



**What is the sustainability of our 'new normal'?  
Ecological impact of remote healthcare on the  
environment, what patients, families and clinicians  
think, and the impact on workforce.**

**Gemma Johns, Research & Evaluation Lead.**

# Environmental Impact Literature – COVID-19



- There are rarely subject matters that remain untouched by the COVID-19 pandemic.
- One area with positive and negative impacts (directly/indirectly) is our environment.
- The spread of the virus drew many countries to a halt, with the cancellation of flights and travel, and has forced populations to socially isolate for long periods of time [1].
- This is expected to have vast impacts on the psychological and physical wellbeing of populations, but it is likely to have unprecedented impacts on the environment [2, 3]
- Much of the environmental impacts remain largely positive, but negative impacts are reported to be greater and more long-lasting [2].

# Air Pollution & Greenhouse Gases

- One positive environmental impact is the reduction in air pollution and greenhouse gas emissions [3].
- Quarantine measures enforced many global populations into their homes, reducing the output of major air pollutant sources such as human mobility and industry [4]
- Reduced the associated emissions from travel via flights, road and rail.
- It is estimated to be up to a 30% reduction in NO<sub>2</sub> (Nitrogen Dioxide) emissions.
- Up to an 80% reduction in particulate matter (e.g., hazardous particles in the air) over the USA, Europe and Southeast Asia [5]
- But these impacts are considered to be short-term [3]





# Increased Plastic Production & Waste



- One of the most negative environmental impact, and likely to have a long-term impact is the increase in plastic production and waste.
- There's been a need for PPE to ensure the safe functioning of healthcare services [6]
- Since March 2020, an estimated 129 billion facemasks and 65 billion pairs of plastic gloves have been used monthly.
- Masks, gloves, plastic aprons and visor shields causing extraordinary amounts of non-recyclable plastic waste, presenting a challenge to dispose of the excess plastic.
- This impact has reversed recent single-use plastic laws across many countries [7].
- The use and mismanagement of these plastics causes local pollution But also, small/light enough to be transported, potentially causing widespread pollution [8].

