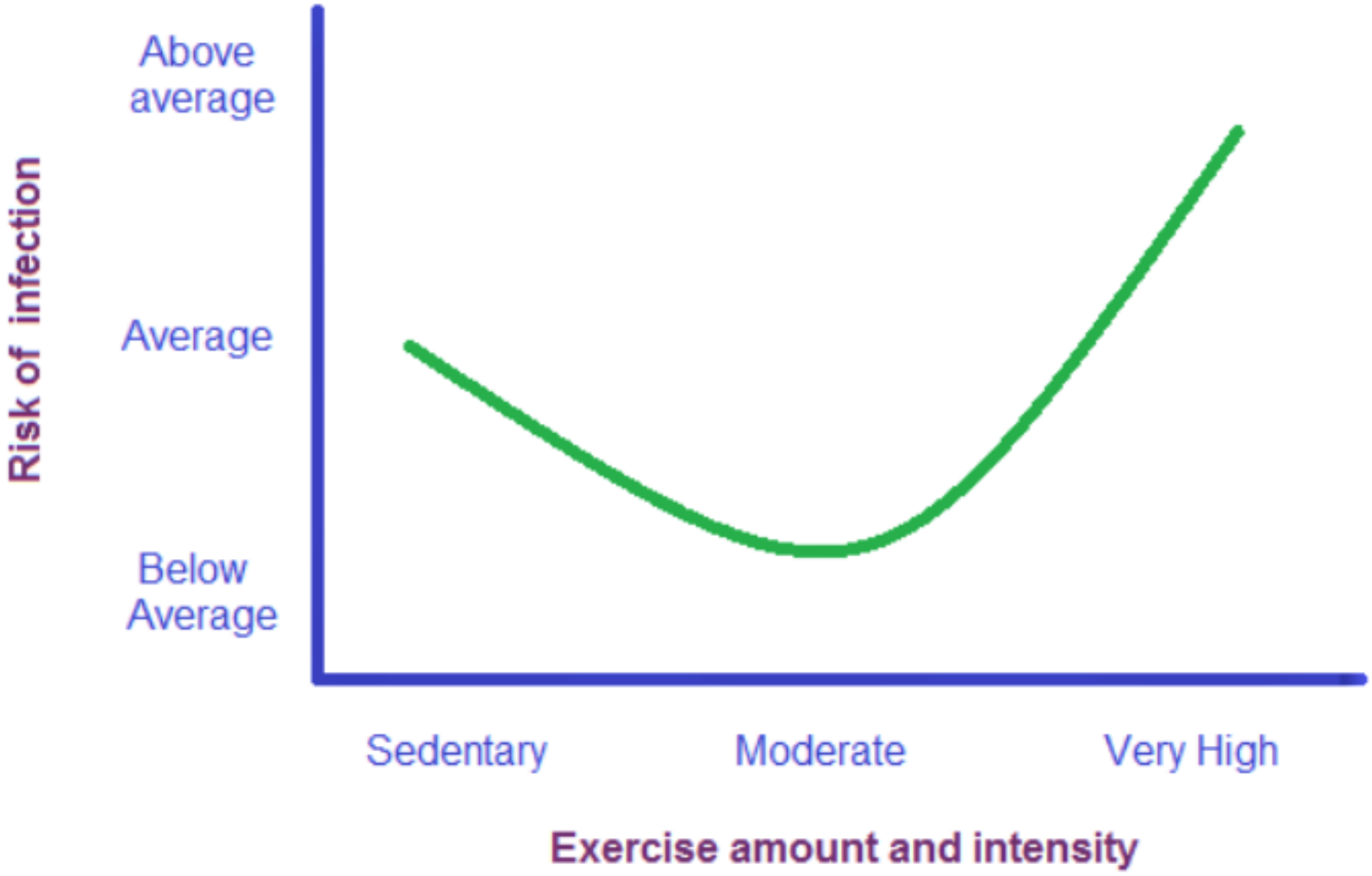
- It is clear the inactivity pandemic is foundational in the global explosion of non-communicable diseases (NCDs) that have collided so tragically with the COVID-19 pandemic.
- Evidence suggests that the failure to take seriously these evidence-based warnings has contributed to nearly 4 million COVID-19 deaths worldwide.
- Unquestionable evidence of the beneficial effects of physical activity on virtually every system of the body supported it as the “best buy in public health”.
- Urgent action is needed to tackle the ongoing collision of the inactivity, NCD, and COVID-19 pandemics (also known as a Syndemic).

Exercise and Your Immune System

- Regular bouts of MVPA (30-45 min) benefit, especially in elderly and with chronic disease.
- Social isolation, confinement and stress adversely affect immune function; Exercise shown to counter this.
- Fitness seems to enhance the immune system:
  - Moderate activity can reduce respiratory tract illness by 30% to 40%.
  - Likely also protects against SARS-CoV-2.
  - However, prolonged intense activity (more than 90 min) can result in temporary immune suppression for up to 72 hours.

Simpson et al., Exerc Immunol Rev, 2020

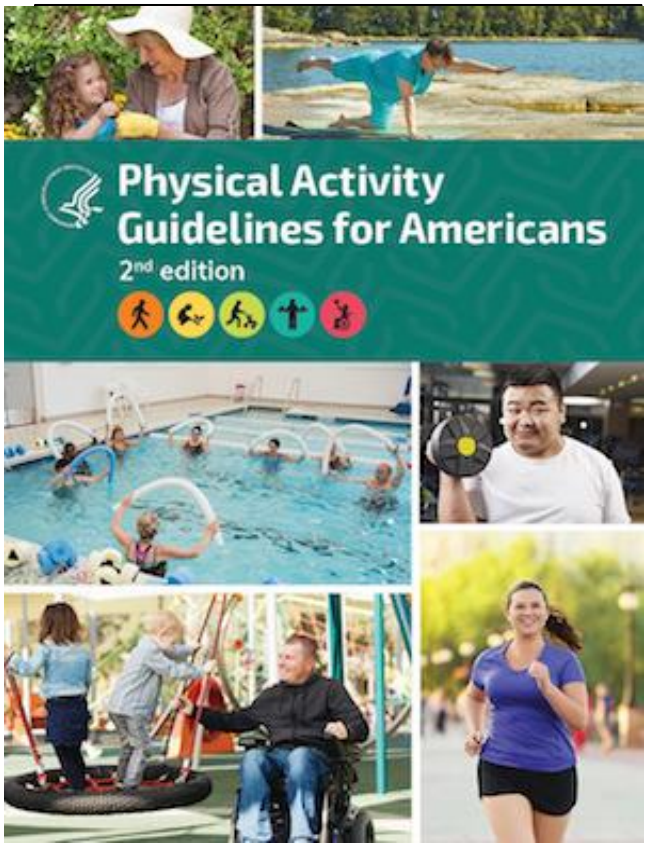
Exercise and Risk of Infection
The “U” Shaped Curve



