Notes on COVID-19

Part 16: 2020-09-10 to 2020-09-30

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2020-09-30

2020-09-12 The editor of AAAS Science lays into the US President for lying to the public in February and March 2020 about the severity of Covid-19
https://science.sciencemag.org/content/early/2020/09/11/science.abe7391
The evidence was partly made public earlier this week by Bob Woodward, of Watergate fame, in his second book on the Trump presidency. Anthony Fauci was interviewed on 2020-09-11 by Andrea Mitchell of MSNBC and said that he thinks is will be "*well into 2021. Maybe even towards the end of 2021*" before life returns to some form of normality in the US, even if a vaccine is approved in the next few months. He is worried about "*the statistics, Andrea, they're disturbing. We're plateauing at around 40,000 [new] cases a day and the deaths are around 1,000.*"
https://www.theguardian.com/world/2020/sep/11/covid-19-fauci-us-life-coronavirus-vaccine

Germany has a population of 83.02m; the US 328.2m, both according to Wikipedia. The US thus has a little under four times the population. The figures are:

	Cases	per 100,000	Deaths	per 100,000	CFR
US	6,445,290	1964	193,016	59	2.99
Germany	260,538	314	9,351	11	3.59

Figures from JHU Dashboard at 2020-09-12 0915 UTC. I give the figures "per 100,000" rounded to the nearest whole number. I calculated CFR by dividing total number of deaths by total number of cases. At this stage of the pandemic, this is roughly right, but it will be slightly too high, for two reasons: treatment of those severely ill has improved, so relatively fewer are dying; and more people are being tested, so relatively more cases, including asymptomatic and paucisymptomatic individuals, are being identified as cases than before.

The figures form a startling contrast. The US has (had) over 6 times the incidence of Covid-19 as Germany, although its CFR is a little better. One can easily understand why Fauci is worried.

2020-09-13 I referenced the study by Anfinrud et al, of droplet generation while speaking, in Notes Part 5 on 2020-04-25 https://www.nejm.org/doi/full/10.1056/NEJMc2007800 They claimed that droplets were generated during normal speech which remained in the air for minutes or longer. Abbas and Pittet wrote in a critique in The Lancet Infectious Diseases that "*[t]he studies have methodological flaws that limit their generalisability.*"
https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(20)30558-2/fulltext The authors reply as Bax et al in The Lancet Infectious Diseases on 2020-09-11
https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(20)30726-X/fulltext Bax et al say "*Mohamed Abbas and Didier Pittet challenge the conclusions of our reports that normal speaking*

might be an important mode of transmission for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), involving small particles that remain airborne for minutes…… we refer readers to the [appendix to the letter] for a detailed response to all issues raised..." In the text body, they address the concern that only one speaker was investigated. Bax et al reply that the physics of speaking is such that different speakers will produce similar droplet-cloud phenomena. Abbas and Pittet also note that the containment box was small, limiting assessment of droplet travel. Bax et al agree; the box environment in which they conducted experiments was "*quiescent*" and actual droplet travel in real-life situations is highly dependent on air movement, driven say by convection and ventilation – their measurements established that some droplets required "*many minutes*" to descend to the bottom of the box; it follows that they can be dispersed, analogously with cigarette smoke. This phenomenon was not mentioned in the original correspondence.

Bax et al refer to the comprehensively argued article by Trisha Greenhalgh on face covering which I referenced in Notes 10, entry 2020-06-17. They wish to make the valid point that public health measures such as face covering in public are not phenomena which lend themselves to minute laboratory examination, but, as Greenhalgh argues, measures which are often justified in advance by common-sense non-scientific criteria, which can (perhaps) be shown in retrospect to have made a difference. Greenhalgh quotes a retrospective study on mask wearing by the German IZA, referenced in my Notes 10 entry, which shows it has made a difference. An obvious example os such a measure is closing pubs. Pubs are often loud places in which people interact verbally at relatively close range for longish periods, and in which the imbibing of alcohol lowers inhibitions, for example, to maintain a minimum-distance requirement, and in which people use communal toilets and washing facilities often. That pubs are loud means the volume of speaking is also higher (to be understood) and speaking volume is directly related to higher emission of droplets, as recently shown by the PERFORM project. Toilets and communal washing facilities were identified early on as prime locations for fomites and thus transmission through touch. And so on. Not only that, but bars have been locations of superspreading events throughout the world, from Ischgl to Seoul, whereas, for example, wide open spaces have not been. It is a different sort of argument from that which establishes if, and how much, < 5 micron aerosols carry SARS-Cov-2 virions.

