

Using linked data to understand and mitigate the indirect impacts of COVID-19

Perspectives from a healthcare system in South West England

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Routine use of analytics in the NHS

- Despite many specific-purpose projects (academic or consultancy), analytics is far from embedded in day-to-day NHS decision making.

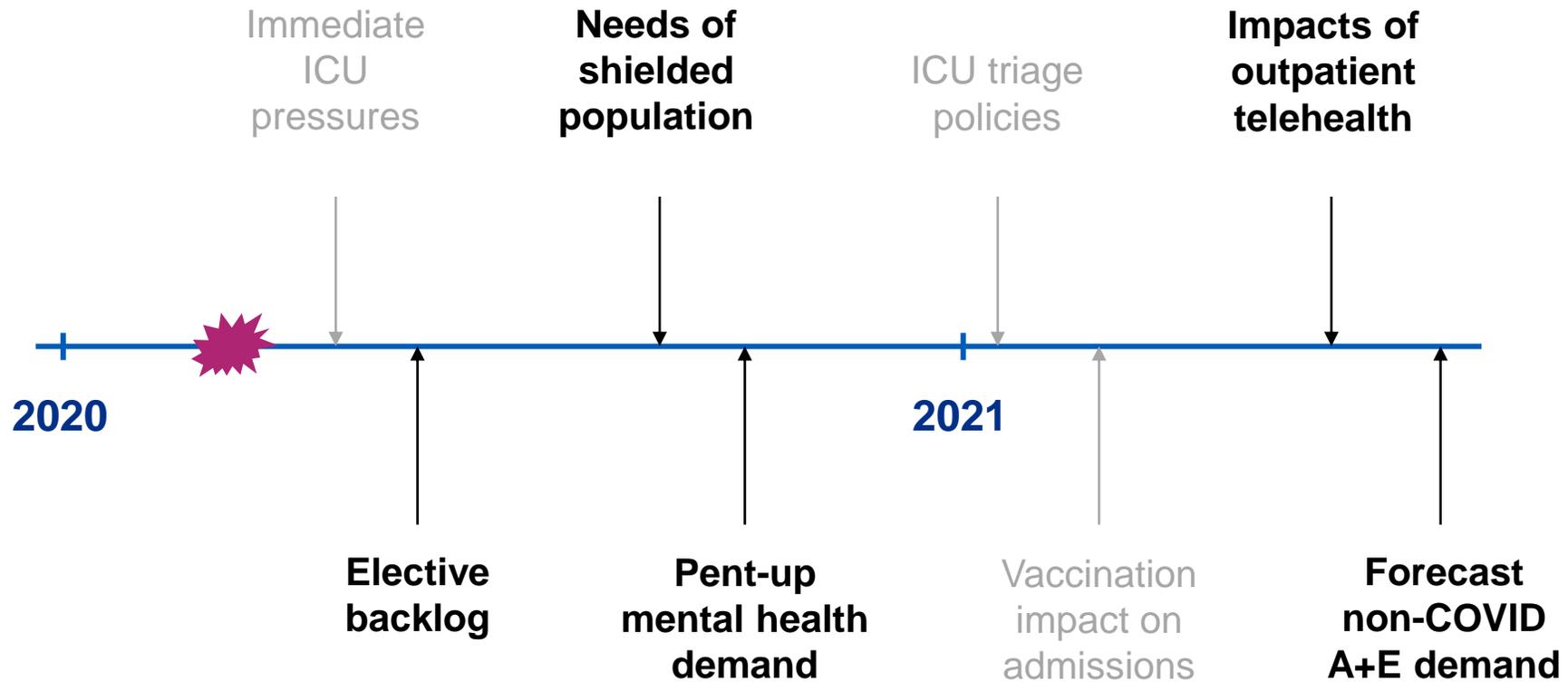
“The health sector is slow to embrace a digital transformation”.
OECD, 2019.

“There is a shortage of people with the right skills and tools”.
The Health Foundation, 2019.

“Decision-makers cannot always access the type of analysis they need”. The Health Foundation, 2016.

- In the Bristol NHS healthcare system (1 million population) we have had a dedicated Modelling and Analytics function since June 2018.
- This talk will overview some of our efforts in responding to the C19 pandemic; helping to embed routine use of analytics in the system.