Nieman DC, J of Sport and Health Science, 2019;8(3):201–17

What is the Optimal Dose of Exercise? 2018 US Physical Activity Guidelines

- 150 minutes per week of moderate to vigorous PA (like a brisk walk) in adults.
  - 30 minutes walking on 5 days per week.
  - Activity bouts of any duration count!
- 75 minutes per week of vigorous exercise (like running).
- 60 minutes per day in kids (half at vigorous intensity).



Physical Inactivity and Severe COVID-19 Risk

Original research

Physical inactivity is associated with a higher risk for severe COVID-19 outcomes: a study in 48 440 adult patients

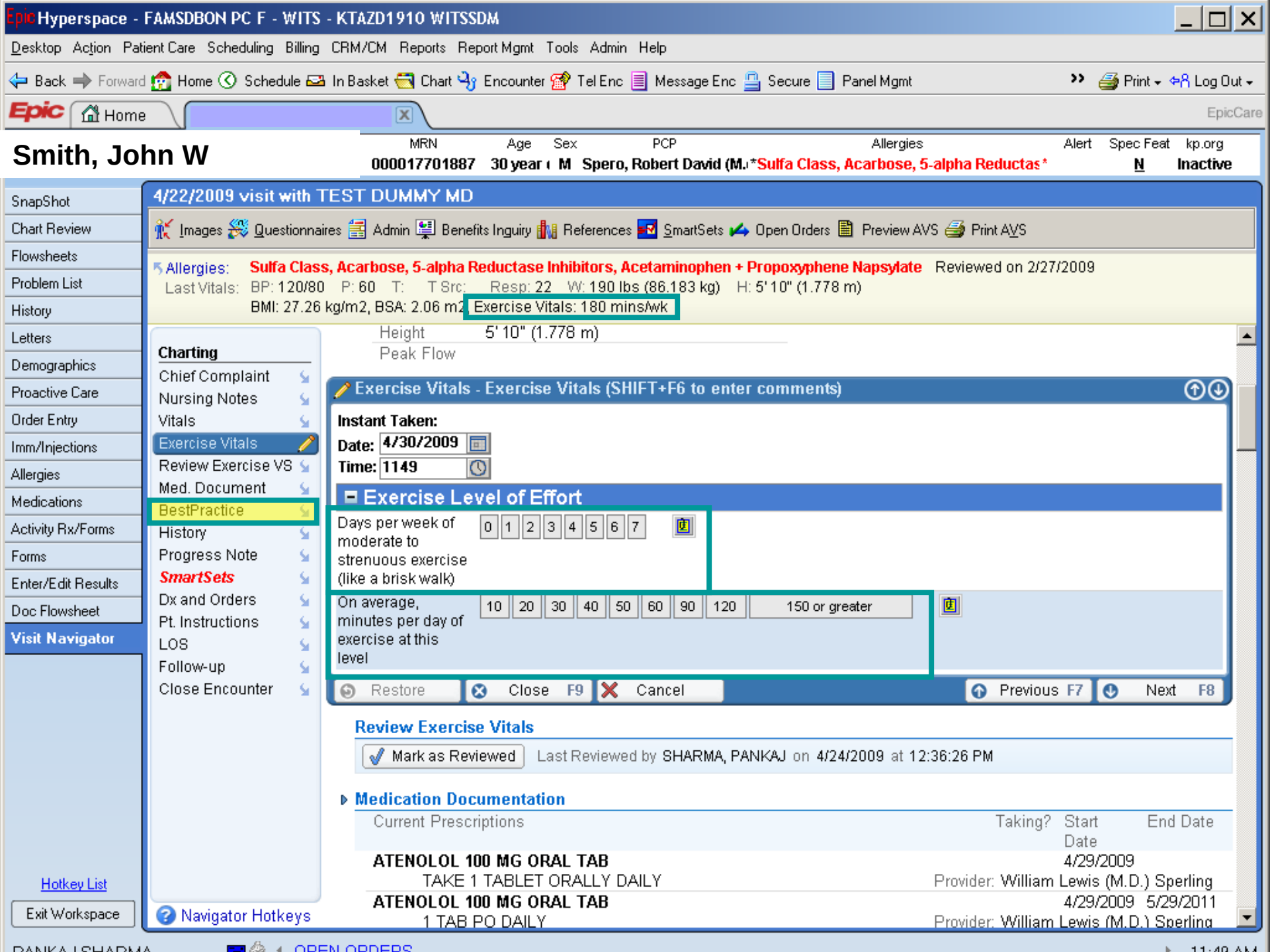
Robert Sallis ,[1] Deborah Rohm Young,[2] Sara Y Tartof,[2] James F Sallis,[3] Jeevan Sall,[1] Qiaowu Li,[2] Gary N Smith,[4] Deborah A Cohen[2]

First published April 13, 2021

British Journal of Sports Medicine

Rationale

- No data regarding the effect of regular PA on COVID-19 outcomes, even though lack of PA is a well-documented risk factor for multiple chronic diseases associated with severe COVID-19.
- This study evaluated the hypothesis that consistently meeting PA guidelines prior to diagnosis is associated with more favorable COVID-19 outcomes among infected adults.
- Conducted at Kaiser Permanente Southern California (KPSC), an integrated healthcare system serving 4.7 million residents at 15 medical centers.