2020-09-15 Describing the severe difficulties there still seem to be with the UK's Test&Trace system are two articles in TheG, on 2020-09-14 https://www.theguardian.com/world/2020/sep/14/utter-shambles-gps-and-medics-decry-nhs-test-and-trace-system followed by https://www.theguardian.com/world/2020/sep/14/people-in-englands-10-worst-hit-covid-hotspots-unable-to-get-tests on 2020-09-15. Also on 2020-09-15 the Secretary of State for Health's report on T&T difficulties to Parliament https://www.theguardian.com/world/2020/sep/15/matt-hancock-says-covid-testing-crisis-may-last-weeks-as-uk-hospitals-plug-gaps synopsis: it could take weeks to fix. And an article by David McCoy on 2020-09-15 https://www.theguardian.com/commentisfree/2020/sep/15/test-trace-system-johnson-shambles-coronavirus
Just to be clear about this: Germany is doing test (locally) and trace effectively. In Bielefeld (population 333,000 or near enough) we have at least two local testing centres which offer same-day or next-day appointments as well as drop-in, and results are communicated within 24 hours.

Still all nasopharyngeal swabs, though, not saliva.

2020-09-15 There is an organisation in Germany called German Legal Accident Insurance (Deutsche Gesetzliche Unfallversicherung e.V.), which has an Institute for Workplace Protection (Institut für Arbeitsschutz, IfA). They produced a poster explaining the differences and uses for various types of face coverings https://publikationen.dguv.de/widgets/pdf/download/article/3788 (in German). They have issued part of it (without the fabric mouth-nose covers) in English as well https://publikationen.dguv.de/widgets/pdf/download/article/3791
This is the kind of thing Germany seems to do quite well. What is not so clear is how this information gets to the general population. It is a poster, and the DGUV/IFA is a well-known organisation to which employers respond, so one can imagine this will be posted in workplaces. But not everybody goes to work nowadays. This clarity on an important component of social protection (the others being distancing, reducing contacts, and hand-washing) contrasts with the English approach, as critiqued poignantly by Christine Berry in TheG on 2020-09-13 https://www.theguardian.com/commentisfree/2020/sep/13/manchester-lockdown-second-wave
Berry points out apparently inconsistent "requirements" and a lack of clarity on what is required where.

2020-09-15 The Lancet Covid-19 Commission was launched in July 2020 to report on how to deal with Covid-19 from a global perspective. A Statement was issued on 2020-09-14, the eve of the 75th UN General Assembly
https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31927-9/fulltext
From the Executive Summary "*The Commission aims to offer practical solutions to the four main global challenges posed by the pandemic: suppressing the pandemic by means of pharmaceutical and non-pharmaceutical interventions; overcoming humanitarian emergencies, including poverty, hunger, and mental distress, caused by the pandemic; restructuring public and private finances in the wake of the pandemic; and rebuilding the world economy in an inclusive, resilient, and sustainable way that is aligned with the Sustainable Development Goals (SDGs) and the Paris Climate Agreement.*" The Commission recommends 10 priority actions:
"

1. *Origins: track down the origins of the virus in an open, scientific, and unbiased way not influenced by geopolitical agenda.*

2. *Non-pharmaceutical interventions: suppress the epidemic through the proven package of non-pharmaceutical interventions, as accomplished by several countries including several in the Asia–Pacific region.*

3. *Science-based policy making: base policy making on objective scientific evidence and stop politicians and others in positions of power from subverting clinical trials and other scientific protocols.*

4. *Timely and consistent data: collect and publish timely and internationally consistent data on the state of the pandemic, including humanitarian and economic consequences.*

5. *Justice in access to tools to fight COVID-19: ensure universal access to the tools to fight COVID-19, including test kits, therapeutics, and prospective vaccines.*

6. *Emergency financing: secure access of developing countries to financing from international sources, especially from the International Monetary Fund and World Bank.*

7. *Protect vulnerable groups: direct urgent protection towards vulnerable groups, including older people, people in poverty and hunger, women who are vulnerable, children, people with chronic diseases and disabilities, the homeless, migrants, refugees, Indigenous Peoples, and ethnic and racial minorities.*

8. *Long-term financial reform: prepare for a deep restructuring of global finances, including debt relief, new forms of international financing, and reform of monetary arrangements.*

9. *Green and resilient recovery: economic recovery will be based on public-investment-led growth in green, digital, and inclusive technologies, based on the Sustainable Development Goals.*

10. *Global peace and cooperation: support UN institutions and the UN Charter, resisting any attempts at a new cold war*
    ”

2020-09-15 Bloom et al discuss in the NEJM on 2020-09-08 what it will take to dampen Covid-19 (to “*return to prepandemic conditions*”) via vaccination https://www.nejm.org/doi/full/10.1056/NEJMp2025331 The answer: quite a lot, including public intervention and persuasion.

