

Handout_20201008_Updating - Assignment_#4, Saving Lives: Speculative Design on #theCoIncidence of #AsthmaHospitalizations and #COVID-19Disease, ...Ongoing Reflections on Sars-CoV-2, A Compromised Immune System and Risk Assessment,¹

October 21, 2020

I did a re-design of the course **Cancer Prevention** acknowledging the era of SARS-CoV-2 infections responsible for the disease COVID-19 and the potential role of a compromised Immune System in the progress of a Sars-CoV-2 infection. We will also cover the role of a compromised Immune System in the progress of metastatic cancer. **I hope we will become interested in causation stories**, proofs of things. Another hope is we form **collaborations**.

Keywords: #CoIncidence #HealthBorders #HealthDisparities #Asthma #SarCoV2 #Harlem

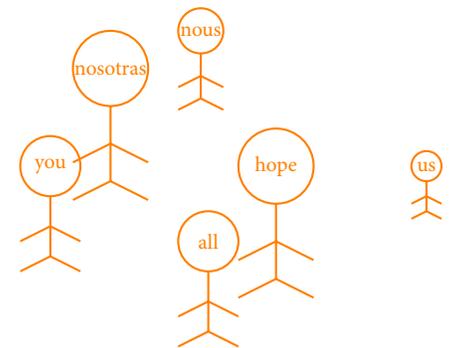
- If we raise the **Science of Health** we should embrace the current health crisis, **the COVID-19 disease**. **Heartbreakingly some of us are encountering the novel virus and not surviving and some of us are surviving.** Death, Survival appears to be a reveal on **the conditions of our lives and the potentially compromised state of our Immune Systems**. The survivors can provide **plasma** that contains antibodies and killer T-cells that neutralize the novel Coronavirus. I hope our course will help you move towards speculative design and writing. We should start immediately, **Hypothesis 1**: the survivors have an **uncompromised Immune System** which is critically important to our defences against invading viruses, bacteria and cancer cells, and, e.g., builds over time a successful immune response to **Sars-CoV-2** and cells infected with Sars-CoV-2. **Hypothesis 2**: the asymptomatic survivors have an uncompromised Immune System which is critically important to our defences against invading viruses, bacteria and cancer cells and produce or builds an immune response that suppresses, e.g., **Sars-CoV-2** before symptoms can arise. Our course will initially focus on the **Immune System**, its relevance to defending us. **We will consider the role of telomere length in the journey to a compromised Immune System.**

Introducing Causal

- **Causal Inference** – the process of drawing a conclusion about the effect of an exposure on an outcome is foundational to Public Health and Environmental Protection where it is used by the school of thought I hope we will join to guide new interventions for screening and **precautionary policies**. Think **Flint**, see Bosman, Julie. **'Michigan to Pay \$600 Million to Victims**

¹ by K Moses JD PhD - reach me at K.Moses@outlook.com

Severe Acute Respiratory Syndrome Coronavirus Clade 2 ...Find NCBI SARS-CoV-2 literature, sequence, and clinical content here <https://www.ncbi.nlm.nih.gov/sars-cov-2/>.



Is the telling of a human health story, the telling of reducing injuries to the Immune System, e.g., lowering the incidence of Deleterious Mutations with safer environments? Less Stress in all its forms? ...For background see here http://bit.ly/AssignedReading_WallsOfDeath, the reading includes the paper <http://bitly.com/Wachteretal2013>.

Compromised Immune Systems



Figure 1: Hey ya, ...'3000, for the sake of everyone in the band, act like you got some sense.'

of Flint Water Crisis. N.Y. Times, New York Times Company, 20 Aug. 2020, www.nytimes.com/2020/08/19/us/flint-water-crisis-settlement.html ...a showing of why **precaution** is vital and why institutionalized racism impacts our health.