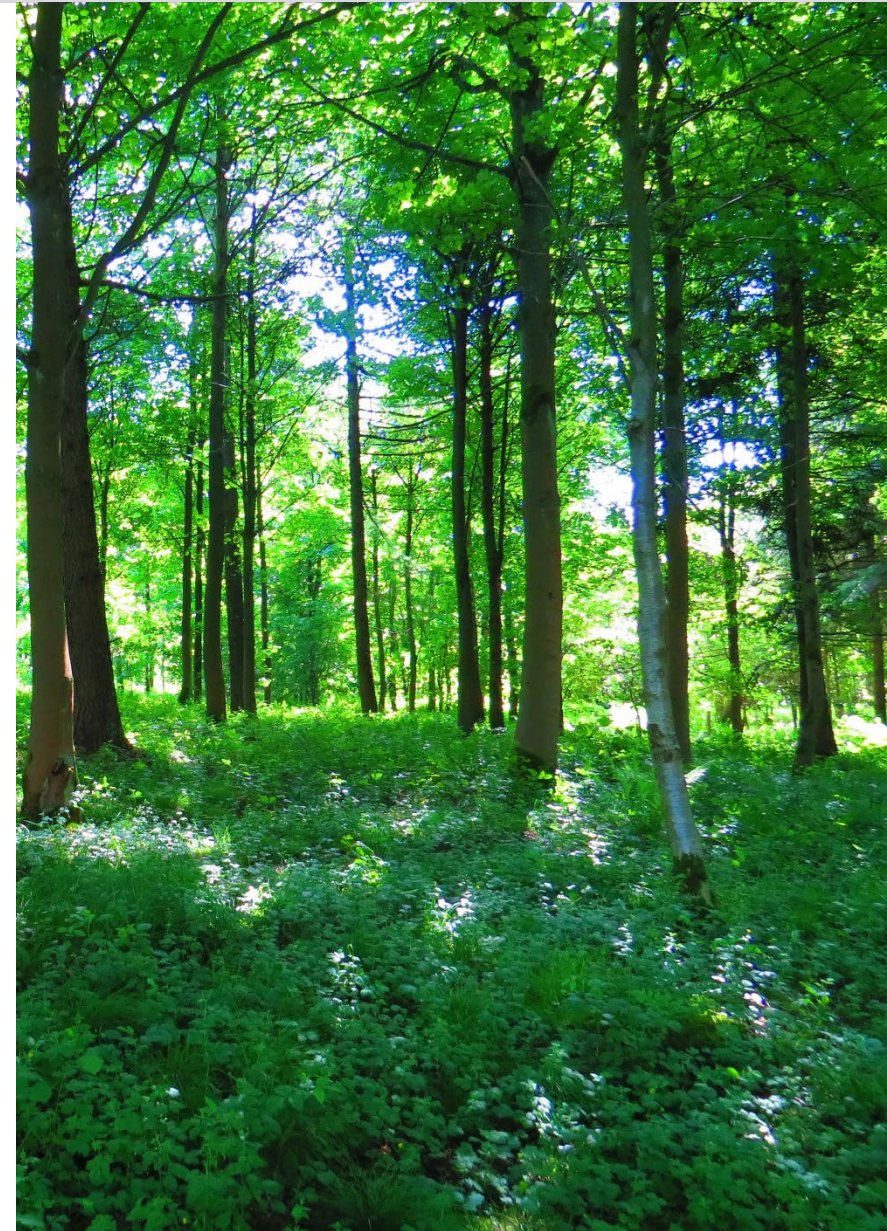


# Improvements to Wildlife & Less Food Waste

- Another positive environmental impact, due to the restriction of human activity, has allowed many wildlife to reclaim previously human dominating spaces. For example,

Reports of wild coyotes in the USA;  
Rarely seen insects reemerging in England;  
Wild goat and peacock have been spotted in North Wales.

- Temporary reduction in traffic collisions involving wild animals [9]
- Improved water quality and return of fish and marine life into urban waterways [10, 11]
- 50% decrease of sewage and industrial waste in rivers [4]
- 15.9% reduction in hazardous particles in lakes [12].
- More efficient household food management has reduced food waste [13]
- Consumers switched to frozen (31% increase) and cupboard food (37% increase) as opposed to fresh food (15% reduction) [14].



# Technology Enabled Care (TEC) Cymru

- Technology Enabled Care (TEC) Cymru enable the sustainable use, scale-up and spread of digital services.
- As a response to the COVID-19 pandemic, TEC Cymru developed a new NHS Wales Video Consulting Service to offer remote healthcare.
- We identified environmental impacts as a significant benefit to remote healthcare.
- A 'benefit' reported by professionals, patients and families which appears to be influencing VC uptake significantly.
- The 'benefit' itself is key to remote healthcare for the patient, and to remote working for the professional.
- The secret to sustainability, maybe?

# The NHS Wales Video Consulting Service

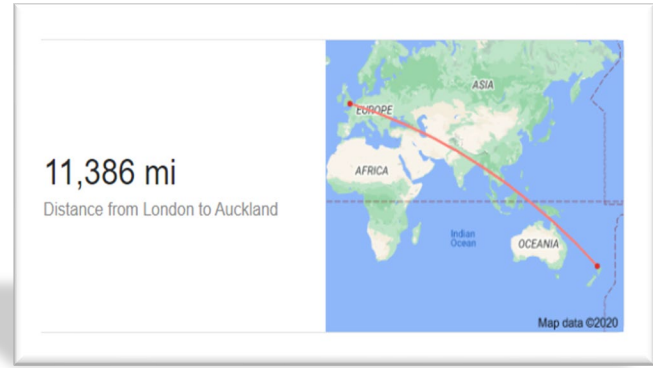


## Travel Savings

**Time** 564,773 mins (9,400 hours)  
**Travel** 379,414 miles  
**Carbon** 111,385 co2



Distance not travelled (miles saved) because of VC  
 = 33 trips from London to Auckland



## TEC Cymru Research Participants

28,000 Patients & Professionals



75%

prevention of  
 face to face

30%

of Professionals  
 Remote Working

## Average Patient Travel Savings

53 mins per patient, per  
 appointment  
 (excluding prep & parking time)

93%



of all patients rate VC as  
 'Excellent, Very Good or Good'



43% Male



57% Female



## Patient Age

<12	13-17	18-24	25-44	45-64	65-80	>80
17%	5%	6%	23%	29%	18%	3%



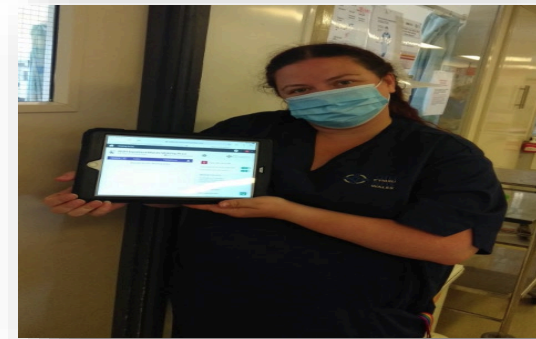
# Quotes from Professionals

*“I advocate for environmental issues and agree that for various reasons (paper waste, petrol, etc.) that video calls are more environmentally friendly than face-to-face...big thumbs up!” (Psychologist).*

*“There is less impact on the environment, with less travel” (Palliative Medicine Doctor).*