Epic Hyperspace - FAMSDBON PC F - WITS - KTAZD1910 WITSSDM
Desktop Action Patient Care Scheduling Billing CRM/CM Reports Report Mgmt Tools Admin Help
Back Forward Home Schedule In Basket Chart Encounter Tel Enc Message Enc Secure Panel Mgmt Print Log Out
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Smith, John W
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SnapShot
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4/22/2009 visit with TEST DUMMY MD
Images Questionnaires Admin Benefits Inquiry References SmartSets Open Orders Preview AVS Print AVS
Allergies: Sulfa Class, Acarbose, 5-alpha Reductase Inhibitors, Acetaminophen + Propoxyphene Napsylate Reviewed on 2/27/2009
Last Vitals: BP: 120/80 P: 60 T: T Src: Resp: 22 W: 190 lbs (86.183 kg) H: 5' 10" (1.778 m)
BMI: 27.26 kg/m2, BSA: 2.06 m2 Exercise Vitals: 180 mins/wk
Charting
Chief Complaint
Nursing Notes
Vitals
Exercise Vitals
Review Exercise VS
Med. Document
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History
Progress Note
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Dx and Orders
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LOS
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Exercise Vitals - Exercise Vitals (SHIFT+F6 to enter comments)
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Date: 4/30/2009
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Exercise Level of Effort
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0 1 2 3 4 5 6 7
On average, minutes per day of exercise at this level
10 20 30 40 50 60 90 120 150 or greater
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Review Exercise Vitals
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Medication Documentation
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ATENOLOL 100 MG ORAL TAB 4/29/2009 5/29/2011
1 TAB PO DAILY Provider: William Lewis (M.D.) Sperling

Physical Activity and COVID 19 Outcomes

KPSC Patients with COVID Dx from 1/1/20 to 10/21/20
N = 103,337

⬇

Patients enrolled with KP ≥6 mo And ≥18 year
N = 84,377

⬇

Patients with 3 or more EVS Measures 3/19/18-3/18/20
N = 48,440

3 or More Exercise Vital Sign Results

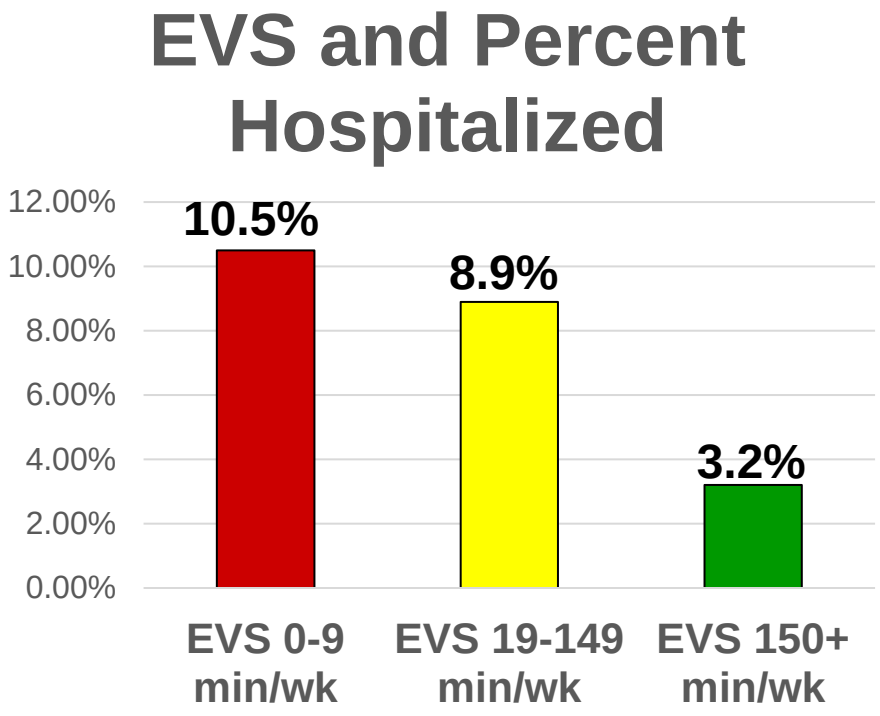
--Consistently Sedentary
0-10 min/week
--Inconsistently Active
11-149 min/week
--Consistently Active
150+ min/week

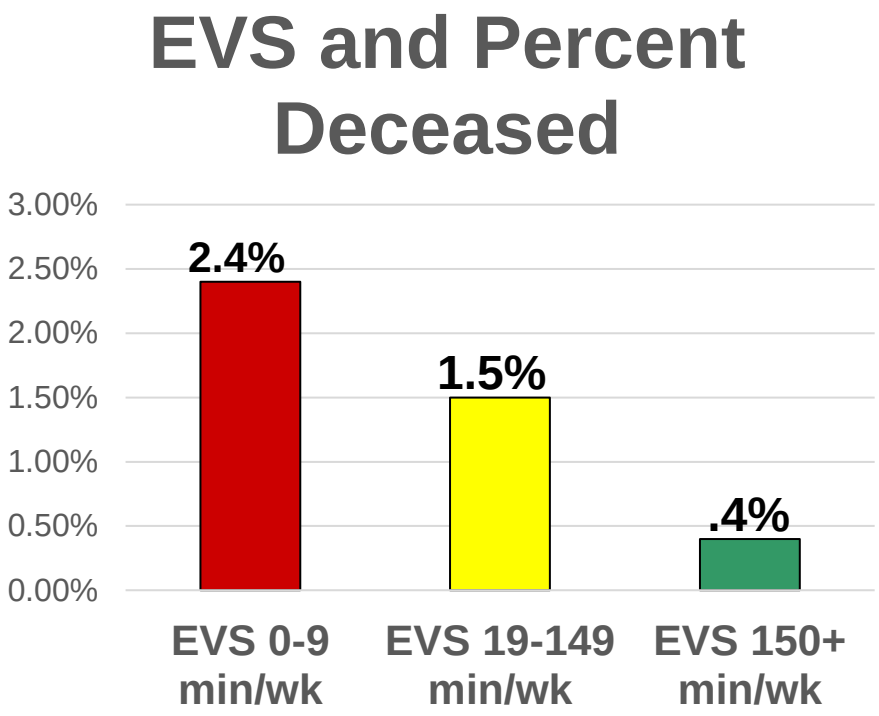
Sallis et al, BJSM, 2021

Patient Characteristics and Outcomes

- 103,337 patients had a diagnosis of COVID-19 or positive PCR test
- 48,440 patients had 3 or more EVS measurements, which comprised the analytic cohort
  - 61.2% had 5 or more EVS measures in the 2-year time frame
  - 61.9% female; 65% Hispanic; mean BMI was 31.2
  - 49.6% had 1+ comorbidities
- Outcomes
  - 8.6% hospitalized
  - 2.4% admitted to ICU
  - 1.6% died