- In this course we are going to take **the role of observers and reviewers**, I propose we also adopt a topic in Causal Inference called **'transportability'**, to quote a good working description we could use this in our practice: **'transferring causal knowledge collected in several heterogeneous domains to a target domain in which [there are / were] only passive observations and limited experimental data [[could] be collected.'**^{2 3}
- Please spend a little time thinking about the above description of **'transportability'**, and consider this data,
- I have curated two data visuals that will hopefully aid us in considering **causes, transportability and Why Does Place Matter**, consider the below identified **#CoIncidence** of Asthma Hospitalizations and COVID-19 disease-related Deaths. At the end of the Spring Semester 2020, this course raised the role of **Compromised Immune Systems** in the progress of a **#SarsCoV2 Infection to COVID-19 disease**.

Health Borders

- I thought I saw in the COVID-19 related deaths data a **health border** running along East 96th Street, it resonated with my past experience of teaching at a school on East 96th and First Avenue, the school, **Life Sciences Secondary School**, is on a **border** of asthma hospitalizations for young people, I had prior knowledge of the incidence of asthma hospitalizations. I highlighted this border in our slide show, Healthy Life Expectancies, <https://www.loom.com/share/80e92d3e79e1407f8bacod909be323eb>,
- The **border** was both a transition in the death rate related to COVID-19 disease and hospitalization rate related to asthma

The conditions of our lives,

² Elias Bareinboim and Judea Pearl. *Transportability from Multiple Environments with Limited Experiments: Completeness Results.*, page 280–288. Curran Associates, Inc., 2014. URL <https://bit.ly/2SWBu4E>

Transportability

³ For me(KM) this resonated with a **Precautionary Principle** strategy of trying to reduce danger to Flora and Fauna (including us) and **Environments**.

Our former Env. Sci. course proposal, <https://drive.google.com/file/d/1aYyTP9hLohcXiay4A4r7W5DZNHOKTCH/view?usp=sharing> <- just a historical marker for the origins of this document, Life Sciences Secondary School, you don't need this for Assignment_#4,

COVID-19 related Deaths

...by Zip Code Area. New York City, 2020

Source: "COVID-19: Data Main - NYC Health." 21 Aug. 2020, www1.nyc.gov/site/doh/covid/covid-19-data.page.

COVID-19 Data by ZIP Code

- Case rate
- Death rate
- Percent positive tests
- Case count
- Death count

Death Count

- 10
- 50
- 100

Marking E96th St.

Central Park



Figure 2: The map provides confirmed death counts with a positive result since March 2020, NYC.Gov,

- The **border** shown by the green arrow is for all five named parameters,
- There are several incidence borders on this map, showing a transition in incidence, I chose to examine the **border** at the green arrow because I am familiar with the location, Life Sciences Secondary School, East 96th Street, *I taught Env. Sci. at the School 2016 - 2017, a startling good encounter,*

Asthma Hospitalizations

...by Zip Code Area. Children Aged 0-14. New York City, 2000

FIGURE 17

Asthma Hospitalization Rates by ZIP Code Area, Children Aged 0-14, New York City, 2000

SOURCE: Garg R, Karpati A, Leighton J, Perrin M, Shah M. "Asthma Facts," Second Edition. New York City Department of Health and Mental Hygiene, May 2003., See, <https://www1.nyc.gov/assets/doh/downloads/pdf/asthma/facts.pdf>
* As of 2013 this circa 2000 data set is still being cited, see <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3529949/>