C19 analytics in the Bristol system



Direct impacts of Covid-19

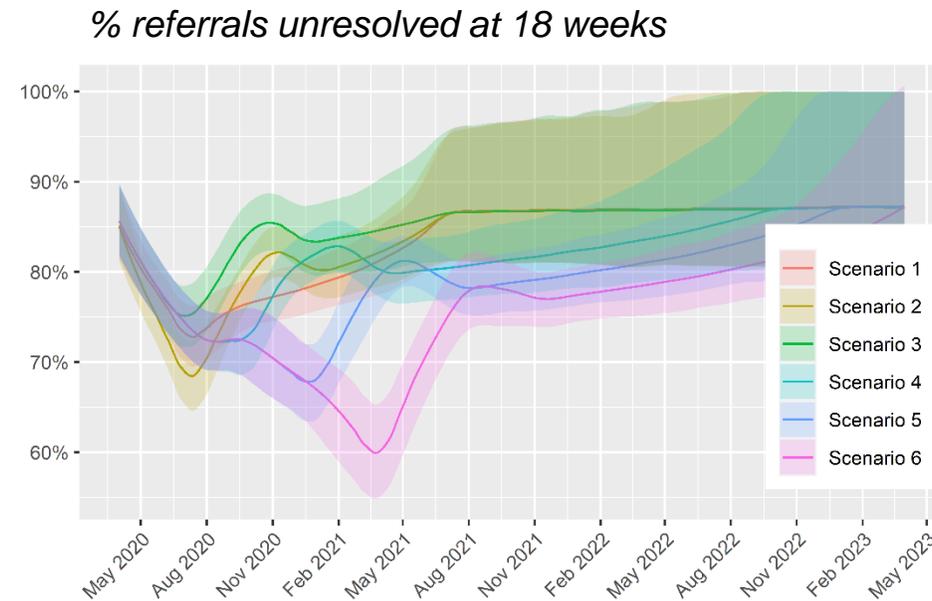
Indirect impacts of Covid-19

Elective backlog (April 2020)

Question How much will elective waiting times increase?

Approach Discrete-time simulation using waiting list data.

Results



Outcomes Which specialties and hospitals are most affected.
Where capacity reallocations should be focussed.

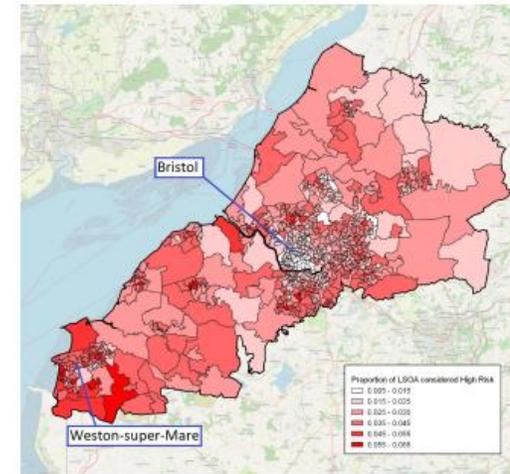
Shielded population (June 2020)

Question Who are the people asked to 'shield' (stay at home)?

Approach Cluster analysis on linked EHRs for 30,000 people.

Results

Segment	Number of people	Average age	Cardiovascular conditions	Mental health conditions
Complex mental health	170	58	16%	79%
Older complex	1,372	76	44%	22%
Younger asthma	5,327	51	8%	23%
Recent cancer	6,612	68	15%	12%
Drug monitoring	6,892	69	16%	15%
Low utilisation COPD	9,171	72	28%	17%



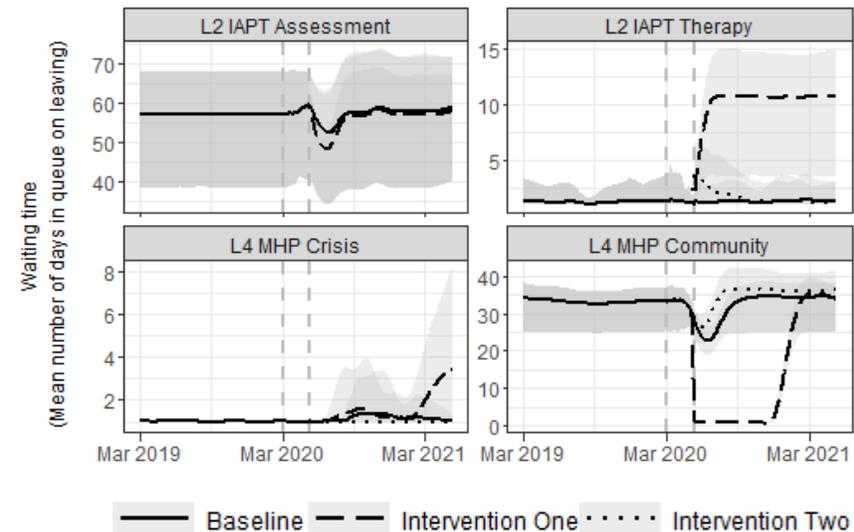
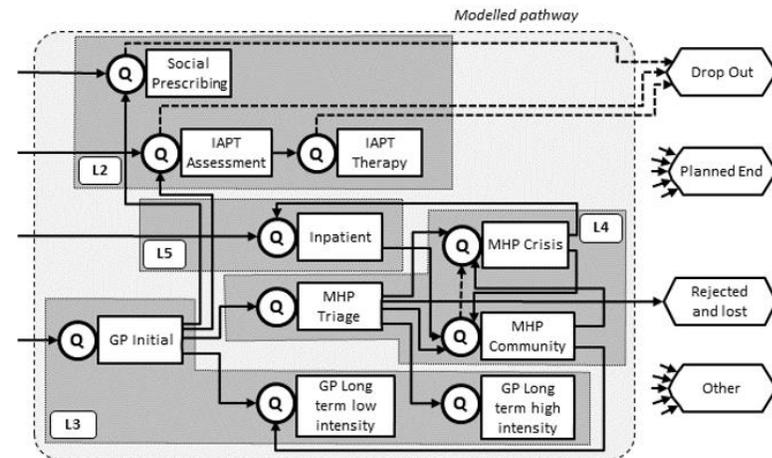
Outcomes Identified mismatches in primary care demand/capacity.
Mental health teams alerted to high-risk MH cohort.
Tailored design of 'healthy shielding' advice.

