



October COVID-19 Report

2nd Big COVID-19 Vaccine trial paused due to possible serious side-effect – October 13, 2020

<https://www.cbc.ca/news/health/oxford-vaccine-covid-19-pause-1.5717719>

- The University of Oxford and pharmaceutical company AstraZeneca announced their pause on September 8
 - o The company is running Phase 3 trials involving thousands of people in the UK and smaller number of people in Brazil and South Africa
 - o They were also recruiting 30,000 people in the US for its largest study
 - o Trials have since resumed in the UK, Brazil, and South Africa but they have not been approved to resume in the US
- Johnson Pharmaceutical Companies announced their pause on Oct. 12
 - o The company is running both early and late-stage clinical trials and did not say which the volunteer participated in
 - o They announced they are pausing all its COVID-19 vaccine trials – including a Phase 3 trial that started in late September and aimed to enroll 60,000 volunteers in Argentina, Brazil, Chile, Colombia, Mexico, Peru, South Africa, and the U.S
- Both of these vaccines were non-replicating viral vector vaccines
- Both companies paused the trials due to an “unexplained illness” in one of the volunteers
 - o This triggered a “standard review process”
 - o Johnson Pharmaceutical Company refused to disclose details
 - o AstraZeneca acknowledged that the patient had neurological symptoms associated with a spinal inflammatory disorder called transverse myelitis
 - This involves localized inflammation of the spinal cord which can cause symptoms such as weakness, loss of sensation, or even paralysis of the arms and legs
 - This diagnosis was later confirmed by an internal report on the incident

Johnson & Johnson COVID-19 Vaccine Study Paused due to unexplained illness in participant – October 12, 2020

<https://www.statnews.com/2020/10/12/johnson-johnson-covid-19-vaccine-study-paused-due-to-unexplained-illness-in-participant/>

- Johnson & Johnson’s COVID-19 vaccine study has been paused due to an unexplained illness in a study participant
- A document sent to outside researchers running the 60,000 patient clinical trial stated that a “pausing rule” had been met
 - o The online system used to enroll patients in the study was closed and the data and safety monitoring board convened



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- The company has declined to provide further details about the study participant who developed an unexpected illness
- They did however emphasize the difference between a study pause and a clinical hold which could last much longer
 - o The vaccine study is not currently under a clinical hold
 - o Clinical trial pauses are not uncommon – especially given the size of this trial
- Johnson & Johnson also stated that in cases like this, it is not always immediately apparent whether the participant who experienced an adverse event received a study treatment of a placebo
- Johnson & Johnson began enrolling volunteers in its Phase 3 study on September 23 and researchers planned to enroll 60,000 participants in the U.S. and other countries

England Joins Other Countries in State of National Lockdown – October 31, 2020

<https://www.theguardian.com/world/2020/oct/31/covid-running-riot-in-england-as-lockdown-looms-scientist-says>

- Scientists on the Scientific Advisory Group for Emergencies in England have stated that COVID-19 is spreading faster than their worst-case scenarios and could kill 85,000 people this winter
- There are now many more cases, particularly in younger females between ages 20-40
 - o 3 to 4 times as many women in this age group are going to hospitals as men
 - o It is believed to be because they are being exposed to the virus in hospitality, retail and some educational settings
- Professor John Edmunds at the London School of Hygiene and Tropical Medicine said that the spread of the coronavirus in England has been worse than the forecasted worst-case scenario
- The Office for National Statistics infection survey found cases “continued to rise steeply” in the week ending 23 October, with an estimated 568,100 people in households becoming infected
- Scientific advisors at the top of government believe it is now too late for a 2 week lockdown to have enough of an effect, and a longer one is needed to drive the reproduction number of the virus below 1
- The advisers believe all parts of England are on course to eventually end up in tier 3 restrictions and death could potentially hit 500 a day within weeks
- They are also confident that more than 50,000 new cases of coronavirus are now occurring every day in England
- Official documents released by the government showed that a Sage meeting on October 8 said the number of infections and hospital admissions was “exceeding the reasonable worst case scenario planning levels at this time:
- France and Germany announced national lockdowns earlier this week
- In Ireland, pubs and restaurants are closed, except for takeaways and deliveries since October 16



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- Schools were also closed for 2 weeks
- Wales is currently under a “firebreak” lockdown with leisure, hospitality, and tourism businesses closed