2020-09-15 Two strong opinions on the U.S. executive response to Covid-19 are expressed in the BMJ on 2020-09-14 by Drew Altmann, President and CEO of the Henry J. Kaiser Foundation, whose essay is entitled “*Understanding the US failure on coronavirus*” https://www.bmj.com/content/370/bmj.m3417 (Kaiser organisations represent the largest health care providing agencies in California) and Gregg Gonsalves, who calls the US executive response “*disease denialism*”, and compares it with the consequences of Aids denialism in South Africa under Mbeki, when it was estimated there were some 350,000 deaths because of this policy https://blogs.bmj.com/bmj/2020/09/14/gregg-gonsalves-covid-19-in-the-us-the-new-disease-denialism/

2020-09-15 The issue of transmissions in care homes in the UK is real. Ladhani et al looked at six London care homes in April, and published the results in EClinicalMedicine on 2020-09-04 https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(20)30277-7/fulltext The Lancet newsletter summarises: “*The authors investigated SARS-CoV-2 outbreaks in six care homes in London during April this year, finding 105/264 (39.8%) residents were SARS CoV-2 positive, of which 28 (26.7%) were symptomatic, 10 (9.5%) post-symptomatic, 21 (20.0%) pre-symptomatic and 46 (43.8%) who remained asymptomatic. Live-virus recovery was similar between*

symptomatic/asymptomatic residents/staff ....."

2020-09-18 An intriguing preprint from Gandhi et al at UCSF on mask-wearing https://ucsf.app.box.com/s/blvolkp5z0mydzd82rjks4wyleagt036 They suggest there is evidence that general mask-wearing results in more mild cases of Covid-19 because of the reduction in exposure.

2020-09-18 An article in the CDC MMWR from 2020-07-17 by Hendrix et al https://www.cdc.gov/mmwr/volumes/69/wr/mm6928e2.htm relates the case of a hair salon in Springfield, Missouri, which had two hairdressers with symptomatic Covid-19. The salon had a masking policy for both clients and employees and there were no symptomatic secondary infections amongst 139 clients; 67 of them were tested and all negative.

2020-09-19 An article in TheG by the estimable Laura Spinney, author of one of the best books on the 1918-9 influenza pandemic, on mutations of SARS-CoV-2 and what they may mean for prophylaxis (vaccines, antivirals, disease transmission and progression) https://www.theguardian.com/world/2020/sep/18/mutant-virus-should-we-be-worried-sars-cov-2-changing-covid The good news is that mutations so far seem to have little effect on the efficacy of the vaccines that are in trial, disease transmissibility is apparently not being enhanced, and progression is not becoming more severe. She also points out that the deadly "second wave" of the 1918-9 flu pandemic was caused by the virus mutating, as flu viruses do. There are few signs of illness-significant mutations so far in SARS-CoV-2. Indeed, one would expect fewer mutations in an RNA-based virus than in a DNA-based one, for well-rehearsed reasons.

2020-09-19 Britton et al report in The Lancet Child and Adolescent Health on the winter season in Australia of respiratory synticial virus, which is a leading viral cause of hospitalisation in children, and has predictably winter seasonality. https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642(20)30307-2/fulltext Admissions were a startling 93.4% down on the 2015-9 trend. The main reason is surely intuitively clear – the distancing and hygiene measures introduced to dampen Covid-19.

2020-09-19 In The Lancet, Jones and Helmreich give a short history of the notion of "herd immunity" https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31924-3/fulltext It was first used in the US by George Potter in the context of what to do about spontaneous abortion in cattle and sheep, and was translated into English, first in the study of lab mice, and then in the study of outbreaks of dyphtheria in a boarding school in Greenwich.

2020-09-19 Peter Doshi, a journalist and healthcare academic, reviews the evidence for possible pre-existing immunity to SARS-CoV-2, in the BMJ on 2020-09-17 https://www.bmj.com/content/370/bmj.m3563 Tests on blood samples from, say, 2015-9 have shown there is some T-cell reactivity to SARS-CoV-2, but of course there was no exposure to the virus at that time. The conclusion is that exposure to other diseases in the past has enabled this phenomenon. There are a lot of small studies showing this. There are two takeaways. First, if there is some level of immunity in populations, then the proportion of the population which can confer

herd immunity goes down drastically. One major question is why cities such as New York, London and Stockholm have not seen a resurgence of Covid-19. New York has 23% seroprevalence, London 18%. Sunetra Gupta of Oxford notes that the "conventional wisdom" was that lockdown had dampened Covid-19, and points out that when you remove lockdown the disease curve should start rising again, but it hasn't in London. Marcus Buggert points out that Stockholm could be showing increasing levels of disease, since people are paying less attention to distancing – but it isn't. It looks like a good case for some large studies of T-cell reactivity.

2020-09-20 Politics and vaccines. Nine pharmaceutical companies developing potential vaccines for Covid-19 said on 2020-09-08 that they would not apply for regulatory approval of a vaccine until adequate trial data are available. Avorn and Kesselheim discuss this event and its background in the NEJM on 2020-09-15 https://www.nejm.org/doi/full/10.1056/NEJMp2029479 The availability of a vaccine has apparently become a politicised issue in the US, as have many aspects of Covid-19. The reason I use the term "politicised" is that social measures to combat a pandemic are inevitably political – that is what politics is supposed to do: help society get organised to achieve social good and avoid social harm. By "politicised" I mean that aspects of the struggle against Covid-19 are being used by some politicians in their own self interest rather than that of the society they claim to govern.