Mental health (August 2020)

Question How can we mitigate release of 'pent up' demand?

Approach Stochastic simulation of whole-system MH patient flow.

Results



Outcomes Insights informed increases in MH capacity.
Model now being used for supporting recovery.

Outpatient telehealth (October 2020)

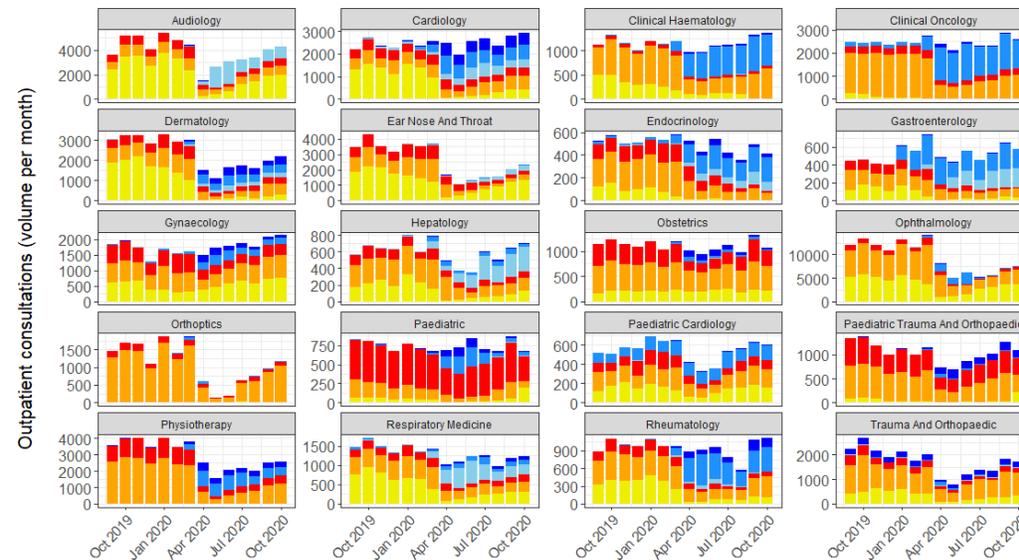
Question What has been the impact of mass telehealth use?

Approach 3,000 patient surveys and data for 143,000 events.

Results

*More preferred virtual (36%)
than physical (27%)*

*But... 17% of those who
preferred virtual would prefer
physical after the pandemic*



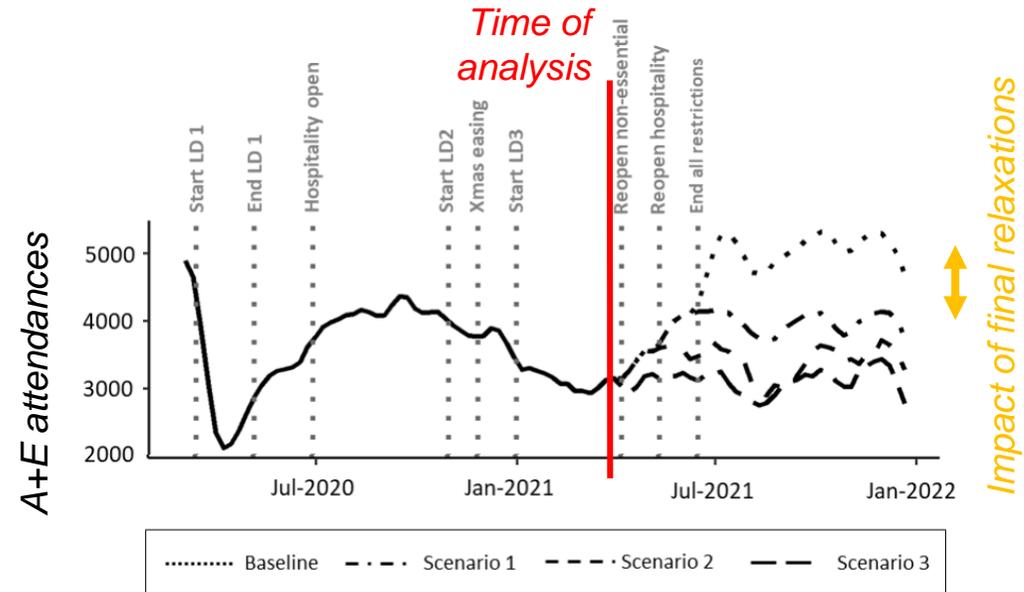
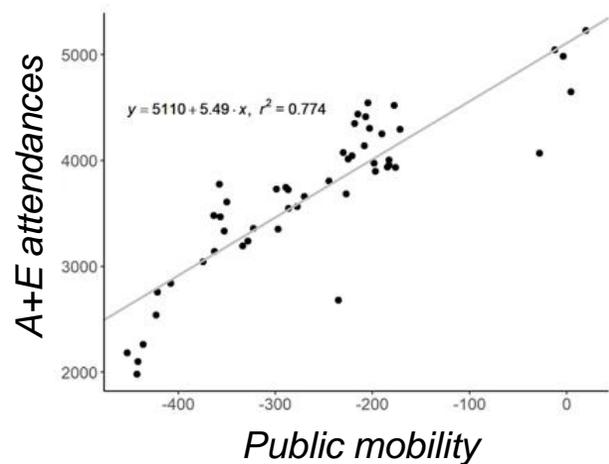
Outcomes Demonstrated efficacy of virtual consultations.
Little evidence of duplicative activity (for this cohort).