AstraZeneca shares turn negative after Brazilian health authority states that Volunteer in COVID Vaccine Study Died – October 21, 2020

<https://www.cnn.com/2020/10/21/astrazeneca-shares-slide-after-brazilian-health-authority-says-volunteer-in-covid-vaccine-study-dies.html>

- Brazilian authorities stated that a volunteer in AstraZeneca’s coronavirus vaccine study died
 - This led to the company’s shares to go down by 1% in early afternoon trading
- The Federal University of Sao Paulo that is helping coordinate late-stage trials in Brazil shared that the volunteer was Brazilian
- A spokesperson from AstraZeneca declined to comment on the volunteer, citing “medical confidentiality and clinical trial regulations”
- They also stated that all significant medical events are carefully assessed by trial investigators and that these assessments have not led to any concerns about continuation of the ongoing study
- A spokesperson from the University of Oxford, which is developing the vaccine with AstraZeneca said that there have been no concerns about safety of the clinical trial after the case in Brazil was assessed
- It is unclear if the volunteer received the vaccine
 - However, a source familiar with the situation has stated that the trial would have been suspended if the volunteer had been a part of the group getting the shot
- Brazil currently has the second deadliest outbreak in the world, behind the U.S. with at least 115,914 deaths according to data compiled by the Johns Hopkins University
- AstraZeneca is one of 4 drug makers backed by the U.S. in late-stage testing for a potential vaccine
 - Their vaccine, AZD1222 uses genetic material from the coronavirus with a modified adenovirus

Big Contact tracing Study Shows Role of Kids and Superspreaders in COVID-19 Pandemic – October 1, 2020

<https://www.ctvnews.ca/health/coronavirus/big-contact-tracing-study-shows-role-of-kids-and-superspreaders-in-covid-19-pandemic-1.5127950>

- A new study published reports that young adults are the primary source of coronavirus spread
- The study was based on a giant contact tracing effort involving more than 3 million people in India
 - The study involved the universal contact tracing efforts undertaken in 2 large states in the south of India



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- Authorities tracked down and tested more than 575,000 people exposed to nearly 85,000 confirmed cases from March until August
- This is the largest contact tracing study in the world by far
- The study showed that most COVID-19 patients never infected anyone else
 - Researchers found that 70% of infected people did not infect any of their contact,
 - Only 8% of the infect primary cases were responsible for 60% of the contacts that were infected
 - This is a hugely disproportionate effect
 - The first patient in the chain of transmission were adults aged 20 to 45
- The young and middle adult age group is the one that is coming in contact with people as they are most likely to be outside the household, therefore taking the disease from one place to another
- The study also contradicts the widely held belief that children are unlikely to catch the coronavirus
 - The study showed that they are actually getting infected in significant numbers
 - This was true even though schools have been closed in India since March
- The study also showed that lockdowns worked and that restriction lowered the rate of transmission
- Case fatality ratios fell over time
 - Those who tested positive in May and June were 13% less likely to die than those tested in March and April

32 Clinical Trails Happening in Canada – October 28, 2020

- **20-5449:** Nitric oxide – not to be confused with nitrous oxide, also known as laughing gas – is being tested in intubated COVID-19 patients to see if it inhibits the disease.
- **2149:** Some critically ill COVID-19 patients at Sunnybrook Health Sciences Centre in Toronto are subjects in this trial, which uses anesthetic drug isoflurane.
- **ARBS CORONA II:** Normally used to treat high blood pressure, losartan is being tested on COVID-19 patients in this trial.
- **CATCO:** Toronto's Sunnybrook Research Institute is handling the Canadian side of the World Health Organization-backed trial of remdesivir in hospitalized COVID-19 patients.
- **CINC424J12301 RUXCOVID:** Ruxolitinib, a drug used to treat high-risk myelofibrosis, is being tested to see if it can stop the cytokine storm created when a body's response to COVID-19 kicks its immune system into overdrive.
- **CIRCA-19:** Tests of a cellular immunotherapy treatment are being conducted by a team from the Ottawa Health Research Institute.