*“Saves travel time, especially for families with other children, saves professionals travel time” (Occupational Therapist).*

*“Reduces the need for patients to travel long distances to appointments” (Management Primary Care)*



# TEC Cymru & Environmental Impacts

TEC Cymru are positively contributing to the environmental impacts of COVID-19 by way of offering remote healthcare, thus helping towards:

- **Saved travel and co2 e.g., patients report saved travel (90%) and time off work/school (additional travel) (65%).**
- **Prevented the need for face-to-face of almost 100k VCs (75% of the time) thus contributing to the significant savings on plastic waste (e.g., PPE)**
- **Enabling professionals to work remotely e.g., less travel, less emission and pollution, food waste, less paper waste, less unnecessary human activity and protection of wildlife.**

TEC Cymru research suggests that 'benefits' determine VC use and value – e.g., uptake is higher when benefits are perceived as high too. To sustain VC, then perhaps focus on the 'benefits' it can offer, and improve on them moving forward.

# LOCKDOWN LAUGHS

by Varsha Sheth

Foolish humans! Just when the air begins to get clean, they start wearing masks!





# TEC Cymru & Future Generations:

- Central to TEC Cymru aims and Welsh Government policy, we are producing a world that is suited to our 'future generations' [17]
- To understand more about what this means, TEC Cymru were keen to learn from our future generations – the young people of Wales.
- TEC Cymru researchers approached young people who had previously been part of the NHS Wales VC Service evaluation to contribute in further research.
- In initial discussions, the young people expressed an interest in creating a film to share their message with the wider public.
- Taking this on board, we agreed to capture and record young people's voices by asking them one simple question:

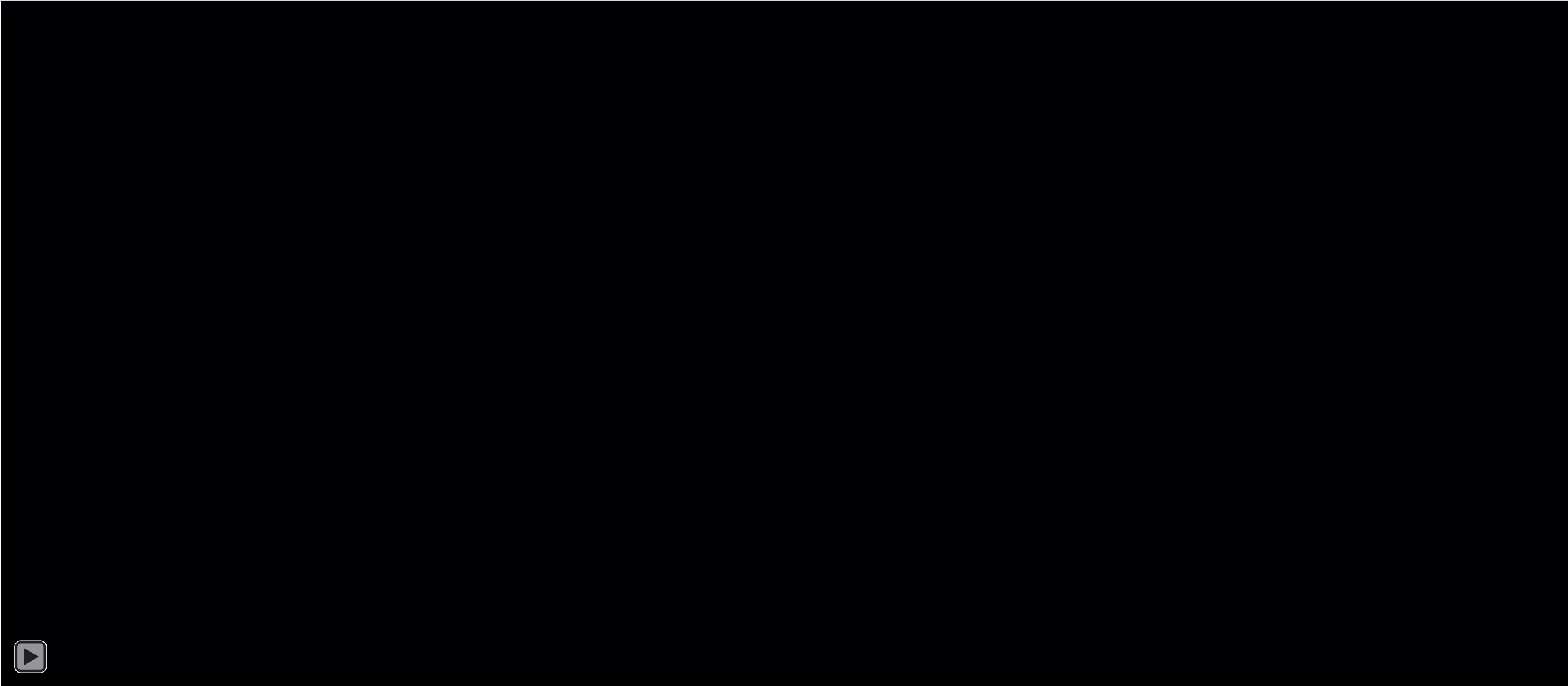
***'How has the COVID-19 pandemic impacted on the environment?'***