Non-C19 A+E (March 2021)

Question How will recovery affect non-C19 A+E demand?

Approach Regress hospital activity data on Google mobility data.

Results

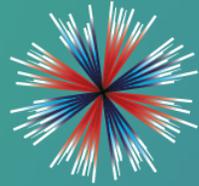


Outcomes Projections used for acute hospital planning.
Informed downstream community capacity procurement.

Acknowledgements

- Anna Powell (NHS BNSSG CCG)
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- Job Wooster (NHS UHBW Trust)
- Jenny Cooper (University of Bristol)

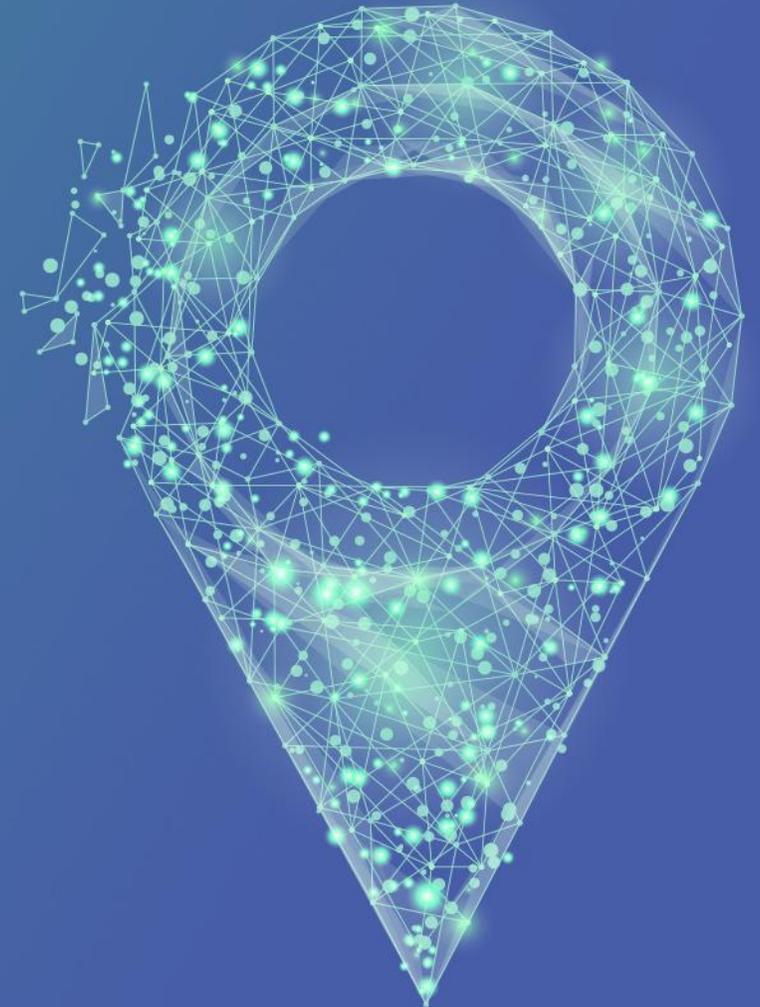
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Impact of the pandemic on cancer services: what does it mean for patients?

Prof Mark Lawler, Associate Pro-Vice Chancellor and
Professor of Digital Health, Queen's University Belfast;
Scientific Director, DATA-CAN, the UK's Health Data
Research Hub for Cancer

**HDRUK Scientific Conference: Data Insights in a
Pandemic 23rd June 2021**



Patients are at the heart of what we do

- **Patients** are involved in **decisions at all levels** of DATA-CAN
 - Steering Board, Management Group and Specific Projects
- **Writing** of Grant
- **Review** of projects
- **Recruitment** of key staff
- **Review** of all contracts
- **Inclusion** in commercial discussions
- **Review** and production of website
- **Co-authorship** of publications
- **PPIE Training** Programme



“Patients want their data to be used to improve care. In fact, they’re often surprised it’s not used already.”

Jacqui Gath, Cancer survivor and patient advocate

For Me COVID-19 was personal



[Eur J Cancer](#). 2020 Jun; 132: 98–99.

Published online 2020 Apr 18. doi: [10.1016/j.ejca.2020.04.001](https://doi.org/10.1016/j.ejca.2020.04.001)



PMCID: PMC7165280

PMID: [32335477](https://pubmed.ncbi.nlm.nih.gov/32335477/)

Cancer and coronavirus disease 2019; how do we manage cancer optimally through a public health crisis?