EVS and Percent of COVID 19 Patients Hospitalized and Deceased





Sallis et al, BJSM, 2021

Odds Ratios for COVID 19 *Hospitalization*

Effect	Odds Ratio	95% CI
Age >60	2.30	2.10 - 2.52
Gender M vs F	1.85	1.72 - 1.99
Hx of Organ Transplant	2.78	1.88 - 4.10
Race (B vs W)	1.33	1.16 - 1.53
A1C >= 8%	2.20	1.98 - 2.45
BMI 30-40 BMI >40	1.12 1.77	1.01 - 1.24 1.55 - 2.02
Smoker COPD	1.09 1.16	1.01 - 1.18 1.06 - 1.28
Kidney Disease	1.32	1.18 - 1.48
Cancer	1.23	1.02 - 1.48
Hypertension	1.14	1.05 - 1.25
Inactive vs Active	2.26	1.81 – 2.83
Inactive vs Some	1.20	1.10 - 1.32

Sallis et al, BJSM, 2021

Odds Ratios for COVID 19 *ICU Admission*

Effect	Odds Ratio	95% CI
Age >60	2.40	2.05 - 2.81
Gender M vs F	2.38	2.10 - 2.71
Hx of Organ Transplant	2.38	1.40 - 4.05
Race (B vs W)	1.25	0.98 - 1.60
A1C >= 8%	1.91	1.62 - 2.62
BMI 30-40 BMI >40	1.17 1.95	0.97 - 1.41 1.54 - 2.45
Smoker COPD	1.08 1.09	0.95 - 1.23 0.93 - 1.28
Kidney Disease	1.31	1.09 - 1.57
Cancer	1.12	0.83 - 1.53
Hypertension	1.32	1.14 - 1.53
Inactive vs Active	1.73	1.18 – 2.55
Inactive vs Some	1.10	0.93 - 1.29

Sallis et al, BJSM, 2021

Odds Ratios for COVID 19 *Deaths*

Effect	Odds Ratio	95% CI
Age >60	4.01	3.06 - 5.25
Gender M vs F	1.72	1.46 - 2.01
Hx of Organ Transplant	4.25	2.37 – 7.62
Race (B vs W)	1.18	0.91 - 1.54
A1C >= 8%	1.64	1.27 - 2.12
BMI 30-40 BMI >40	0.89 1.90	0.72 - 1.10 1.43 - 2.54
Smoker COPD	1.24 1.28	1.05 - 1.47 1.06 - 1.53
Kidney Disease	1.50	1.24 - 1.81
Cancer	1.04	0.75 - 1.44
Hypertension	1.30	1.06 - 1.60
Inactive vs Active	2.49	1.33 - 4.67
Inactive vs Some	1.32	1.09 - 1.60

Sallis et al, BJSM, 2021

EVS and COVID-19
Key Findings

- COVID patients who were sedentary were much more likely to be hospitalized, admitted to ICU and die than patients who were active.
- Other than advanced age and hx of organ transplant, being sedentary was strongest risk factor for severe COVID outcomes.
- Meeting PA guidelines provides substantial benefit but being active at less the guidelines reduced all risks as well.
- Race was not a risk after controlling for PA and COVID risk factors.
- Obesity was not a risk until BMI $\geq$40.

Strengths and Limitations of this Study

- Strengths:
  - Large number of COVID patients and diversity of study sample (65% were Hispanic).
  - Ability to adjust for CDC defined demographic and health risk factors.
  - COVID outcomes measured were objective and taken from the electronic medical record.
- Limitations:
  - PA was self-reported using the EVS.
  - This is an observational study so does not prove cause and effect (finding could be in reverse).

Study Take Aways

- The evidence for benefit of regular PA contrasts with lack of effort to promote PA during the pandemic.
- We should inform patients that short of vaccination, regular PA is perhaps the most important thing one can do to reduce risk for severe COVID.
- These results represent a clear and actionable guideline to reduce risk for severe COVID and suggest that PA be prioritized by Public Health officials and incorporated into routine medical care.

Additional Evidence

- **Cunningham GB**. Physical activity and its relationship with COVID-19 cases and deaths: J of Sport and Health Science. 2021 Mar 26.
  - A study of 3142 US counties used BRFSS PA data and found counties with higher PA had fewer COVID-19 cases and deaths, adjusting for numerous variables.
- **Cheval B, et al**. Muscle strength is associated with COVID-19 hospitalization in adults 50 yrs of age and older. MedRxiv. Jan 2021.
  - Among 3600 adults repeated measures of hand grip strength were inversely related to COVID-19 hospitalization.
- **Yates T, et al**. Obesity, walking pace and risk of severe COVID-19 and mortality: analysis of UK Biobank. Int J of Obesity. Feb 2021.
  - Among 400K+ UK adults, reported slow walking speed was associated with 1.84 higher odds of severe COVID-19 than brisk walkers, regardless of obesity status.

Physical Activity (PA) and Infection Risk

- Immune function improves with regular PA.
  - Results in lower incidence, intensity of symptoms and mortality from various viral infections.
  - Reduces risk for systemic inflammation that is main cause of lung damage from COVID.
  - Improved CV health, lung capacity, muscle strength and mental health.
- All possible mechanisms by which PA could mitigate risks for severe COVID-19.