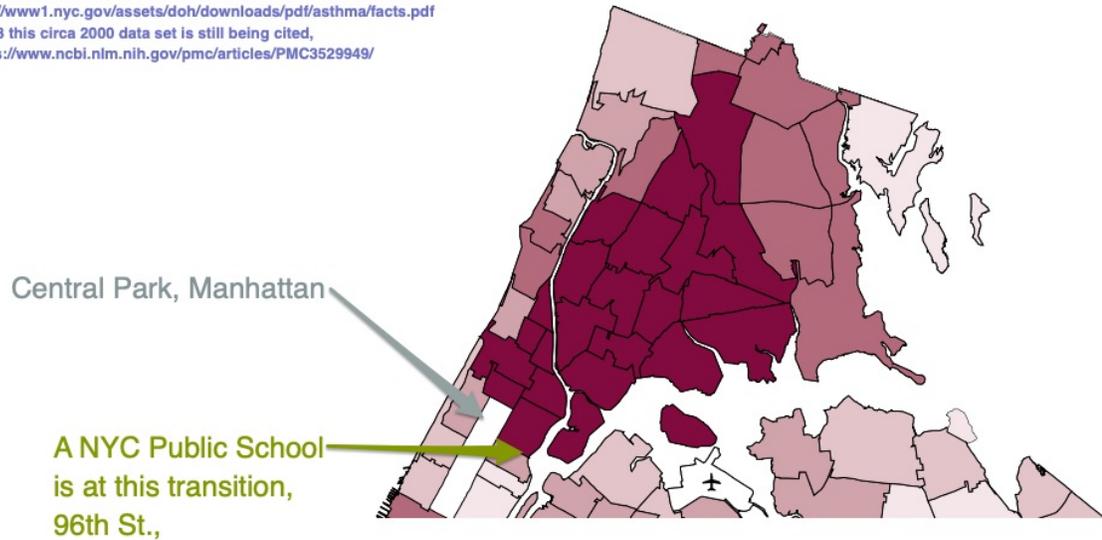


Figure 3: This Figure is from NYC.Gov, "Asthma Facts," May 2003.

- Garg et al., 2000, Asthma Hospitalization range: lightest colouration is 0 -1.99 per 1000, darkest pink is 7.91 - 17.55 per 1000.
- A framework for speculative design is that #PlaceMatters; in this course I am calling the transitions, *health borders*. The green arrow points to a *border* I would like us to focus on designing interventions.
- The objective here is to increase our understanding of the relationship between our Health and the Health of our Environments. ...*Why does Place Matter to Human Health?*
- For *Assignment_#4* I would like you to consider the coincidence of Health Disparities at the *border* identified above, *why do you think such a border exists and how would you investigate it*, I hope you will address the following,
 - Possible primary drivers of the Health Disparities, the variables if you wish to think in terms of exposures and outcomes, please remember it is your choice on how you want to think about this,

Assignment_#4

- I like data but sometimes when we don't have the data, we need to look around and interpret what's happening and what's happening for / to people, for / to environments. Some of you might like doing a literature review (Final Project, Autumn 2020) here, 'Asthma' and 'Covid' - Google Scholar. 17 Oct. 2020, <https://scholar.google.com/scholar?oi=gsb40&q=%22Asthma%22%20and%20%22Covid%22&lookup=o&hl=en>.
- Possible confounding factors,
- A biomedical approach to investigating the Health Disparities, e.g., should we be measuring Telomere Lengths,
- How would you go about investigating why such a border exists,
- Can we begin a conversation on remedies,

Speculative Writing,

Our Time Together

- I am treating **our time together** as an opportunity to report on significant Public Health issues, and their relationship to place, as we watch and experience the journey of Sars-CoV-2 what are we seeing,

Searching for Causation

- The identified **border** is a significant Public Health issue and exploring its relationship to place, **what are the conditions of the lives across that border**, what are the modifiable risk factors across that **border**, might get us to health interventions,⁴

• Why this #CoIncidence,

- Why does Place matter,
- What other health issues coincide at this **border**,
- Consider, e.g., a putative hypothesis could explain that populations exposed to chronic air pollution are associated with a different COVID-19 disease incidence in line with chronic DNA injury, DNA sequence changes, telomere shortening, ...all possible DNA sequence injuries,
- If you, we are thinking about dangerous fortune, reference 23 of http://bitly.com/LivesToLive_Ornishetal2013 resonates with the heartbreaking COVID-19 deaths amongst caregivers, resonates with a compromised Immune System,
- Reference 23: Damjanovic et al. 'Accelerated Telomere Erosion Is Associated with a Declining Immune Function of Caregivers of Alzheimer's