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- **COLCORONA-MHIPS-2020-01:** The Montreal Heart Institute is behind one of two Canadian trials involving colchicine, a medication normally used to treat gout. This trial is partially sponsored by the Bill and Melinda Gates Foundation and is expected to be completed by December.
- **CONCOR-KIDS:** Some pediatric COVID-19 patients in Alberta hospitals are being given this treatment, which uses frozen plasma from recovered patients.
- **CONTROL-COVID-FAVIPIRAVIR-1:** Nova Scotia-based Appili Therapeutics is behind this trial of favipiravir, an antiviral drug most commonly used in Japan.
- **CORIPREV-1:** Lopinavir/ritonavir was approved for treatment of HIV/AIDS infections in 2000, and is now being tested by Unity Health Toronto to see how it affects COVID-19.
- **COVACTA:** Drugmaker Hoffmann-La Roche is testing Actemra, a relatively new arthritis medication, to see how patients with severe pneumonia related to COVID-19 respond to it.
- **COVID-CTP-01:** This is another trial involving nitric oxide, this one being carried out in Quebec by Vancouver-based R&D firm SaNOtize.
- **GRAAL-2020-01:** A team from Hamilton Health Sciences is behind a trial that uses plasma from recovered patients to treat hospitalized adults who have acute cases of COVID-19.
- **GS-US-540-5821:** Another trial investigating antiviral drug remdesivir, this one is being conducted by pharmaceutical company Gilead.
- **HEROS-1:** Hydroxychloroquine is being given to front-line health-care workers for this trial run by the University Health Network in Toronto.
- **IC.8:** The only ongoing Canadian trial to involve a potential vaccine, this tests involves recruiting patients at higher risk of severe complications and giving them IMM-101, a bacteria designed to boost their immune system and keep COVID-19 at bay.
- **F-4-2020:** The Toronto-based University Health Network is taking part in this trial involving peginterferon-lambda, a part of the human antiviral immune response that proponents believe may have a lower risk of serious side effects than other potential COVID-19 treatments.
- **LAU-20-01:** Fenretinide, which has been found to be effective in fighting some cancer cells, is being tested against COVID-19 in this trial run by Laurent Pharmaceuticals.
- **LOVIT-COVID:** Researchers at the Sherbrooke University Hospital are examining whether high doses of vitamin C can lessen organ dysfunction in hospitalized patients.
- **MK-4482:** Some hospitalized adults with COVID-19 are taking part in this trial, which involves an experimental influenza drug known as MK-4482.
- **MP-31-2019-2945:** COVID-19 patients in intensive care are eligible for this Sherbrooke University Hospital trial examining how high doses of vitamin C affect organ dysfunction.



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- **NCT04405102:** A multiple sclerosis-fighting drug known as ozanimod is being given to COVID-19 patients who require oxygen in this Quebec-based trial.
- **OZM-113:** The University of Manitoba is behind this trial, which gives therapeutic doses of blood thinners to participating hospitalized COVID-19 patients.
- **PHRIACT.COVID19:** The other Canadian trial to use gout-fighting drug colchicine, this one is being carried out by Hamilton Health Sciences.
- **PREP2020:** Another trial run by researchers from the University of Manitoba, this one involves hydroxychloroquine.
- **PROTOCOL 214094:** COVID-19 patients with severe pulmonary symptoms may be eligible for this trial from pharmaceutical company GlaxoSmithKline, which uses an antibody known as Otilimab.
- **RAPID COVID COAG:** This Toronto-based trial involves the use of blood thinners as a COVID-19 therapy.
- **REMAP-CAP:** This trial involving intensive care patients tracks the effectiveness of several therapies being studied in other entries on this list, including lopinavir/ritonavir, blood thinners and frozen plasma.
- **SAIL-004:** Baricitinib, an arthritis drug, is being tested in hospitalized COVID-19 patients in a trial run by Dr. Lisa Barrett of Dalhousie University.
- **SAR153191:** Another drug normally used to treat arthritis, sarilumab is being tested on some hospitalized COVID-19 patients by pharmaceutical company Sanofi.
- **U-DEPLOY:** This is the second of two Canadian trials involving anti-myelofibrosis treatment ruxolitinib. Researchers in Toronto are monitoring how many COVID-19 patients' symptoms worsen after they are given the drug.
- **VASCEPA-COVID-19-CARDIOLINK-9:** Icosapent, a drug primarily used to help prevent heart issues and strokes, is the focus of this trial.