Nieman DC, J Sport Health Sci 2019 **da Silveira MP, Clin Exp Med 2020**


While you are waiting to get your vaccine, you need to walk 30 min per day to significantly reduce your risk of dying from COVID!

Damn it Anthony! If you had told me this a year ago I would have started exercising and avoided almost dying from COVID!!

The WHO got the *memo*…

UN INTERAGENCY TASK FORCE ON NCDs #beatNCDs @un_ncd

World Health Organization

UNDP

COVID-19 and NCD risk factors

OBESITY

Obesity increases the risk for becoming severely ill from COVID-19. In a study in France,[1] the odds of developing severe COVID-19 were seven times higher in patients with obesity. Promoting healthy diets to maintain nutritional well-being is more important than ever in the fight against COVID-19.

SMOKING

In a meta-analysis,[2] **smokers were 1.5 times more likely to have severe complications from COVID-19** and had a higher mortality rate.

ALCOHOL

Alcohol impairs the body's ability to fight infections such as COVID-19.[3] Even a single heavy drinking session can measurably reduce immune function. Intoxication can also interfere with taking precautions against infection.

PHYSICAL INACTIVITY

Physical activity provides multiple short- and long-term health benefits, including improving the immune system, stress and anxiety.[4] **Physical activity is also associated with prevention of heart disease, hypertension, diabetes and overweight and obesity, which are risk factors for severe COVID-19 disease.**[5]

POLLUTION

A relation between exposure to air pollution and mortality from COVID-19 has been hypothesized.[6] **Air pollution compromises lung function, which increases the risk for vulnerability to respiratory infection, including COVID-19.**

1 Simonnet A, et al. High prevalence of obesity in severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) requiring invasive mechanical ventilation. Obesity. 2020. doi:10.1002/oby.22831.
2 Alqahtani J, et al. Prevalence, severity and mortality associated with COPD and smoking in patients with COVID-19: a rapid systematic review and meta-analysis. PLoS One. 2020;15(5):e0233147.
3 WHO Regional Office for Europe. Alcohol and COVID-19: what you need to know.Copenhagen: WHO Regional Office for Europe; 2020. http://www.euro.who.int/__data/assets/pdf_file/0010/437608/Alcohol-and-COVID-19-what-you-need-to-know.pdf.
4 Nieman DC et al. The compelling link between physical activity and the body's defense system. J Sport Health Sci. 2019;8(3):201-17.
5 WHO. Global action plan on physical activity 2018–2030: more active people for a healthier world.
6 Liang D, et al. Urban air pollution may enhance COVID-19 case-fatality and mortality rates in the United States. 2020. medRxiv. doi: https://doi.org/10.1101/2020.05.04.20090746 (https://www.medrxiv.org/content/10.1101/2020.05.04.20090746v1).

UN INTERAGENCY TASK FORCE ON NCDs #beatNCDs @un_ncd

World Health Organization

UNDP

COVID-19 and NCDs

DIABETES

A systematic review[7] indicated that **people with diabetes were up to three times more likely to have severe symptoms or die from COVID-19**, and the situation is likely to be worse for people with uncontrolled diabetes.[8]

CARDIOVASCULAR DISEASE

A meta-analysis showed that **hypertension, cardiovascular and cerebrovascular disease increased the odds for severe COVID-19** by 2.3, 2.9 and 3.9 times, respectively.[9] Another meta-analysis indicated that hypertension increased the risk of mortality from COVID-19 by 3.5 times.[10]

RESPIRATORY DISEASE

In a meta-analysis, **patients with chronic obstructive pulmonary disease (COPD) were at increased risk of severe complications or death from COVID-19.**[11] A study in the United Kingdom suggested that the presence of respiratory disease, including asthma, increased patients' risk of mortality from COVID-19.[12]

CANCER

Cancer patients are more likely to experience severe COVID-19.[13] A study in Wuhan, China, showed that the **mortality rate from COVID-19 was significantly increased in patients with cancer and was particularly high among those with blood cancers.**[14]

7 Roncon L et al. Diabetic patients with COVID-19 infection are at higher risk of ICU admission and poor short-term outcome. J Clin Virol. 2020;127. doi:10.1016/j.jcv.2020.104354.
8 Williamson E, et al. Factors associated with COVID-19-related death using OpenSAFELY. Nature. 2020 (https://doi.org/10.1038/s41586-020-2521-4).
9 Wang B, et al. Does comorbidity increase the risk of patients with covid-19: Evidence from meta-analysis. Aging (Albany NY). 2020;12(7):6049–57.
10 Zhang J, et al. Associations of hypertension with the severity and fatality of SARS-CoV-2 infection: a meta-analysis. Epidemiol Infect. 2020;148. doi:10.1017/S095026882000117X.
11 Alqahtani J, et al. Prevalence, severity and mortality associated with COPD and smoking in patients with COVID-19: a rapid systematic review and meta-analysis. PLoS One. 2020;15(5):e0233147.
12 Williamson E, et al. OpenSAFELY: factors associated with COVID-19-related hospital death in the linked electronic health records of 17 million adult NHS patients. medRxiv. doi.org/10.1101/2020.05.06.20092999.
13 Tian J, et al. Clinical characteristics and risk factors associated with COVID-19 disease severity in patients with cancer in Wuhan, China: a multicentre, retrospective, cohort study. Lancet Oncol. 2020;21(7):893.
14 Meng Y, et al. Cancer history is an independent risk factor for mortality in hospitalized COVID-19 patients: a propensity score-matched analysis. J Hematol Oncol. 2020;13(1):75.