⁴ Dean Ornish, Jue Lin, June M Chan, Elissa Epel, Colleen Kemp, Gerdi Weidner, Ruth Marlin, Steven J Frenda, Mark Jesus M Magbanua, Jennifer Daubenmier, and et al. *Effect of comprehensive lifestyle changes on telomerase activity and telomere length in men with biopsy-proven low-risk prostate cancer: 5-year follow-up of a descriptive pilot study. The Lancet Oncology*, 14(11): 1112–1120, Oct 2013. ISSN 1470-2045. DOI: 10.1016/S1470-2045(13)70366-8. URL <http://www.sciencedirect.com/science/article/pii/S1470204513703668>

Disease Patients.’ ...I recommended at a minimum read the Abstract please,

- I was hoping that highlighting Damjanovic et al (Gotlib et al, Lee et al and Chae et al) would help you consider some groups⁵ should be the recipients of public health initiatives, e.g., [have their telomeres measured, inviting them to participate in O et al. type interventions, Save People](#),
- On O et al., ...they do not have a Causal step as in ...smoking-related lung cancers; [Benzopyrene](#) a component of tobacco smoke can intercalate into a DNA chain changing the DNA sequence, with potentially disastrous consequences moving a cell from Normal to AbNormal to Cancerous if left un-repaired and the cell is not killed by the Immune System, a [disastrous flow](#). This is the beginning of putting together a direct Causal step (Benzopyrene intercalating ...). [O et al., do not have that type of Causal step but they do have a unidirectional dose-response, ...some of the participants maintained, lengthened telomeres](#). The O et al team have a [dose-response](#) - identifying where to look for those causal steps. Here are citations to O et al, https://www.ncbi.nlm.nih.gov/pubmed?linkname=pubmed_pubmed_citedin&from_uid=24051140. I used the citations to check if the work of O et al had been refuted or had it received reproducibility checks, had it been supported: Yes on supported. The O et al specific lifestyle changes that lengthened telomeres are identified as showing a dose-response relationship, I would argue this is [a critical observation](#), and beyond a showing of associated variables. You are free to argue this any way you wish and please extend our reading for Assignment_#4 into a review of at least the introduction of this paper, Hernán, Miguel A. *‘The C-Word: Scientific Euphemisms Do Not Improve Causal Inference From Observational Data.’*⁶ And why it matters most: [we need tools for eliminating the social inequalities in health](#).

Causal Inference

- [Generating information that can be translated into effective preventive or treatment strategies for the disparities in health is the way to go,](#)
- There is a need to distinguish the *causal question* from the investigatory steps used to answer it. Don’t get misled on the procedure used by O et al, sure it is not a vast study group but they have stunning observational data, [lengthening telomeres](#).
 - * Chae et al too observed lengthened telomeres in the face of racism with a within pro-Black sense of self and others. All four papers,

Think on the Care of the Caregivers,

⁵ Amanda K. Damjanovic, Yinhua Yang, Ronald Glaser, Janice K. Kiecolt-Glaser, Huy Nguyen, Bryon Laskowski, Yixiao Zou, David Q. Beversdorf, and Nan-ping Weng. Accelerated telomere erosion is associated with a declining immune function of caregivers of alzheimer’s disease patients. *Journal of immunology (Baltimore, Md. : 1950)*, 179(6):4249–4254, Sep 2007. ISSN 0022-1767. URL <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2262924/>

Speculative Design

...Dear Class I hope we can discuss what methods are most likely to deliver causal evidence on the social determinants of health. See our slide show http://bitly.com/LivesToLive_HLE for more on the social determinants, ...[Assignment_#4 might need your speculative designing, writing](#)

⁶ Miguel A. Hernán. The c-word: Scientific euphemisms do not improve causal inference from observational data. *American Journal of Public Health*, 108(5):616, May 2018. DOI: 10.2105/AJPH.2018.304337. URL <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5888052/>

Health Disparities

The Psychology of it all,

Chae et al, Gotlib et al, Lee et al, O et al, inspire *speculative design*.