2020-09-21 A database of Covid-19 superspreading events
https://medium.com/@codecodekoen/covid-19-superspreading-events-database-4c0a7aa2342b

2020-09-21 Devi Sridhar has some observations in TheG on 2020-09-21 on what to do and how to behave with the persisting threat of Covid-19
https://www.theguardian.com/commentisfree/2020/sep/21/local-lockdowns-begin-no-normal-advice-live-with-covid They are consonant with my own conclusions (and, I hope, behaviour). She also regrets the lack of functioning test-and-trace in the UK. The lack of preparation for such a society-wide function could be partly a result of the UK focusing in the past on influenza being the most likely pandemic; as far as I know, there is little or no asymptomatic infectivity with influenza strains, whereas with Covid-19 there is a mean of 4-5 days and 99% CI of two weeks in which one may be asymptomatically infectious.

2020-09-22 A report in TheG says that Fugaku, the world's fastest supercomputer, has run simulations of visor-wearing and found that visors do not inhibit the distribution of <5 μm aerosols but do seem to be effective at inhibiting droplets larger than 50 μm
https://www.theguardian.com/world/2020/sep/22/face-shields-ineffective-trapping-aerosols-japanese-supercomputer-coronavirus

2020-09-22 Nuzzo, Bell and Cameron discuss in JAMA on 2020-09-16 the suboptimal response of the US, despite coming first in preparedness in the GHS Index a year ago
https://jamanetwork.com/journals/jama/fullarticle/2770891 The first factor they adduce is low public confidence in government, which they not can undermine public adherence to disease-control measures . They also note the US ranked 38th (of 194 countries ranked) in number of

physicians per capita, and 40th in number of hospital beds per capita – and on access to health care the US was ranked 175th for the usual reasons: no universal health-care coverage and large numbers of uninsured and underinsured people. They also note that the US "*failed to harness its own technical expertise*", remarking on the initial test-supply debacle and the apparent lack of stocks of protective equipment. All in all, a brief, rounded synposis.

2020-09-22 Useful. Frank et al have shown in JAMA on 2020-09-17 that povidone-iodine nasal antiseptic is quick and effective in neutralising SARS-CoV-2 in vitro in concentrations as low as 0.5% https://jamanetwork.com/journals/jamaotolaryngology/fullarticle/2770785 It is rather better even than 70% ethanol. "*Povidone-iodine nasal antiseptics at concentrations (0.5%, 1.25%, and 2.5%) completely inactivated SARS-CoV-2 within 15 seconds of contact as measured by log reduction value of greater than 3 log10 of the 50% cell culture infectious dose of the virus. The ethanol, 70%, positive control did not completely inactivate SARS-CoV-2 after 15 seconds of contact. .... No cytotoxic effects on cells were observed after contact with each of the nasal antiseptics tested.*"

2020-09-22 A JAMA editorial by Bos, Brodie and Calfee on 2020-09-18 looks at severe Covid-19 and its treatment https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2770931 They note that severely-ill Covid-19 patients often meet the criteria for ARDS, and suggest it is important to treat them with the experience derived from effective ARDS management. One "*source of contention*" in ARDS is the timing of intubation, as it has been in severe Covid-19. Amongst proven treatments, they note that remdesivir shortens time to recovery, but its helpfulness in mechanically-ventilated patients is still uncertain. Corticosteroids have shown themselves to be very helpful for severe Covid-19, even though for general ARDS their trials have yielded "*conflicting results and no consensus.*" On the list of unproven therapies, the authors include hydroxychloroquine and lopinavir/ritonavir, as well as IL-6 blockers to control the "*cytokine storm*". The authors express themselves reservedly about the cytokine storm phenomenon. "*[T]he limited data that are available indicate that plasma IL-6 levels in patients with COVID-19 are orders of magnitude lower than in patients with cytokine release syndrome and, in some cases, lower than in patients with ARDS not associated with COVID-19. At present, there is no evidence from randomized clinical trials that IL-6 blockade has beneficial effects for patients with severe COVID-19.*" The authors note that the outcomes of Covid-19 critical care have improved to levels associated with ARDS in general, and put that down to the "*value of meticulous critical care that can be provided in hospitals with adequate resources and that are not operating under severe strain*." In contrast to ARDS in general, Covid-19 ARDS has a single causal etiology (namely, SARS-CoV-2), which leads to "*a more specific and more uniform clinical and biological phenotype of ARDS*" and thus more specific intervention possibilities. For example, they mention "*some evidence suggests that endothelial injury and coagulopathy may be central mediators of lung injury in COVID-19. If confirmed, therapies that target endothelial activation or coagulopathy may hold promise...*"

2020-09-23 So how well are Warn-Apps working? A comment from TheG Live Blog at 12.07 UTC (= 13.07 on the blog's timescale) today suggests: not too well ……...
"*Germany's health minister has urged users of a smartphone app to help trace coronavirus*

infections to upload positive test results into the system, so that others at risk get a timely warning. The Corona-Warn-App, launched 100 days ago, has been downloaded more than 18m times – more than all other similar apps across Europe combined that use Bluetooth technology to assess an individual's risk of catching Covid-19. Yet only 5,000 app users who have tested positive – or half the total – have actually taken the steps needed to trigger exposure notifications to their contacts, the health minister, Jens Spahn, told a news conference. Most are calling a hotline, while few are directly uploading their results via their phone – reflecting lingering fears that people's identity will be revealed despite the app's privacy protections.
Spahn told reporters:

> *Please use the app, if you test positive, to inform those you have been in touch with.*

Despite the relatively high public support for the app, designed by Deutsche Telekom and SAP, there is little evidence so far that it has contributed meaningfully to curbing the pandemic. Still, the government is backing the Corona-Warn-App as a supplement to manual contact-tracing to contain infection numbers that are rising in Germany, albeit more slowly than in other European countries. Work is continuing to digitally automate the task of uploading of lab test results, with the consent of users. A symptom tracker to help users figure out whether they may have Covid-19 will be added in October, said Juergen Mueller, the chief technology officer at SAP."
https://www.theguardian.com/world/live/2020/sep/23/coronavirus-live-news-uk-restrictions-could-last-six-months-as-who-reports-record-weekly-case-high

2020-09-24 Angela Giuffrida elicits for TheG some potential explanations for why Italy is not suffering the current expansion in cases happening in Spain, Italy or the UK "*On Tuesday [2020-09-22], [Italy] recorded 1,392 new cases compared with 10,799 in Spain, 10,088 in France and 4,926 in the UK.*" https://www.theguardian.com/world/2020/sep/24/totally-awakened-how-tragedy-has-left-italians-alert-to-deadly-virus Interviewees put it down to the visible suffering in Lombardy and particularly in Bergamo during the first wave, and enduring public sensibility to the seriousness of the disease and the desire not to see that happen again, leading most people to "*diligently follow*" the safety rules. T&T is also said to work well: "*[t]he ... approach has been to test everyone within the social network of an infected person – their families, friends, colleagues, neighbours – regardless of whether they have been exposed.*" But schools started up on 2020-09-14 and economic activity has resumed again and the effects of both of those will only be known at the end of the month.

2020-09-25 Poletti et al published a preprint on 2020-06-15 on a survey of over 5,400 individuals in Lombardy. Almost 74% of infected people under 60 years of age were asymptomatic (95% CI 71.8% – 75.9%). 6.6% of those over 60 required critical care (ICU) or died.
https://arxiv.org/abs/2006.08471

2020-09-26 Hallal et al report in The Lancet Global Health on 2020-09-23 on two seroprevalence surveys conducted across 133 cities in Brazil, with 25,000 or so participants in mid-May and 31,000 in early June https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(20)30387-9/fulltext Findings are best quoted in full:
"*We included 25 025 participants in the first survey (May 14–21) and 31 165 in the second (June*

4–7). For the 83 (62%) cities with sample sizes of more than 200 participants in both surveys, the pooled seroprevalence increased from 1·9% (95% CI 1·7–2·1) to 3·1% (2·8–3·4). City-level prevalence ranged from 0% to 25·4% in both surveys. 11 (69%) of 16 cities with prevalence above 2·0% in the first survey were located in a stretch along a 2000 km of the Amazon river in the northern region. In the second survey, we found 34 cities with prevalence above 2·0%, which included the same 11 Amazon cities plus 14 from the northeast region, where prevalence was increasing rapidly. Prevalence levels were lower in the south and centre-west, and intermediate in the southeast, where the highest level was found in Rio de Janeiro (7·5% [4·2–12·2]). In the second survey, prevalence was similar in men and women, but an increased prevalence was observed in participants aged 20–59 years and those living in crowded conditions (4·4% [3·5–5·6] for those living with households with six or more people). Prevalence among Indigenous people was 6·4% (4·1–9·4) compared with 1·4% (1·2–1·7) among White people. Prevalence in the poorest socioeconomic quintile was 3·7% (3·2–4·3) compared with 1·7% (1·4–2·2) in the wealthiest quintile."

So Rio is comparatively high, at 7.5% [4.2-12.2]; one city is up there with 25%, but in the city populations as a whole it is just over 3% in early June. Recall, though, that that is almost 4 months ago and Brazil has been suffering a daily new-case figure of over 30,000 for the entire time since, according to the JHU tracker. Brazil has a daily-new-infections curve which started to flatten in early August. The June survey date is about half-way up the left (increasing) side of the curve.

2020-09-26 Burki reports in The Lancet Digital Health on a new report by the Center for Countering Digital Hate on on-line anti-vaccine advocates and the phenomenon of anti-vaccination on social media
https://www.thelancet.com/journals/landig/article/PIIS2589-7500(20)30227-2/fulltext The report is https://252f2edd-1c8b-49f5-9bb2-cb57bb47e4ba.filesusr.com/ugd/f4d9b9_7aa1bf9819904295a0493a013b285a6b.pdf
The Center, despite the US spelling of its name, is a UK NGO, about which more information can be found at https://www.counterhate.co.uk

2020-09-26 Han et al have written a Health Policy paper for The Lancet on 2020-09-24 on lessons learned from easing Covid-19 restrictions in nine high-income countries/regions, namely Hong Kong SAR, Japan, New Zealand, Singapore, South Korea, Germany, Norway, Spain, and the UK. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)32007-9/fulltext They used a framework for comparison consisting of knowledge of infection status (gathering numbers), community engagement (distancing, mask wearing, school and workplace measures, communications, protection of the vulnerable, socioeconomic support), public health (TTI, use of expert advice), health system capacity (availability of treatment, equipment, workforce) , and border control (restrictions on inbound travel).