# Young People in Wales: Environmental Impacts

- Due to lockdown restrictions, we asked young people to self-record and send clips to TEC Cymru.
- Total of 22 video clips (24 young people), between 2 years old and 23 years old.
- Across 5 or the 7 Health Boards in Wales.
- Provided common themes, including both good, bad and combined environmental impacts, which were comparable to the recent COVID-19 related scientific literature [1-14].
- Five dominant themes emerged, to include;
  1. Travel, emission and air pollution
  2. Water pollution and beaches
  3. Protection of animals and wildlife
  4. Recycling and plastic waste
  5. Food and energy waste

# The Video – Young People of Wales





## References

1. Rupani, P., Nilashi, M., Abumalloh, R., Asadi, S., Samad, S. and Wang, S., 2020. Coronavirus pandemic (COVID-19) and its natural environmental impacts. *International Journal of Environmental Science and Technology*, 17(11), pp.4655-4666.
2. Espejo, W., Celis, J., Chiang, G. and Bahamonde, P., 2020. Environment and COVID-19: Pollutants, impacts, dissemination, management and recommendations for facing future epidemic threats. *Science of the Total Environment*, 747.
3. Helm, D., 2020. The Environmental Impacts of the Coronavirus. *Environmental and Resource Economics*, 76(1), pp.21-38.
4. Arora, S., Bhaukhandi, K. and Mishra, P., 2020. Coronavirus lockdown helped the environment to bounce back. *Science of the Total Environment*, 742.
5. Kanniah, K., Kamarul Zaman, N., Kaskaoutis, D. and Latif, M., 2020. COVID-19's impact on the atmospheric environment in the Southeast Asia region. *Science of The Total Environment*, 736, p.139658.
6. Wong, J., Goh, Q., Tan, Z., Lie, S., Tay, Y., Ng, S. and Soh, C., 2020. Preparing for a COVID-19 pandemic: a review of operating room outbreak response measures in a large tertiary hospital in Singapore. *Canadian Journal of Anesthesia/Journal canadien d'anesthésie*, 67(6), pp.732-745.
7. Prata, J., Silva, A., Walker, T., Duarte, A. and Rocha-Santos, T., 2020. COVID-19 Pandemic Repercussions on the Use and Management of Plastics. *Environmental Science & Technology*, 54(13), pp.7760-7765.
8. Liubartseva, S., Coppini, G., Lecci, R. and Creti, S., 2016. Regional approach to modeling the transport of floating plastic debris in the Adriatic Sea. *Marine Pollution Bulletin*, 103(1-2), pp.115-127.
9. Shilling, F. and Waetjen, D., 2020. Special Report: Impact of COVID19 on California Traffic Accidents. Road Ecology Centre. California: University of California.
10. Saadat, S., Rawtani, D. and Hussain, C., 2020. Environmental perspective of COVID-19. *Science of The Total Environment*, 728, p.138870.
11. Braga, F., Scarpa, G., Brando, V., Manfè, G. and Zaggia, L., 2020. COVID-19 lockdown measures reveal human impact on water transparency in the Venice Lagoon. *Science of The Total Environment*, 736, p.139612.
12. Yunus, A., Masago, Y. and Hijioka, Y., 2020. COVID-19 and surface water quality: Improved lake water quality during the lockdown. *Science of The Total Environment*, 731, p.139012.
13. Roe, B., Bender, K. and Qi, D., 2020. The Impact of COVID-19 on Consumer Food Waste. *Applied Economic Perspectives and Policy*.
14. Chetty, R., Friedman, J., Hendren, N., Stepner, M., 2020. Real-Time Economics: A New Platform to Track the Impacts of COVID-19 on People, Businesses, and Communities Using Private Sector Data. *Applied Economic Perspectives and Policy*, 00(00), pp.1-11.
15. Technology Enabled Care (TEC) Cymru. Retrieved at: <https://digitalhealth.wales/tec-cymru>
16. The NHS Wales Video Consulting Service (2020). Retrieved at: <https://digitalhealth.wales/tec-cymru/vc-service>
17. Future Generations Commissioner for Wales. Retrieved at <https://www.futuregenerations.wales/wp-content/uploads/2019/07/Global-Responsible-Topic-2.pdf>