- * I(KM) am trying to open up opportunities for current and future hypothesis generation in observational studies and the identification of potential new targets for screening and precautionary policies ... going for *identifying the conditions of our lives* that lead to compromised Immune Systems,
- * What are critical observations, I am arguing a dose-response observation of lengthening telomeres, that is reproducible, ...gets me/us to we are looking at a causation story, we do not have causal steps, we are building a picture, [details](#),
- * This is the foundational work for telomere length: The Nobel Prize in Physiology or Medicine 2009. www.nobelprize.org/prizes/medicine/2009/illustrated-information. Identifying a telomere, the enzyme telomerase and their roles,
- * There is work trying to reach the causal steps of telomere shortening, consider reviewing Oxidative Stress bit.ly/DeBriefing_Resources_Dose_Response ... maybe good Literature Review material for a Final Project,

The Nobel Prize

Causal Question

- Here are four points I think we should consider for [Assignment_#4](#),
 - *Can we develop an adequate Causal Question, does the question help us in designing methods for our study,*
 - Can we reach a causal analysis with our study? ...this is the question that should hover above us during [Assignment_#4](#),
 - Don't worry too much about statistical methods, almost all are correct only under precise assumptions which in observational data will never hold.
 - Fourth, [I hope we are choosing an ecological approach](#); I am promoting work at the individual level, e.g., 'there are suggestions that certain populations, such as South Asian groups, may develop metabolic syndrome and diabetes at lower levels of obesity as assessed by BMI than other populations such as Caucasians.' ...taken from reflections posted by Basu et al., *The Relationship of Sugar to Population-Level Diabetes Prevalence: An Econometric Analysis of Repeated Cross-Sectional Data.*⁷

[Assignment_#4](#)

Try to draw a real simple diagram illustrating the question,

Observational Studies with Minimal-No Interventions,

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Overweight and COVID-19 Disease Vulnerabilities

- I thought the following great work on the relationship of being overweight and risks of COVID-19 disease [...] ‘Results: A total of 1191 severe and 358 fatal [COVID-19 disease] cases were identified. [...] Since only pre-diagnostic clinical data were available, the main objective of this analysis was to identify baseline risk factors. [...] For the prediction of mortality, the top features were age, systolic blood pressure, waist circumference (WC), urea and [waist-hip ratio(WHR)].’ Wong and So. *Uncovering clinical risk factors and prediction of severe COVID-19: A machine learning approach based on UK Biobank data.*⁸
- **Are we losing the vulnerable because we do not know enough about variations in vulnerability, would measuring telomeres help our knowledge?**
 - Of course, ‘environmental factors such as sugar consumption should be investigated as potential factors in this interaction.’ Basu et al.,
 - We are looking for the patterns of health disparities for different diseases, e.g., **do we see that some diseases have the same pattern of health disparities?** Is it Place?
 - This observation would suggest investigating the social determinants of health if we see the same health borders for disease x and disease y and disease ...

8

Our Course

- In our course, we are trying to reach an understanding that prevention is *dependent on the development and application of exposure and outcome observations, we might not get to experiment for a range of health and ethical concerns.*
- Think of the **health border** identified above, approximately at East 96th street, I would be willing to argue the disparities at that border are an emergency and intervention requires us to ... **?**
 - **Measure telomere lengths on both sides of the border is a start,**
- My attempt to address the origins of **Causal Inference**, giving all credit to **Hill**⁹ and embracing a deductive reasoning approach of Karl Popper was an initial slide show for you https://bit.ly/Inquiry_A_Review,
 - In this show we do an analysis of supporting a **Correlation** type statement but maintain the objectives of a causal analysis, see Assignment_#1,

Exposure and outcome observations,

⁹ Sir Austin Bradford Hill. The environment and disease: association or causation? *Journal of the Royal Society of Medicine*, 108(1): 32, Jan 2015. DOI: 10.1177/0141076814562718. URL <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4291332/>