[Eduard Vrdoljak](#)^{a,*} [Richard Sullivan](#)^b and [Mark Lawler](#)^c

“People are starting to fear a COVID-19 diagnosis more than a cancer diagnosis”



- **BUT WHERE WAS THE EVIDENCE?**
- **Data-Driven Collaboration** between DATA-CAN and University College London
- **Accessing Real Time Data** from Hospital Trusts across the UK
- **Modelling excess deaths** due to the adverse effects of the COVID-19 pandemic

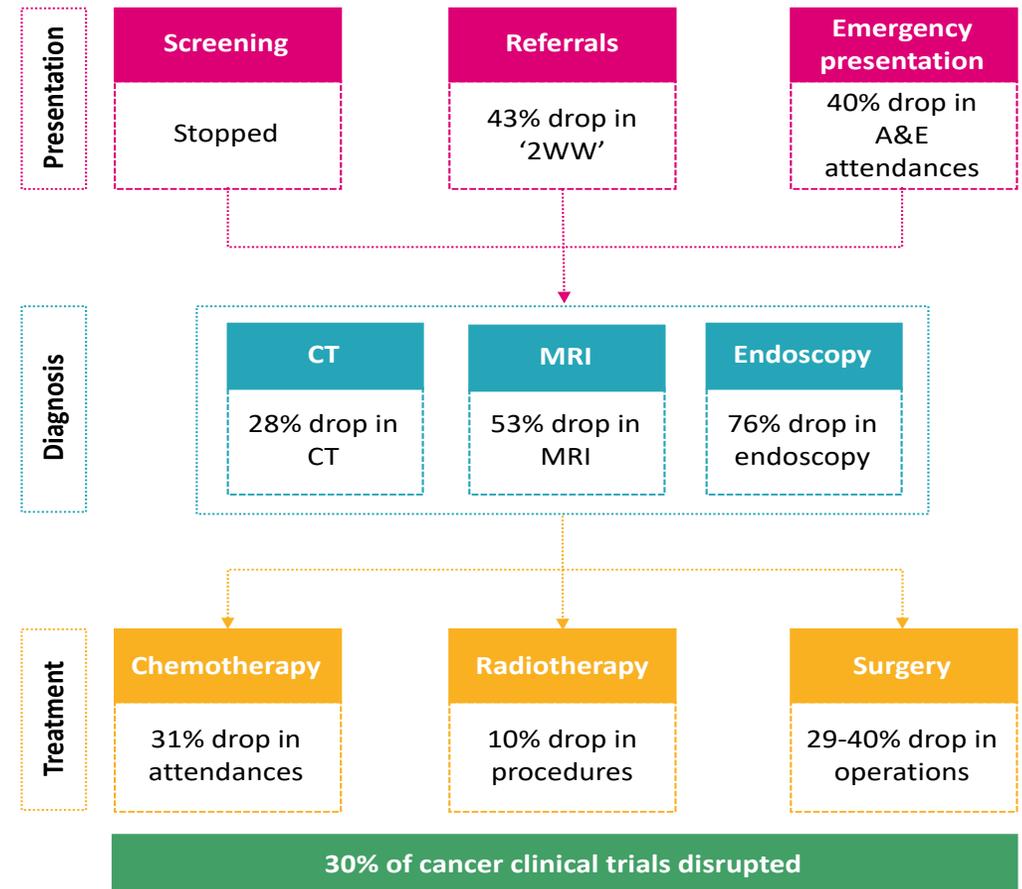
COVID-19 and Cancer: “Real Time” Data analysis and modelling studies

- **DATA-CAN** researchers accessed / analysed data from Hospital Trusts across the UK
- Looked at two measures to determine the effect of the pandemic on cancer services
- **2 Week Waiting** Time for Cancer Referrals (early warning system for suspicion of cancer)
- **7 out of 10 people with suspicion of cancer were not getting referred to cancer specialist services**
- **Chemotherapy attendances** (proxy measure -“health” of the cancer treatment service)
- **4 out of 10 cancer patients were not getting access to their chemotherapy**
- **Modelling studies: 7,165 – 17,910** excess deaths
- **First data that drew attention of the government, academia, NHS and the public to the disastrous effect of COVID-19 on cancer services and cancer patients**

Lai AG, Pasea L, Banerjee A, Hall G, Denaxas S, Chang WH, Katsoulis M, Williams B, Pillay D, Noursadeghi M, Linch D, Hughes D, Forster MD, Turnbull C, Fitzpatrick NK, Boyd K, Foster GR, Enver T, Nafilyan V, Humberstone B, Neal RD, Cooper M, Jones M, Pritchard-Jones K, Sullivan R, Davie C, Lawler M, Hemingway H *BMJ Open*. 2020

Disruptions to cancer services across the cancer pathway due to the COVID-19 pandemic

- Disruption was felt across the **entire cancer pathway**
- **Presentational Delay, Diagnostic Delay** and significant **impact on treatment**
- **Significant disruption of cancer research** (clinical trials, discovery research, translational research)