2020-09-26 We have had some recent local outbreaks. There is one in Hamm, an important rail interchange point about 80km WSW of BI with some 180,000 residents. https://www.zeit.de/gesellschaft/zeitgeschehen/2020-09/corona-ausbruch-hamm-superspreader-hochzeit-sieben-tage-inzidenz-wert (in German). There was a large wedding celebration at the

beginning of September, in which 330 residents were said to have participated. (The current upper limit in my state of North-Rhine Westfalia is 150, and hygiene regulations are supposed to be followed.) Now, the number of new infections per 100,000 residents in 7 days in Hamm is 99.9, the largest in Germany. The national newspaper Die Zeit says there are 207 cases, 150 of them with a connection to the celebration. It has affected nine schools, which are closed or partly closed for quarantine. Currently, 40 school attendees are infected, only one without a connection to the celebration. My local paper, the NW, speaks of 100 infections and more than 2,500 people in quarantine.

Now there is an outbreak in BI after a family celebration last week, luckily smaller. Initial reports identified 24 infected people, including 10 school pupils, and 5 schools went into full or partial quarantine. The city is talking about several hundred people who will need to be quarantined.

Update on 2020-09-28 on the numbers. It turns out that 36 people associated with the celebration tested positive, and that 10 schools are now in partial or full quarantine. After weeks of 0-7 daily new infections, 19 were registered on Saturday 2020-09-26 and 20 more on Sunday 2020-09-27.

Update on 2020-09-29 on the numbers. There are now 950 teachers and school pupils in quarantine as a result, almost two thirds of the total quarantined in Bielefeld, which is around 1,500 at the moment, just under 1 in 200 residents.

Update on 2020-09-30 on the numbers. There were said to be 30 people at the superspreading event, and 45 associated are infected.

People are not supposed to be doing this. Private events, of up to 150 participants in my state, are supposed to be taking place under well-publicised, stable and uniform public-hygiene measures, no matter what their size. The events in Hamm and BI are not essentially different from the Heinsberg outbreak in February, except, first, in numbers (lower), second, that we all now know about superspreading at celebrations, and, third, we are therefore supposed to be behaving differently, to limit transmission of Covid-19. Such celebrations are being roundly and loudly condemned by the city authorities for their irresponsibility.

The quarantines and closing of schools as a consequence of infections are a matter of law. The celebrations themselves are currently only regulated by the maximal count of 150 participants and nominal adherence to hygiene guidelines. It looks as if the Hamm celebration was larger, but apparently there was more than one constituting event. Nothing is said about how large the BI celebration was.

I looked up restrictions on gatherings, which differ from state to state in Germany. As I mentioned above, in my state of North-Rhine-Westfalia (NRW), private celebrations of “important occasions” (weddings, christenings are given as examples) are allowed with up to 150 participants, under specific hygiene regulations [Note 2020-09-20: this has changed as of 2020-09-29]. In the UK, ES and NL, no more than 6 may participate in private gatherings; EI says no more than 6 indoors (up to 15 outdoors). In FR, BE, it is no more than 10 participants. In SE and DK it is no more than 50.

Germany in general and NRW in particular is very much an exception in Europe. I suspect this is about to change.

Update on 2020-09-29 on political responses. The Federal government is suggesting today a limit of 25 participants. There is another, probably mammoth, discussion between the Chancellor and the heads of the Federal states this afternoon. It is manifestly obvious that no city wants to have to deal with thousands more tests, partially closing ten schools and a thousand people in quarantine because of a poorly-managed celebration. Why on earth don't we go for the limits our neighbours are using?

Update on 2020-09-30 on political responses. The Chancellor did not get her suggestion adopted by all states. My state of NRW has introduced a complicated rule. In districts where the rate is 35 new infections per 100,000 residents in the last 7 days – let's call this measure ni10^{5}r7d – or over, then celebrations outside the home will be restricted to 50 participants. Where the rate is 50 ni10^{5}r7d or over, celebratrions are restricted to 25 participants. The state has refrained from regulating celebrations in "private spaces" (homes and suchlike). But has determined it is "urgently recommended" that such be restricted to 15 participants in 35 ni10^{5}r7d districts and 10 participants in 50 ni10^{5}r7d districts. Such reticence may seem odd to, say, Brits, who were told to receive no visitors in their homes during lockdown, and now may receive no more than 5. Since the politics of the 1930s-1940s and the Second World War, Germany has been very reluctant to let the state interfere in what is taken to be the "private" realm. NRW Health Minister Laumann made explicitly clear that the state has no business regulating "private spaces."