- **Assignment_#1** - Telomere Length, **Is there a causation story**, is also trying to highlight the need for prevention interventions in human health, http://bit.ly/Assignment_1_20200824. The theme of Assignment_#1 was continued into Assignment_#2, http://bit.ly/Assignment_2_Autumn2020, Question (a) Is measuring Telomere Length a means to identify vulnerable populations? Discuss, Question (b) If the conditions of our lives are a collection of Modifiable Risk Factors, possibly affecting individual or/and group experienced Environments, please design the public health interventions, or maybe health messaging you would use, including an identification of any Modifiable Risk Factors of concern? Discuss,
 - I have printed an Assignment_#2 DeBriefing and made it part of this combined PDF,
 - **Assignment_#3, 20201004**: bit.ly/Pasqualino_Cancer2020 and a Pre-Briefing here, check out the Loom videos, bit.ly/PreBriefingPasqualino,
 - **Assignment_#4, 20201008**: http://bit.ly/Assignment_4_20201008,

Is there a causation story,

Dear All, I recently came across this excellent vehicle for health messaging: Treanor & Nunis '*Why Africa's animation scene is booming*.' BBC World Service, 14 Oct. 2020, www.bbc.co.uk/news/business-54438334. My thoughts went to health messaging, Healthy eating,

Thank you for all your submissions, reading this,

K Moses JD PhD

OtherNotes, an Assignment 2 DeBriefing

- Here is an excerpt from a DeBriefing on Assignment_#2,
- Consider this, can telomere length lead us to better public health interventions. While public interest for interventions exists, the language used is often interpreted as curtailing, e.g., in the USA particular constructions of freedom intervene and cast government initiatives as interference in “private” choices for one’s life. Such narratives undermine the acceptability of gov. interventions to protect population health from, e.g., being overweight, being obese, treating obesity as a disease. Would knowledge of shorter telomeres make it easier to reach narratives for health as a Human Right, can we then reach *processed food reformulations*, regulated advertising and promotions, fruits and vegetable subsidies, higher taxation of tobacco, alcohol and highly processed foods ...please consult the WHO’s ‘best buys’ for preventing noncommunicable diseases (NCDs),¹⁰

Behavioural Change

- Do you think knowledge of Telomere Length might provide people with better reassurance for adjusting to, for in many cases, drastic Lifestyle changes?¹¹ And it might be just about raising health literacy, giving people the opportunity for more health knowledge. How can we persuade the vulnerable to buy into our health recommendations, and avoid highly processed foods? Is it really the case that highly processed foods are out-competing fruit and vegetables on price? How can we get those who need it the most to The Precautionary Principle, <http://bit.ly/PrecautionaryP>? Sharing information on Telomere Length is possibly an introductory step to making lifestyle changes. In an era of assessing sustainability, the impact of consumption on the status of planet Earth is very relevant to lifestyle choices made. What interventions can transform our realities? How do we enrich learning outcomes,
- A public health community initiative will need to move to the underlying cultural, social, political nature of the issues, including the conditions of our lives. A smart approach would use language embracing *local communities*, framing the issues as our health, our longevity, showing proposed solutions concerning, e.g., taxes on sugary beverages and regulation going to healthy levels of salt and trans fats in highly processed foods. We must build counter-narratives to guide us to health,
- How are we going to persuade people who are eating highly

Reformulating Processed Foods,

¹⁰ World Health Organization. Tackling NCDs: ‘best buys’ and other recommended interventions for the prevention and control of noncommunicable diseases. (WHO/NMH/NVI/17.9), 2017. URL <https://apps.who.int/iris/handle/10665/259232>. Accepted: 2017-10-12T15:09:59Z

¹¹ Oliver T. Mytton, Emma Boyland, Jean Adams, Brendan Collins, Martin O’Connell, Simon J. Russell, Kate Smith, Rebekah Stroud, Russell M. Viner, and Linda J. Cobiac. The potential health impact of restricting less-healthy food and beverage advertising on UK television between 05.30 and 21.00 hours: A modelling study. *PLOS Medicine*, 17(10): e1003212, Oct 2020. ISSN 1549-1676. DOI: 10.1371/journal.pmed.1003212. URL <https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1003212>

Do you think knowledge of Telomere Length might provide people with a better incentive for adjusting to Lifestyle changes? What is seductive knowledge?