Safety and Immunogenicity of Two RNA-Based COVID-19 Vaccine Candidates – October 14, 2020

<https://www.nejm.org/doi/full/10.1056/NEJMoa2027906>

- In an ongoing, placebo-controlled, observer-blinded, dose-escalation, phase 1 trial conducted in the U.S. a study randomly assigned health adults 18-55 years of age and those 65-85 years of age to receive either placebo or 1 of 2 lipid nanoparticle-formulated, nucleoside-modified RNA vaccine candidates
 - o BNT162b1 – which encodes a secreted trimerized SARS-CoV-2 receptor-binding domain
 - o BNT162b2 – which encodes a membrane-anchored SARS-CoV-2 full-length spike, stabilized in the prefusion conformation
- In all group but 1, participants received 2 doses with a 21-day interval between doses
- In 1 group, participants received just 1 dose
- In each of the 13 groups of 15 participants, 12 participants received vaccine and 3 received placebo



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- BNT162b2 was associated with a lower incidence and severity of systematic reaction than BNT162b1, particularly in older adults
- In both younger and older adults, the 2 vaccine candidates elicited similar dose-dependent SARS-CoV-2- neutralizing geometric mean titers, which were similar to or higher than the geometric mean tier of a panel of SARS-CoV-2 convalescent serum samples
- The safety and immunogenicity data from this U.S. phase 1 trial of 2 vaccine candidates in younger and older adults added to earlier interim safety and immunogenicity data regarding BNT162b1 in younger adults from trials in Germany
- The U.S. supports the selection of BNT162b2 for advancement to a pivotal phase 2- 3 safety and efficacy evaluation

The Side-Effects of Dexamethasone – October 7, 2020

<https://www.forbes.com/sites/brucelee/2020/10/07/dexamethasone-here-are-the-side-effects-of-the-covid-19-coronavirus-treatment-that-trump-received/>

- To help treat the effects of COVID-19, President Donald Trump reportedly received dexamethasone
 - o This is a corticosteroid
- Dexamethasone has shown promise in decreasing the risk of death for patients with more severe COVID-19 infections
- However, it can have side effects such as stomach irritation, nausea, vomiting, headaches, dizziness, and irregular or absent menstrual periods, easy bruising of the skin, acne, hair loss, increase hair growth on different parts of the body, and suppress your immune system
 - o It can also have potential impact on one's mood, behavior, and thinking
 - o An article published in the Mayo Clinic Proceedings – studies have found that between 1.8% to 57% of patients who have received corticosteroids had adverse psychiatric reactions
- The rationale for dexamethasone as a possible treatment is to reduce inflammation and suppress one's immune system by inhibiting cells and the production of chemicals involved
 - o This is good because the virus can trigger inflammation and an uncontrolled immune response from your body
- The strongest evidence for dexamethasone's use for COVID-19 comes from RECOVERY – an ongoing clinical trial sponsored by the National Health Service in the United Kingdom
- A preliminary analysis of 6,425 RECOVERY trial participants (where 2,104 received dexamethasone and 4,321, did not) showed that among those participants who were already on mechanical ventilators when enrolled in the trials, 29.3% of those receiving dexamethasone ended up dying within 28 days of being enrolled in the study compared to 41.4% of those who didn't get the medication



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- The 28-day mortality for those patients who were on supplemental oxygen but not mechanical ventilation on enrollment was 23.3% of those receiving dexamethasone vs. 26.2% of those who did not
- There was no significant difference in 28-day mortality between those who received dexamethasone and those who didn't for those who didn't require oxygen therapy
- This has led to the following recommendation in the NIH COVID-19 treatment guidelines:
 - o Using dexamethasone 6mg per day for up to 10 days or until hospital discharge, whichever comes first, for the treatment of COVID-19 in hospitalized patients who are mechanically ventilated who require supplemental oxygen but who are not mechanically ventilated
 - o They also recommend against using dexamethasone for the treatment of COVID-19 in patients who do not require supplemental oxygen

COVID Study to Assess Pandemic's Effects on Wellbeing of NHS Staff – October 10, 2020