PA Levels Have Dropped During the Lockdown

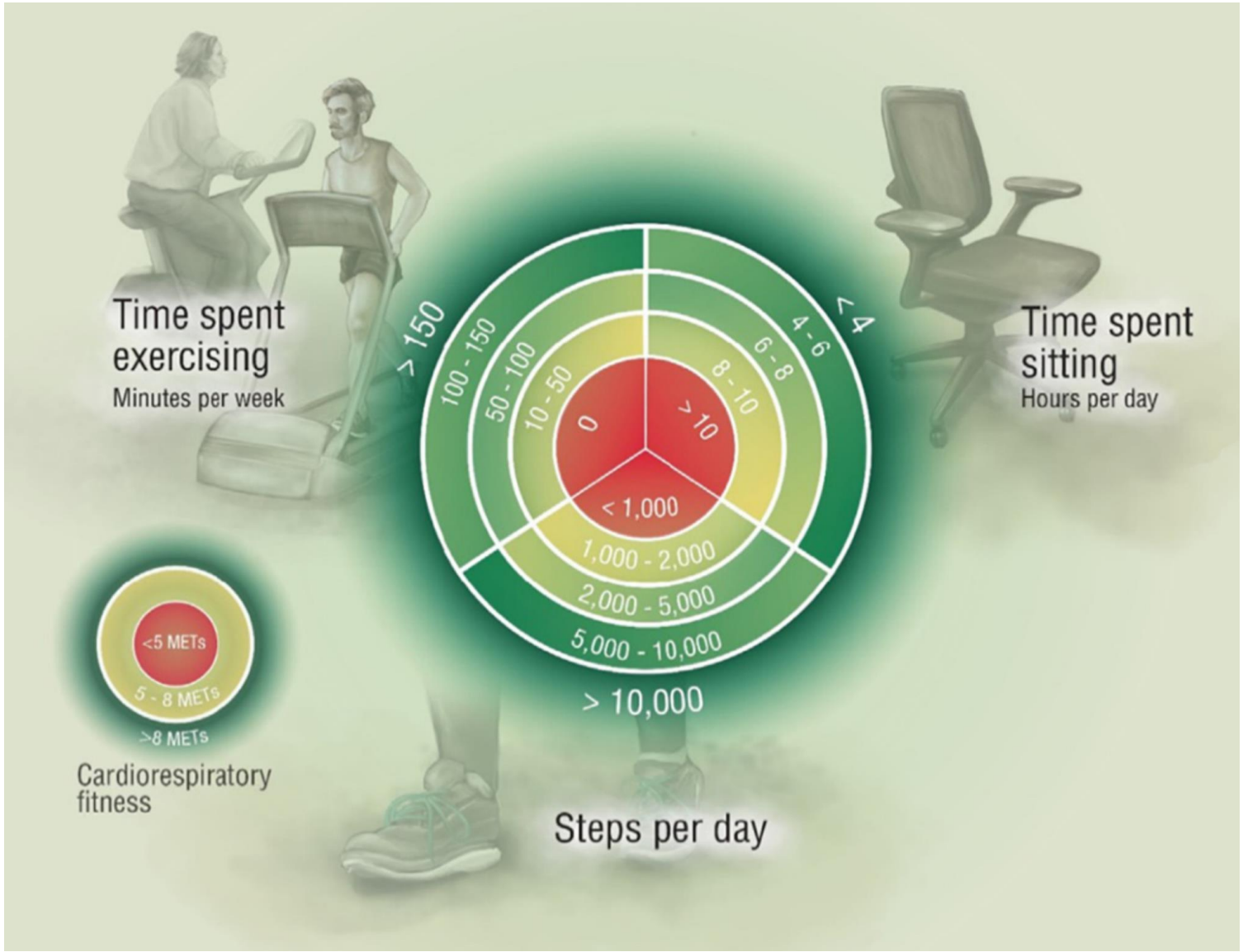
- ~1 in 3 adults and 3 in 4 adolescents worldwide did not meet PA guidelines heading into the pandemic
- The lockdown has been devastating on many levels:
  - Analysis of 455K from 187 countries showed that within 30 days means step counts decreased 27.3% (Tison. Ann Int Med; Nov 2020).
  - Most studies show significant decreases in PA regardless of age, health status, or geographic location; along with increased sitting compared to pre-COVID-19.

Risks of Social Isolation

- Translates into less movement, loss of function and declines in mental health.
- From April to June 2020:
  - 30.7% reported symptoms of anxiety disorder (up from 8.1% in 2019)
  - 25.1% reports symptoms of depressive disorder (up from 6.5% in 2019).
  - 35.6% reported anxiety and/or depressive disorder symptoms (up from 10.9% in 2019.)

Household Pulse Survey, CDC 2020

Goals for Physical Activity



What Can Busy Physicians Do to Encourage Physical Activity?

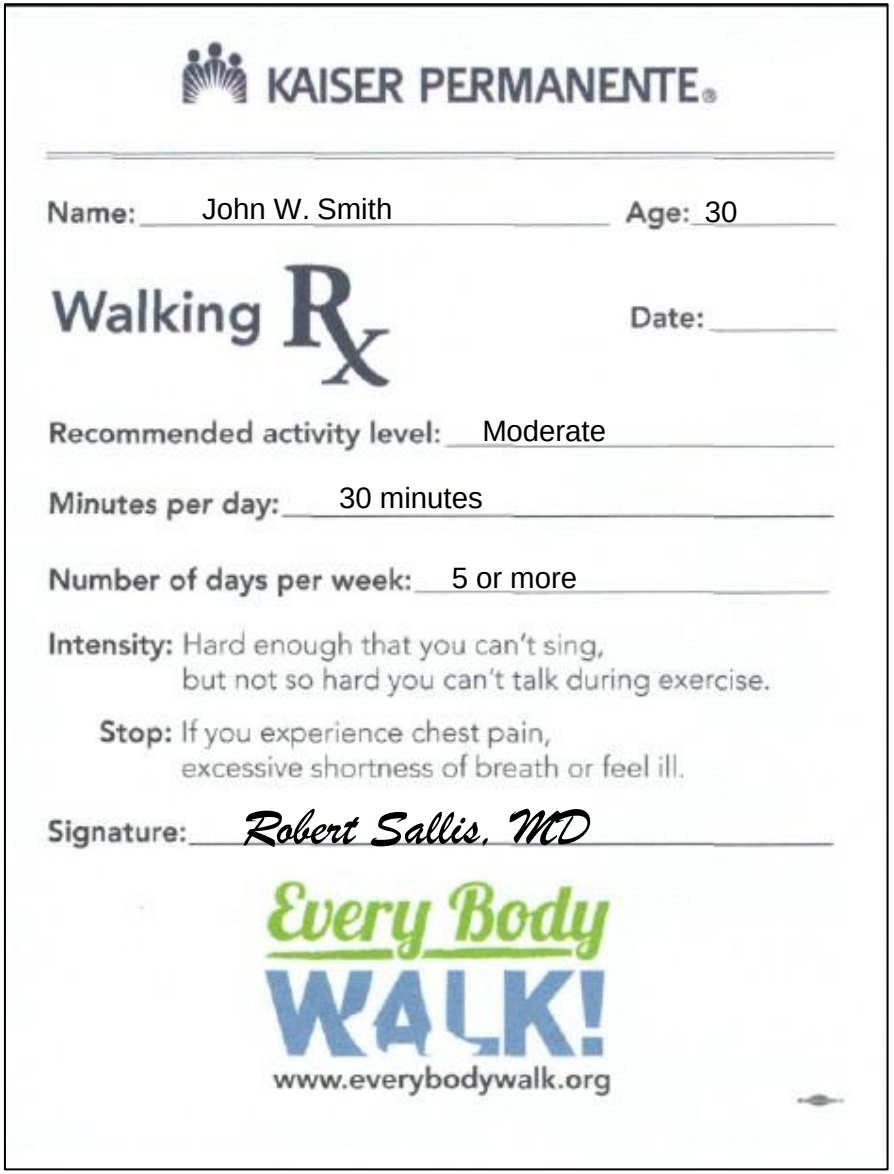
0 Minutes:

- Running late? Too many other concerns on the patient's list? Relax! Plan to discuss physical activity at next visit. Hopefully office staff will have assessed exercise and provided resources.

1 Minute for Advice:

- Quickly congratulate patients who are getting 150 minutes or more of moderate or greater physical activity.
- Advise patients who are getting fewer than 150 minutes of the importance of physical activity, especially linking benefits to patient's complaints, problems, and diagnoses.

Write a walking Rx for patients!



KAISER PERMANENTE®

Name: John W. Smith Age: 30

Walking Rx Date:

Recommended activity level: Moderate

Minutes per day: 30 minutes

Number of days per week: 5 or more

Intensity: Hard enough that you can't sing, but not so hard you can't talk during exercise.

Stop: If you experience chest pain, excessive shortness of breath or feel ill.

Signature: Robert Sallis, MD

Every Body WALK!

www.everybodywalk.org

What Can Busy Physicians Do to Encourage Physical Activity?

2 Minutes for a Prescription:

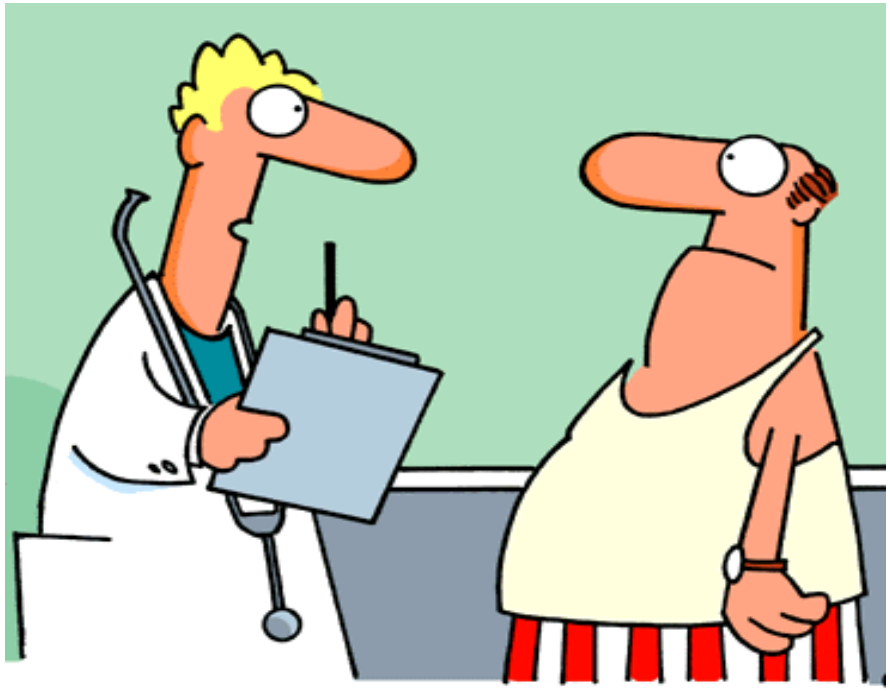
- Review key messages about the importance of physical activity.
- Offer a generic Exercise Prescription.
- Suggest useful resources (e.g. Wellness Coaches by phone, pedometer, chair exercise DVDs, community resources, fitness professional).

5 Minutes for Brief Counseling:

- Assess readiness for change regarding exercise habits.
- Ask what the patient might want to do to be more active and barriers to prevent this from happening -- brainstorm on how to get around them.
- Explain in detail how exercise can affect diseases they have or are at risk for and how they can go about incorporating it into their life.

Common Barriers to Exercise

- Competing demands (work/kids/spouse)
- Not enough time
- Too tired
- Physical limitations
- Too boring
- Sedentary habits



"What fits your busy schedule better, exercising ½ hour a day or being dead 24 hours a day?"