Update on 2020-09-30 on consequences. The result, therefore, of 30 people celebrating in BI on September 15th is that 10 schools are closed or partially closed and nearly 1,000 people are in two-week quarantine. We know this because Germany has well-functioning TTI. Such a celebration would also be condoned under the new restrictions determined yesterday, because BI had less than 35 ni10^{5}r7d on September 15th. This is not the first time in the history of law that law has been formulated, in response to an incident (or incidents), that would not have prevented that incident. Similar happened with the 1986 event in which Aeromexico Flight 498 on approach to LAX collided in midair with a small private plane. The incident led to Congress mandating the TCAS anticollision system which, as I have argued elsewhere, was not yet technologically mature (not even in 2002, as the Überlingen midair showed). Yet TCAS would not have prevented the collision, for it depended on participants using (at least) a working Mode C radar transponder and the private plane involved in the collision was not (although it should have been).

Continuing the 2020-09-30 update. There is another way of viewing these events than that of the NRW government. The German constitution ("Basic Law") does not condone activity which leads to harm to others. At least 15 of those infected were secondary infections (since only 30 people were at the celebration), and at least 920 quarantined people were also not there. That constitutes a certain amount of harm (illness, poorly-compensated furlough from work) as well as significant disadvantage to others (loss or reduction of education for two weeks for pupils, families providing for quarantined pupils). It is not unconstitutional to formulate laws and regulations to limit such specific harm, and those laws and regulations need make no distinction between public and private spheres of activity, just as laws concerning (the German equivalent of) grievous bodily harm and

manslaughter and murder do not. Some (all?) of my acquaintances opine that the September 15th celebrants were harmfully negligent. There are criminal laws against such harmful negligence. It is presumably a matter of the judgement of state attorneys to use them or not, and I can imagine that such judgement may well change if we have more incidents of this nature.

There are other measures one might consider. It costs resources for cities and states to handle superspreading events, and superspreading is clearly hindered by adhering to hygiene guidelines. One might think of making certain people (say the organisers of an event, or those who provide locations for celebrations, or hosts if the location is private) responsible for costs of an outbreak (there are surely ways to estimate how much testing, quarantine and school closures costs). However, there are likely legal obstacles to doing so. Public health is a legal responsibility of the government, not of individuals, and government expenditure comes through its revenue, which is taxation as well as fines for violating laws and ordinances, not through sending individuals bills for other than requested services. Second, one could imagine a permit procedure, as for public demonstrations. An event, say with over 10 participants, would require a permit, and the permit may require the applicant to acknowledge heshe understands the public health advice and freely (relatively, that is, on pain of not getting a permit) commit to abide by it; maybe even requiring that the applicant submit a hygiene plan. Some scheme like that is surely possible. But it is not clear what kind of enforcement activity might be appropriate – you can police and break up a demo, because it occurs in public (that is the point of a demo), but private facilities are not the domain of the state.

The argument for not going with a rule of six, or a rule of ten, is that the daily new-infection count in Germany has been hovering stably somewhere around the 1,500 mark for the last few weeks, even though it is higher than it was in June or July. But I see a danger in pretending that the country has Covid-19 under stable control, and I suspect most public-health experts would agree. The Chancellor holds a similar view, if remarks reported from closed government negotiations are accurate.

2020-09-29 A detailed survey of Covid-19 vaccine development by Florian Kramer has been published by Nature on 2020-09-23 https://www.nature.com/articles/s41586-020-2798-3.epdf

2020-09-29 The Nature Briefing "Notable Quotable" belongs on 2020-09-28 to William Hanage, British epidemiologist at Harvard, "*Britain is in the grip of an extraordinarily dangerous outbreak of forgetfulness.*" He suggests in TheG on 2020-09-27 that the UK did not properly learn lessons from the "first wave" (as people may call it) https://www.theguardian.com/commentisfree/2020/sep/27/britain-failure-covid-surge-disaster-test-trace-virus The essay is based on the observation that effective TTI is critical. The first observation is that restricting testing to those with specific symptoms does not work – it misses most transmissions, all those from people who don't exhibit the defined symptoms, who are many and maybe most. Second, young people are infecting older people, because they are not being tested as they might be, and this has fueled outbreaks, as happened in the US "sunbelt". Third, the UK is reopening schools without effective infection control, and has lost pandemic "situational awareness" (a concept familiar to those of us with experience in accident analysis in commercial air

transport). The UK is thus unable to react to local outbreaks as it must to keep the illness in check.

2020-09-30 The Institute for Music Medicine (IMM) at the University for Music in Freiburg updated its guidance for music playing, teaching and rehearsals. The fifth update (sixth edition) of the guidance was published on 2020-07-17 and is available from available at https://www.mh-freiburg.de/hochschule/covid-19-corona/risikoeinschaetzung , English version https://www.mh-freiburg.de/fileadmin/Downloads/Allgemeines/RisikoabschaetzungCoronaMusikSpahnRichter17.7.2020Englisch.pdf . Other documents on guidance for musical activities refer to it, such as that of Public Health Ontario of 2020-09-07 https://www.publichealthontario.ca/-/media/documents/ncov/covid-wwksf/2020/07/what-we-know-transmission-risks-singing-wind-instruments.pdf and that of Swalje and Hoffman of the University of Iowa https://medicine.uiowa.edu/iowaprotocols/wind-instrument-aerosol-covid-era-covid-19-and-horns-trumpets-trombones-euphoniums-tubas-recorders .