Figure 4: Walk on by ...or demand change, Reformulation

processed foods to demand less salt and trans fats? What can we learn about addressing the social determinants of health? Is Telomere Length a way of bringing people to a consideration of their long term health,

- There are some observations in the field that say **precaution now**. *There are stories for a correlation between ‘nuchal (neck) subcutaneous adipose tissue (SAT) thickness, a surrogate marker of central trunk-weighted obesity,’ [as an independent predictor of shortening Telomere Length,]*¹²

Speculative Design and Writing

- A **speculative concept** is shorter telomeres are part of a causation story to a Compromised Immune System, which may be, e.g., needed for understanding the relationship between obesity and the risk of COVID-19 disease progressing, see bit.ly/DeBriefing_Resources_Dose_Response for a beginning of our analysis on the impact of Oxidative DNA Damage and Stress on the functioning of telomerase and telomeres. Reminder **telomerase** is the enzyme we are focusing on as the maintainer of telomere length.
- *I highly recommend Wong and So. ‘Uncovering clinical risk factors and prediction of severe COVID-19: A machine learning approach based on UK Biobank data.’ medRxiv, Cold Spring Harbor Laboratory Press, 22 Sept. 2020, Preprint Server, <https://www.medrxiv.org/content/10.1101/2020.09.18.20197319v1>,*
- Wong and So are great work on obesity and COVID-19 ... **‘Results: A total of 1191 severe and 358 fatal [COVID-19] cases were identified. [] Since only pre-diagnostic clinical data were available, the main objective of this analysis was to identify baseline risk factors. [] For the prediction of mortality, the top features were age, systolic blood pressure, waist circumference (WC), urea and waist-hip ratio(WHR).’**
- I would put the above forward as a putative hypothesis explaining a correlation between excessive weight gain and increased risk of the COVID-19 Acute Respiratory Syndrome progressing,
- **If this is the flow, hypothesis:** *being overweight, being obese promotes the development of shorter telomeres, leading to a compromised Immune System, creating a vulnerability to COVID-19 disease progressing, ...it might be precautionary to urge measurement of telomeres, show the results, change diet, increase movement, urge weight loss now. It will mean giving people direct information about what they need to change, e.g., in their diet, which means surmounting cultural, social, political*

Is Telomere Length a way of bringing people to a consideration of their long term health,

¹² Harald Mangge, Markus Herrmann, Gunter Almer, Sieglinde Zelzer, Reinhard Moeller, Renate Horejsi, and Wilfried Renner. Telomere shortening associates with elevated insulin and nuchal fat accumulation. *Scientific Reports*, 10(11):6863, Apr 2020. ISSN 2045-2322. DOI: 10.1038/s41598-020-63916-6. URL <https://www.nature.com/articles/s41598-020-63916-6>

A **speculative concept** is shorter telomeres are part of a causation story to a Compromised Immune System,

A putative hypothesis,

Wong and So, 2020 is great work on obesity and COVID-19,

A Plant-Based Diet,

beliefs and tropes.

- Further, there is more support for a correlation showing prematurely shortened telomeres significantly associated with the rising risk of cancer mortality, see Shen et al, 2020.¹³ And see, Kamrunnahar et al, 2020.¹⁴ *Conclusions: Patients with ovarian cancer (OC) and cervical cancer (CC) with shorter lymphocyte telomeres have significantly reduced survival; therefore, the peripheral blood lymphocyte telomere length is a prognostic biomarker in OC and CC,*
- A **hypothesis** is biological age ing and/or shorter telomeres are part of a causation story to a Compromised Immune System, which may be needed for understanding rising Cancer risk,
- **Being ready to speculatively design for investigating a range of Health Disparities and remedying the Disparities currently appears to be a good public health investigator approach,**
- **p.s. 'Measurable'** describes a biomedical attitude towards Telomere Length. Short Telomeres can be an outcome of injury, DNA damage, e.g., loss - of -function mutations in the genes encoding the telomerase enzyme complex that maintains and lengthens telomeres. You might be interested in reviewing Alder et al. Diagnostic utility of telomere length testing in a hospital-based setting. PNAS USA. 2018;115(10): E2358–E2365. <https://www.pnas.org/content/115/10/E2358>¹⁵ ...Remember these papers have an Abstract, Introduction, and Conclusion, it may not be necessary to read the whole paper to get the information we need. If TL is measurable and an indicator of biological health, should we, can we intervene to save lives or at least more years,