<https://www.bmj.com/content/371/bmj.m3942>

- A research project looking at the effects of the COVID_19 pandemic on the psychological health and wellbeing of NHS staff in England has received 530,000 Euros in government funding
- This is 1 of 6 research projects that share 2 million euros from UK Research and Innovation and the National Institute for Health Research
 - o 3 of the projects will look at the effects of the pandemic on children and younger adults
 - o 2 studies will focus on people with serious mental health problems
 - o This one will focus on NHS Staff
- The study started in April in King's College Hospital NHS Foundation Trust
 - o Now that there is new funding, it will be expanded to 18 other trusts
 - o Everyone on the payroll at each of the trusts including doctors, nurses, cleaners, and security guards will be contacted
- The study will use a combination of online questionnaires carried out at regular intervals and more detailed interviews with a smaller group of participants
- A sister study will focus particularly on the pandemic's effects on NHS workers from ethnic minority backgrounds
- One study which will receive 495,000 euros will evaluate an online cognitive behavioural therapy programme for children aged 5-12 years who have anxiety
 - o The study will assess whether an online programme is an effective alternative to face-to-face provision by child and adolescent mental health services
 - o These services were already struggling to cope with increased demand before the pandemic



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- 2 other studies will use existing cohorts to assess COVID-19's effects on people aged 14-17
- The other study will work with a cohort of 5000 Londoners aged 15-17 to examine whether changes in use of digital technology during the pandemic have had an impact on adolescents' mental health

The Hidden long-term cognitive effects of COVID-19 – October 8, 2020

<https://www.health.harvard.edu/blog/the-hidden-long-term-cognitive-effects-of-covid-2020100821133>

- It has become increasingly recognized that the virus also attacked the nervous system
- Doctors in a large Chicago medical center found that more than 40% of patients with COVID showed neurologic manifestations at the outset, and more than 30% of those had impaired cognition
- Sometimes the neurological manifestations can lead to death
- COVID-19 can cause damage to the brain directly by encephalitis, which may have devastating or subtle consequences
- In a British study of 12 patients with encephalitis, 1 made a full recovery, 10 made a partial recovery, and 1 died
 - o They also found that a number of patients with COVID-19 suffered strokes
 - COVID infection is a risk factor for strokes
- A group of Canadian doctors found that individuals over 70 years of age were at particularly high risk for stroke related to COVID-19 infection but that even young individuals are 7 times more likely to have a stroke from this coronavirus compared to a typical flu
- Autopsy data from COVID patients in Finland suggests that another major cause of brain damage is lack of oxygen
 - o What is worrisome is that several of the patients who were autopsied did not show any signs of brain injury during the course of their COVID infection – yet all had brain damage
- In survivors of ICU stays due to acute respiratory failure or shock from any cause, 1/3 of people show such a profound degree of cognitive impairment that performance on neuropsychological testing is comparable to those with moderate traumatic brain injury
 - o This can have cognitive effects on memory, attention, and executive function leading to difficulties managing medications, managing finances, comprehending written materials, and even carrying on conversations with friends and family
- A Chinese group of doctors and researchers examined several aspects of cognitive function in 29 individuals who were thought to have fully recovered from COVID infection and they found persistent impairment in sustained attention
 - o Doctors thought it might be linked to underlying inflammatory processes

- It is however, equally likely that patients with COVID suffered silent strokes or lack of oxygen that damaged their brains

Immediate and Long-term Consequences of COVID-19 Infections for the Development of Neurological Disease – June 2020

<https://alzres.biomedcentral.com/articles/10.1186/s13195-020-00640-3>

- Severely affected COVID-19 cases experience high levels of proinflammatory cytokines and acute respiratory dysfunction and often require assisted ventilation
 - All of these things can cause cognitive decline
- Patients who show neurological systems due to the COVID-19 infection included cases with or without pre-existing neurological disorders
- While in intensive care units, patients showed agitation, confusion, and corticospinal tract signs such as enhanced tendon reflexes and clonus
- In mild to moderate disease cases, patients reported olfactory and gustatory dysfunctions
- In about 11% of patients, anosmia occurred prior to any other clinical symptoms
- COVID-19 can also lead to changes of coagulation and in particular, to inflammation-infused disseminated intravascular coagulation
- Clinically striking are cases of Kawaski-like multisystem inflammatory syndromes now being recognized in children and teenagers
- There are at least 4 possible pathogenic mechanisms that may account for the detrimental effects of COVID-19 on the CNS
 - Direct viral encephalitis
 - Systematic inflammation
 - Peripheral organ dysfunction (liver, kidney, lung)
 - Cerebrovascular changes
- In most cases however, neurological manifestations of COVID-19 may arise from a combination of the above
- The fact that systematic inflammation has been shown to promote cognitive decline and neurodegenerative disease makes it likely that COVID-19 survivors will experience neurodegeneration in the following years
- Evidence strongly suggests that patients surviving COVID-19 are at high risk for subsequent development of neurological disease and in particular, Alzheimer's disease