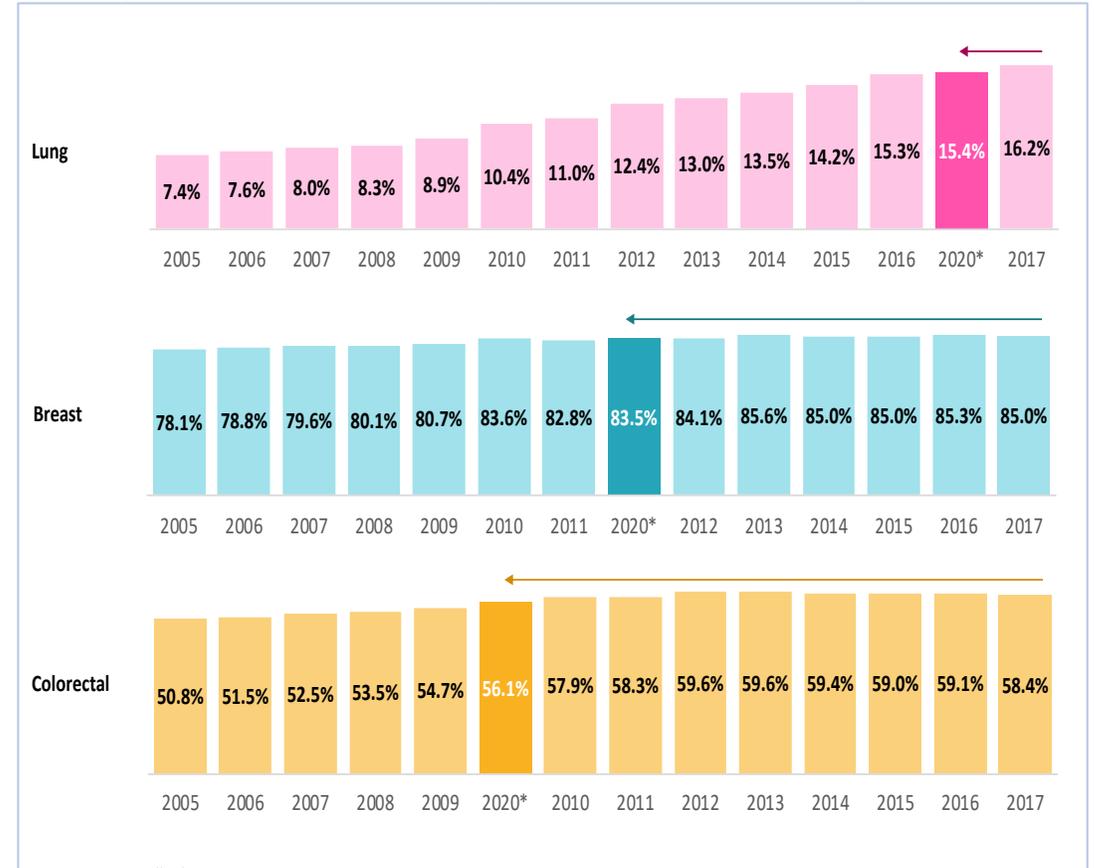


Sud A, Torr B, Loveday C, Jones M, Broggio J, McFerran E, Lawler M, Houlston R, Turnbull C. COVID-19 Lockdown and its impact on the two-week wait pathway for suspected cancer (*Lancet Oncology* 2020)
<https://www.carnallfarrar.com/life-sciences/life-sciences-insights/disruption-and-recovery-of-cancer-from-covid-19/>

One Step Forwards Two Steps Backwards

- Assuming **3 months of disruption** (which is conservative), **stage shift** in detection of cancer (i.e. detecting cancer later rather than earlier) due to disruptions to the cancer pathway **could significantly affect five-year survival**
- For certain cancers e.g. colorectal, the **COVID-19 pandemic could set us back nearly a decade**

Five-year survival anticipated for 2020 (England)



SOURCE: CF analysis, Office for National Statistics, Cancer survival in England, adults diagnosed
* Anticipated 5-year survival for 2020, calculated from 2017 figures

Impact on cancer services has been catastrophic

UK could have thousands of extra cancer deaths due to Covid delaying 500,000 endoscopies

EXCLUSIVE



By [Tom Bawden](#) 18th March 2021



- April 2020: **10,476** endoscopy procedures
- April, 2019: **110,584** endoscopy procedures
- Recovered to **105,716** by October, 2020 (**84.5%** of those done in October, 2019 [n=125,072])

Ho KMA, Banerjee A, Lawler M, Rutter MD, Lovat LB. [Predicting endoscopic activity recovery in England after COVID-19: a national analysis.](#) *Lancet Gastroenterol Hepatol.* 2021