¹³ G. Shen, J.-Y. Huang, Yu-Qing Huang, and YingQing Feng. The relationship between telomere length and cancer mortality: Data from the 1999–2002 national healthy and nutrition examination survey (NHANES). 24(1):9–15. ISSN 1760-4788. DOI: 10.1007/s12603-019-1265-z. URL <https://doi.org/10.1007/s12603-019-1265-z>

¹⁴ Kamrunnahar Shanta, Kentaro Nakayama, Masako Ishikawa, Tomoka Ishibashi, Hitomi Yamashita, Seiya Sato, Hiroki Sasamori, Kiyoka Sawada, Sonomi Kurose, Hossain Mohammad Mahmud, Sultana Razia, Kouji Iida, Noriyoshi Ishikawa, and Satoru Kyo. Prognostic value of peripheral blood lymphocyte telomere length in gynecologic malignant tumors. 12(6):1469. DOI: 10.3390/cancers12061469. URL <https://www.mdpi.com/2072-6694/12/6/1469>. Number: 6 Publisher: Multidisciplinary Digital Publishing Institute

A **hypothesis** is biological age ing and/or shorter telomeres are part of a causation story to a Compromised Immune System,

¹⁵ Jonathan K. Alder, Vidya Sagar Hanumanthu, Margaret A. Strong, Amy E. DeZern, Susan E. Stanley, Clifford M. Takemoto, Ludmila Danilova, Carolyn D. Applegate, Stephen G. Bolton, David W. Mohr, and et al. Diagnostic utility of telomere length testing in a hospital-based setting. *Proceedings of the National Academy of Sciences*, 115(10):E2358–E2365, Mar 2018. ISSN 0027-8424, 1091-6490. DOI: 10.1073/pnas.1720427115. URL <https://www.pnas.org/content/115/10/E2358>

Who is dying: COVID-19 related Deaths

...New York City, 2020

'Dear Colleague: COVID-19 Update,' Week of May 3-9, 2020

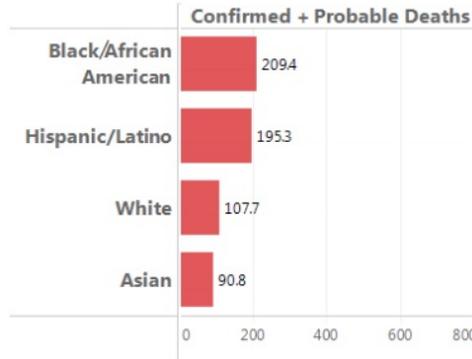


Figure 1. Age-adjusted rates of confirmed and probable COVID-19 deaths in New York City, by race and ethnicity, as of April 27, 2020.

Note: A death is classified as confirmed if the decedent was a NYC resident who had a positive SARS-CoV-2 laboratory test. A death is classified as probable if the decedent was a NYC resident who had no known positive laboratory test for SARS-CoV-2 but the death certificate lists as a cause of death "COVID-19" or an equivalent. Hispanic/Latino includes people of any race. People of other races are not shown

[Data](#) from the New York City Health Department

Figure 5: 'Dear Colleague: COVID-19 Update,' New York City Department of Health and Mental Hygiene, Week of May 3-9, 2020. <https://www1.nyc.gov/assets/doh/downloads/pdf/imm/covid-19-providers-dear-colleague-updates-05052020.pdf>.

Support

Dear all I built this document with (1) kjhealy. 'latex-custom-kjh.' GitHub, 21 Oct. 2020. Github, <https://github.com/kjhealy/latex-custom-kjh> and (2) the Tufte- \LaTeX document classes.

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