Breaking Down the Barriers

- Make exercise a habit, not an option.
- 150 min per week is goal – not starting point; so start small:
  - 1-2 days per week
  - Three 10-min bouts.
- Simple recipe for getting your exercise:
  - AM; park car 10 min from office, walk in
  - Lunch; walk 5 min out, eat, walk back
  - PM; Walk 10 min back to car

Breaking Down the Barriers

- Make weekends count!
  - Change mindset; weekends are for fitness.
  - Walk 60 min on Sat or Sun, only need 90 more minutes during week.
- Bump up the intensity!
  - 25 min of vigorous exercise (jog) done 3x per wk
  - 30 min of moderate (brisk walk) done 5x per wk
- More ideas:
  - Find an exercise partner
  - Get good shoes and nice workout clothes
  - Set goals (fun run, sprint triathlon)

Post COVID Syndrome *(Long Haulers)*

- Defined as those not fully recovered from COVID-19 after weeks or months.
  - 80% better in 11 days; 13% took 4 wks; 5% took 8 wks; 2% took longer than 12 wks.
  - Hard to predict who gets it, many had only mild symptoms initially. More common if age >50, chronic disease and more severe COVID.
  - Some feel better for weeks, only to relapse.
- Common symptoms include:
  - Fatigue, “brain fog” and loss of taste/smell.
  - Body ache, headache and joint pain.
  - Cough, SOB, racing heart and chills.
- Treatment – progressive PA.

Sudre, medRxiv 2020

Resuming Workouts After COVID

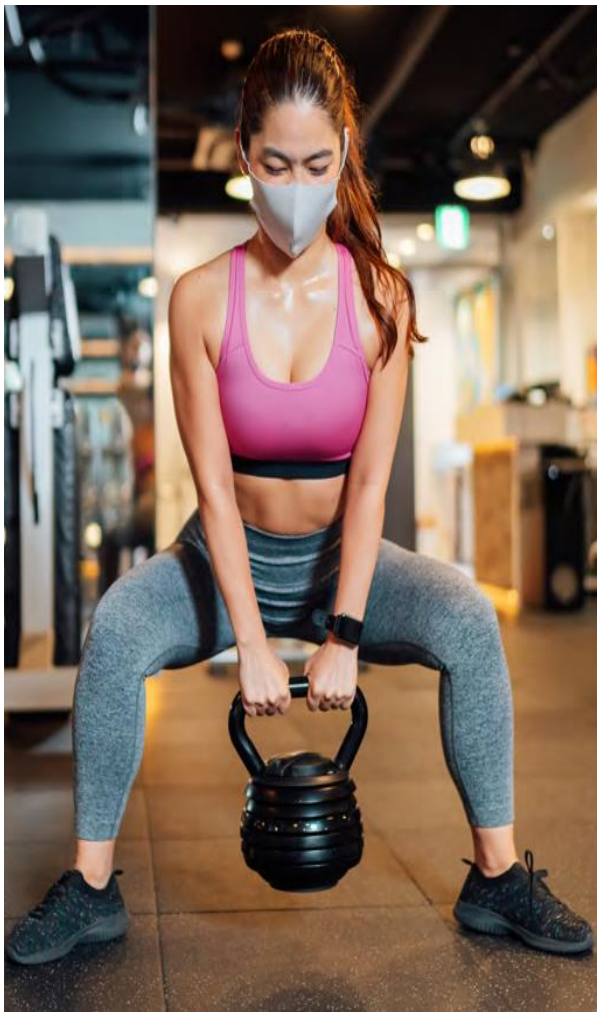
- The vast majority of people infected with COVID appear to recover well.
- However, those hospitalized with severe COVID may have damage to their heart and lungs.
  - May consider testing with EKG and Echo (or cardiac MRI) in those with severe COVID.
  - Cardiac and lung damage is rare in those with mild COVID illness.
- Therefore, you should resume exercise slowly and watch for symptoms (palpitations, CP, SOB) before returning to high-level training.

Return to Jogging Post COVID

- Recommend graduated program of 2 to 3 workouts per week.

Is the Gym Safe?

- Rate of reported transmission very low (visits to virus ratio)
  - US looked at 2877 gyms; 49.4 million visits; Found 1,155 COVID cases for ratio of **1 in 42,731 (.0023%)**.
  - UK looked at 1300 gyms; >8 million visits; Found 17 COVID cases for ratio **1 in 500K (.0002%)**.
  - Australia looked at 423 gyms; 6.26 million visits; Found **no COVID cases**.



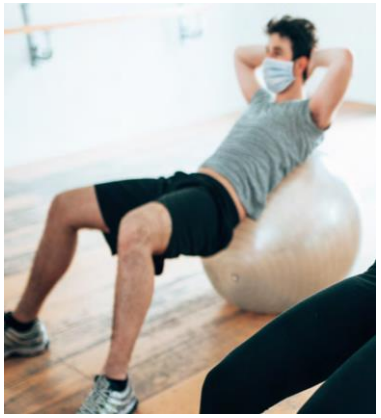
International Health, Racquet & Sportsclub Association; Oct 2020

However, Spin Class Superspreader Event…

- Cycling studio in Ontario, Canada called SpinCo , 72 cases linked to classes held Sep 28 to Oct 4.
  - 47 primary cases (45 patrons & 2 staff) and 25 secondary cases (family, friends, other contacts).
- Studio took precautions.
  - 50% capacity, bikes placed >6 ft apart, rooms cleaned after classes, and masks were worn before/after workouts.

Strategies to Boost Your Immune System

- Develop an individualized post-execise recovery plan that includes:
  - Get adequate sleep (at least 7 hrs).
  - Optimize nutrition (carbs/protein) and hydration.
  - Avoid or limit alcohol
  - Utilize mindfulness and stress management techniques to optimize mental health.
  - Avoid back-to-back intense training days.
  - Consider more-frequent training sessions of shorter duration.



Keys to Staying Safe from COVID-19

- Get healthy – Stay Healthy!
  - Exercise and eat right to maintain a healthy weight and improve mental health.
  - Manage chronic diseases.
  - Don’t smoke.
- Employ Protective Measures if you have not been vaccinated:
  - Physical distancing.
  - Wear a mask in crowded areas.
  - Avoid touching eyes, nose and mouth.
  - Wash your hands if exposed to high touch surfaces.

Conclusion

- The Inactivity, NCD and COVID Pandemics have collided with predictable tragic consequences!
  - COVID-19 has shockingly exposed how unhealthy we are around the world – especially in the US.
- The most important answers to health are not going to be provided by a pharma company.
  - The best protection you have against COVID-19 (and the next pandemic) is to exercise daily and eat well.
  - Think of Exercise as a Medicine and take it accordingly!