COVID-19 (like Cancer) does not respect Borders

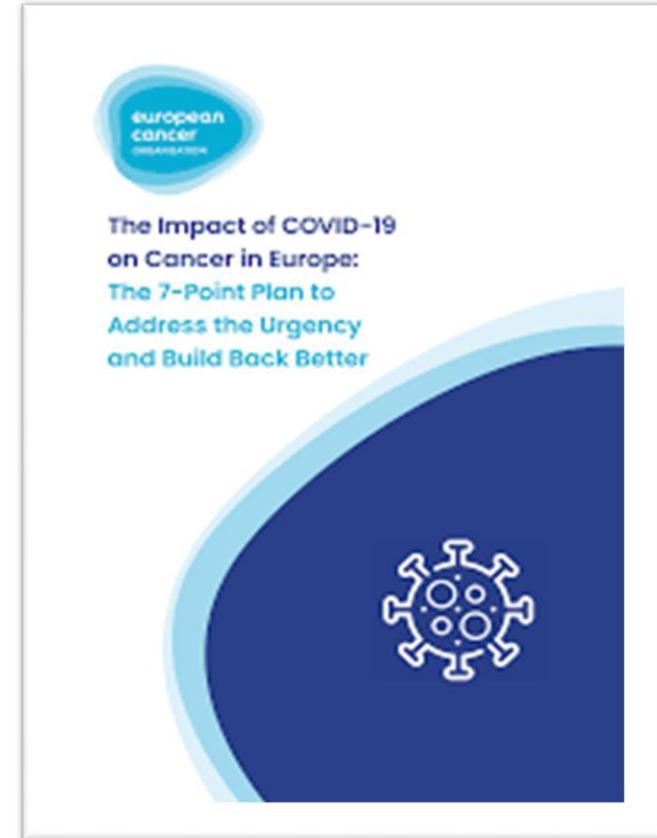


- Presented our data to the **European Cancer Organisation** (Europe's largest multidisciplinary cancer organisation) - a lot of interest and anecdotally similar situation being experienced across Europe, but drops may be less profound.
- Also presented to WHO Europe
- Prof Lawler is **co-leading** a European Cancer Organisation **Special Network on Covid-19 and Cancer** (<https://www.europecancer.org/topic-networks/16:impact-of-covid-19-on-cancer>)
- Researchers in many other countries **following our approach** in analysing (near) real time data
- **Launched a 7-Point Plan for COVID-19 and cancer** at the opening session of the **European Cancer Organisation Summit (18th November 2020)**



Our 7-Point Plan to Build Back Better (And Smarter)

1. Urgently addresses the **cancer backlog**
2. **Restores confidence** of European citizens and patients in cancer health services
3. **Tackles** medicines, products and equipment **shortages**
4. **Addresses cancer workforce gaps** across the European continent
5. Employs innovative technologies to **strengthen cancer systems** and provide optimal care to cancer patients
6. Embeds data collection and the **rapid deployment of cancer intelligence** to enhance policy delivery
7. Secures deeper **pan-European health cooperation**

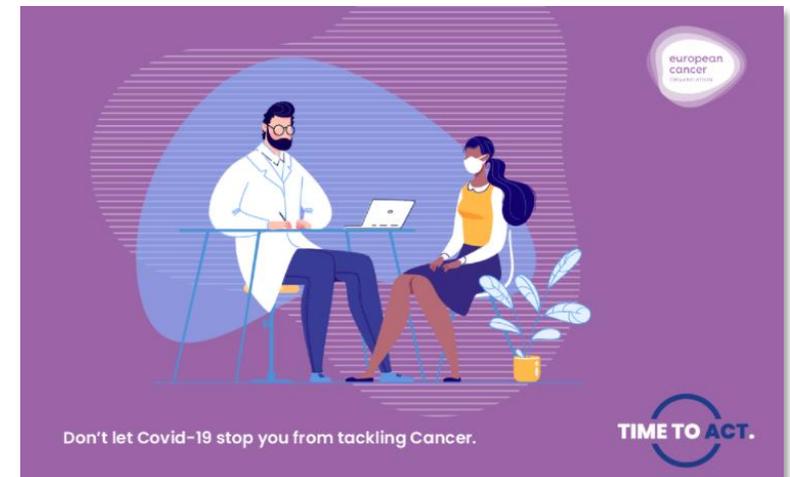


Cancer must not become the Forgotten “C” in the Fight against COVID-19.



Cancer must be at the top of the Recovery Agenda

- Following the Summit and launch of our 7-point plan, Build Back Better, we were approached by various stakeholders to consider **running a campaign** on the impact of Covid on Cancer
- The Board and the Co-Chairs of the Special Network of the Impact of Covid-19 on Cancer discussed this opportunity and decided to develop **"Time To Act"**
- A **Data Intelligence study** underpinned the Time To Act campaign with some **headline evidence-based messages**
- Campaign messages for the public, patients, health-care professionals and policy-makers were translated in more than **30 European languages**



Impact on cancer screening and diagnosis



Impact of Covid-19 on Cancer patients seen

Clinicians across Europe saw **1.5 million fewer Cancer patients** in the first year of the pandemic



Impact of Covid-19 on Cancer screening

100 million Cancer screening tests were **not performed** in Europe as a result of the pandemic



Impact of Covid-19 on Cancer diagnosis

1 million Cancer patients could be undiagnosed due to the backlog of screening tests across Europe

Impact on cancer patients and cancer professionals



Impact of Covid-19 on Cancer treatment

During the pandemic, **1 in 2 Cancer patients in Europe did not receive the surgical or chemotherapy treatment** they needed on time, and **1 in 5**, their treatment is still being delayed



Impact of Covid-19 on Cancer patients

Due to fears of contracting Covid-19, **citizens and patients are less likely to attend screening appointments or go to hospital for cancer treatment**



Impact of Covid-19 on Cancer workforce

The pandemic has taken its toll on healthcare workers with **4 in 10 feeling burnout and 3 in 10 showing signs of clinical depression**

TIME TO ACT: Cancer won't wait



Cancer Patients and Citizens:

- **Don't Delay:** See your Doctor if you have **Warning Signs of Cancer.** Keep your Screening and Treatment appointments.
- **Cancer services are safe.**



Healthcare Professionals:

- **You are not alone.** Learn from the wealth of tools and experience shared by professional organisations. Identify and adopt best practices for maintaining high service standards



Policy-makers and Health System Leaders:

- Getting **cancer** services back on **track must be top of the agenda.** Every action now to **address the cancer backlog will help save lives.**
- **TIME TO ACT**



Patient Centred Initiative with pan European relevance

- Data Intelligence study presented to the **Europe Beating Cancer Committee** (10th May 2021)
- Official **European virtual launch** (11th May 2021)
- **Poland** launch 22 May 2021
- **Italy** 17th June 2021
- **Spain** 25th June 2021
- Romania, Ireland, France, Germany, Slovakia, Croatia, Lithuania, **UK**, Cyprus currently being discussed with local Stakeholders
- **Royal College of Physicians Excellence in Patient Care award**



www.TimeToActCancer.com





TIME TO ACT.