Economic Consequences of COVID-19- October 19, 2020

<https://voxeu.org/article/economic-consequences-covid-19-multi-country-analysis>

- On the supply side, infections reduce labour supply and productivity while lockdowns, business closures, and social distancing also cause supply disruptions
- On the demand side, layoffs and the loss of income and worsened economic prospects reduce household consumption and firms' investment

- This counterfactual analysis suggest that the pandemic will likely knock 3 percentage points off real world GDP relative to the level of global economic activity that would have materialised in the absence of the shock
- The U.S. and UK are likely to experience deeper and longer-lasting effects
- China's outcome has more than a 50% chance of being much better
- The euro area is showing a negative skew, however there is some probability that it recovers faster than the US by the end of 2021
- Pulled by China, the rest of "Emerging Asia" has a higher chance of performing better than the global average
- Non-Asian emerging markets stand out for their vulnerability
 - o They will likely suffer from a significant output collapse in the first and second quarter of 2020
 - o They have a less than 20-30% chance of not experiencing an output loss by the end of 2021
- Turkey, South Africa, and Saudi Arabia will almost certainly see at least 8 quarters of severely depressed economic activity
- The study also estimates that the pandemic will likely lower long-term interest rates in the advanced economies by about 100 basis points below their pre-COVID-19 lows
 - o This is because the crisis raises precautionary savings and dampens investment demand
- However, in emerging market economies, borrowing rates could increase rapidly
- The analysis points to large and persistent negative effects of the pandemic on the world economy

WHO Study finds Remdesivir has little Effect on Hospital Stay or Mortality in COVID-19 Patients 0 October 16, 2020

<https://www.cbc.ca/news/health/remdesivir-covid-19-who-solidarity-trial-1.5764858>

- A clinical trial by the World Health Organization (WHO) has found that Gilead Sciences Inc.'s remdesivir has little or no effect on COVID-19 patients' length of hospital stay or chances of survival
- The study evaluated the effects of remdesivir, hydroxychloroquine, anti-HOV drug combination lopinavir/ritonavir and interferon, in 11,266 adult patients across more than 30 countries
- They found that the 4 regimens appeared to have little or no effect on 28-day mortality or the length of the in-hospital course among patients hospitalized with COVID-19
- Gilead, the company that developed the drug, is concerned that the data from this open-label global trial has not undergone the rigorous review as their data contradicts data from a U.S. study on remdesivir that they conducted
 - o Gilead's study showed that the treatment cut COVID-19 recovery time by 5 days compared with patients who got a placebo

- The trial involved 1,062 patients
- Dr. Grace Parraga at Western University is studying the long-term effects of the COVID-19 virus on the lungs
 - They are using ground-breaking lung imaging technology, which uses a polarized and magnetized gas that patients inhale
 - The harmless gas travels throughout the lungs once inhaled, which allows researchers to track lung function in real time to see if there are any issues
- They are finding that 6 months after, people are still not well, even if they only had mild infections
- The research shows that even young, healthy people with only mild cases of COVID-19 can have permanent lung damage after recovering from the infection

Effects of COVID-19 Outbreaks in Care Homes in the UK – October 1, 2020

[https://www.thelancet.com/journals/lanhl/article/PIIS2666-7568\(20\)30012-X/fulltext](https://www.thelancet.com/journals/lanhl/article/PIIS2666-7568(20)30012-X/fulltext)

- Detailed information on outbreaks on care home residents internationally, is scarce
- This study looked at care home in one large health region in Scotland
- The study conducted a population analysis of testing, cases, and deaths in care homes in the National Health Service Lothian health region of the UK
- They obtained data for COVID-19 Testing and deaths and analysed data by several variables including type of care home, number of beds, and locality
- Outcome measures included timing of outbreaks, number of confirmed cases in care home residents, care home characteristics associated with the presence of an outbreak, and deaths of residents in both care homes and hospitals
- Conclusions:
 - The size of care homes for older people was strongly associated with a COVID_19 outbreak
 - Shielding care home residents from potential sources of SARS-COV-2 infection and ensuring rapid action to minimise outbreak size if infection is introduced is important for any second wave