Some experiments have been done on emissions from flute playing since the first edition, and the distancing guidance, which used to be 3-5 m in breath direction from a flute and 1.5 m sideways, is now uniform 2 m radial distance for all musicians and singers. Distancing advice addresses the issue of droplets which fall to the ground under gravity.

The issue of aerosols is, however, must also be addressed. Aerosols can remain suspended in air in an enclosed space for a number of hours – Mürbe et al say 3 hours for SARS-CoV-2 https://audiologie-phoniatrie.charite.de/fileadmin/user_upload/microsites/m_cc16/audiologie/Allgemein/Singen_und_SARS-CoV-2_Prof._Mürbe_et_al._04052020.pdf p4, citing van Doremalen et al https://www.nejm.org/doi/full/10.1056/NEJMc2004973 .

The Journal of Infectious Diseases published a review of the propagation of breath-expelled aerosols and droplets in general by Bahl et al on 2020-04-16 https://academic.oup.com/jid/advance-article/doi/10.1093/infdis/jiaa189/5820886 (a PDF version of this open access article is available through this page).

The IMM document says "*from an air exchange rate of 6/h on, a sufficient removal of aerosols can be assumed*" (p16). "6/h" means 6 times room volume per hour. The authors mean a replacement with air from outside the space, assumed to be pathogen-poor. I summarise the IMM general recommendations as follows:

- as much space as possible ("*cathedral situation*"); they suggest a ceiling height of 10m or more is comparable to the air exchange of 6/h;
- when possible, air exchange of at least 6 times room volume per hour (p16);
- if this air exchange rate is not available, thorough indoor ventilation (without occupants) of smaller spaces every 15 minutes (if there is no HVAC system; they suggest HVACs can help, but do not derive specifications);

- assessment of CO_2 amounts, via a CO_2 "traffic light" based on the Pettenkofer number (1000 ppm), since the quantity of CO_2 correlates with aerosol accumulation.

2020-09-30 The good news, if there is any, about dealing with aerosols is that there are ultraviolet germicidal irradiation (UVGI) devices on the market which can be installed standalone in non-mechanically-ventilated rooms which will render any virus in aerosol unviable. They work by damaging DNA/RNA, so they are also effective against other DNA/RNA-based pathogens, such as bacteria, but these require more radiation exposure than viruses because the radiation has more "stuff" to get through to get at the DNA in these biologically more complicated microbes. Stand-alone UVGI devices have fans which pass air through an enclosed irradiative tube. From my research, throughput ranges from about 80 m^3/hour to 300 m^3/hr and cost (of those devices with enough public technical information for a user to judge their potential effectiveness) from about €500 to just over €5000. My music space is large for a house (two rooms turned into one and has just under 80 m^3. So I could get between 1/h and 3.75/h turnover (assuming adequate irradiation).

There are also "upper room" UVGI systems which irradiate room space about the occupants and are shielded downwards (where the people are). Here, sightlines to the occupants are important, and the reflection of radiation to the occupants below must be considered. The installation must be tested for leakage of radiation to the occupied space, because human eyes can be damaged by the wavelegths typically used (253.7 nm from mercury vapor lamps is very effective germicidally). These systems are manifestly not "plug in and go", like the stand-alones.

Finally, for mechanically-ventilated spaces there are in-tube UVGI systems which can be installed in the ventilation pipes.

All of these systems, as well as the principles of UVGI, are discussed in Kowalski, W., Ultraviolet Germicidal Irradiation Handbook, Springer-Verlag, 2009. I find the handbook easy to read and informative.

2020-09-30 Paul Hampton pointed out that the IMM considerations could apply to any potentially-crowded indoor spaces. Some of them certainly, but these recommendations were specifically for singing and wind-instrument playing. There is a discussion of HVAC and a restaurant outbreak by Lu et al in the CDC Journal Emerging Infectious Diseases 26(7) in 2020-07 (the article is from March or April) https://wwwnc.cdc.gov/eid/article/26/7/20-0764_article#tnF1 . This was criticised by Clark on 2020-05-18 in a well-reasoned blog post https://www.hpac.com/covid-19/article/21131547/clarks-remarks-iaq-ventilation-hvac-restaurants-commercial-buildings Clark refers to an analysis published in preprint on MedrXiv on 2020-04-22 which considers aerosol transmission https://www.medrxiv.org/content/10.1101/2020.04.16.20067728v1 .

People are unquestionably more sensitive to the possibilities of aerosol transmission now than they were at the time of the original analysis, as previous Notes have documented. In light of this understandably increased sensitivity, Clark's observation that the original analysis did not consider adequately consider aerosol transmission is justified.