Don't let Covid-19 stop you from tackling Cancer.

TimeToActCancer.com

[#TimeToActCancer](https://twitter.com/TimeToActCancer)

Remote mental healthcare during COVID-19

Insights from electronic health record (EHR) data

Dr Rashmi Patel

MRC UKRI Health Data Research UK Fellow

Department of Psychosis Studies

Institute of Psychiatry, Psychology & Neuroscience (IoPPN)

King's College London (KCL), UK

South London and Maudsley NHS Foundation Trust (SLaM)

Institute of
Psychiatry
at The Maudsley



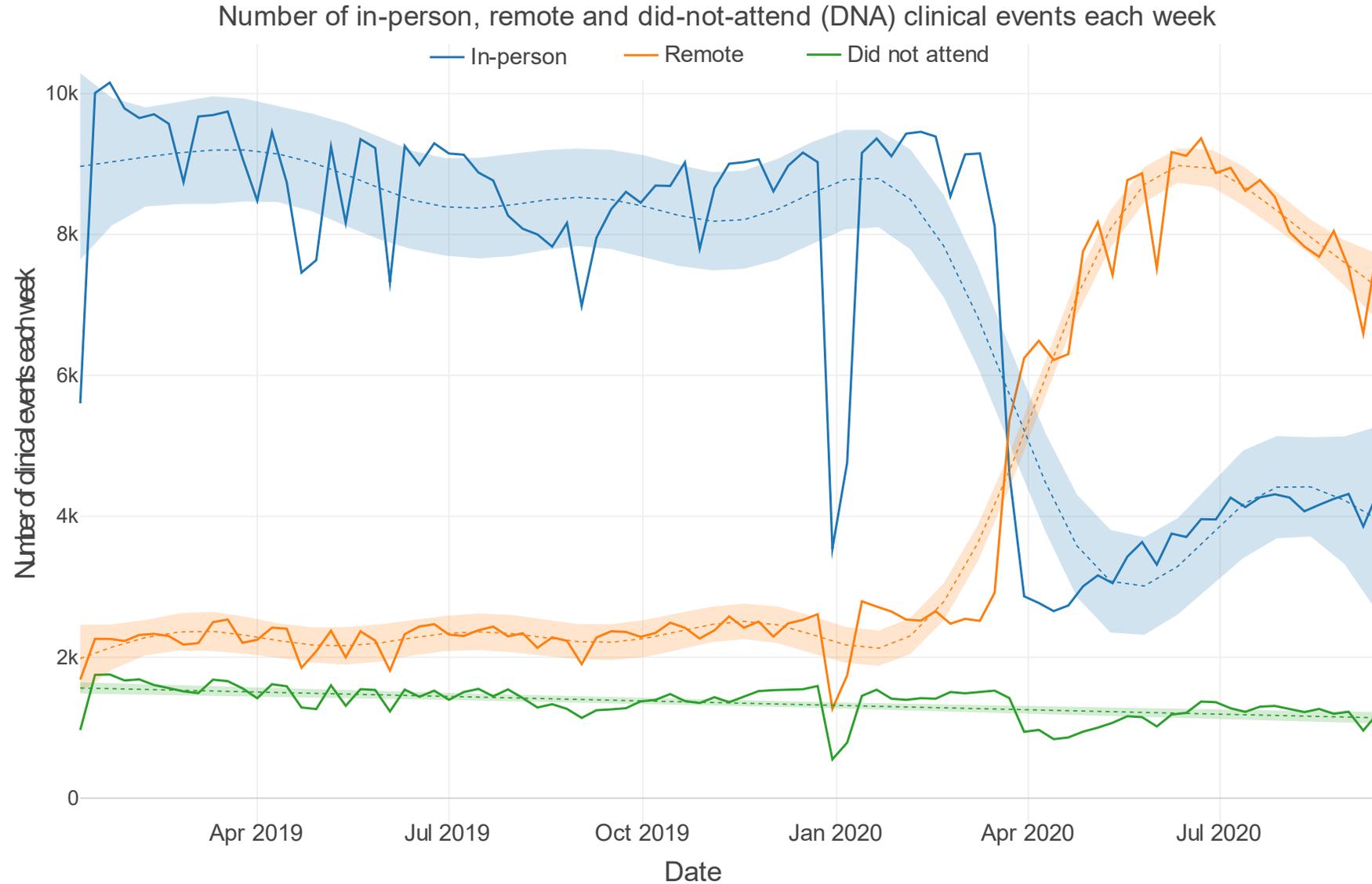
- Large provider of secondary mental healthcare in South London
 - Catchment population of 1.2 million people
 - 4 London boroughs: Lambeth, Southwark, Lewisham, Croydon
 - Around 37,500 active patients per week



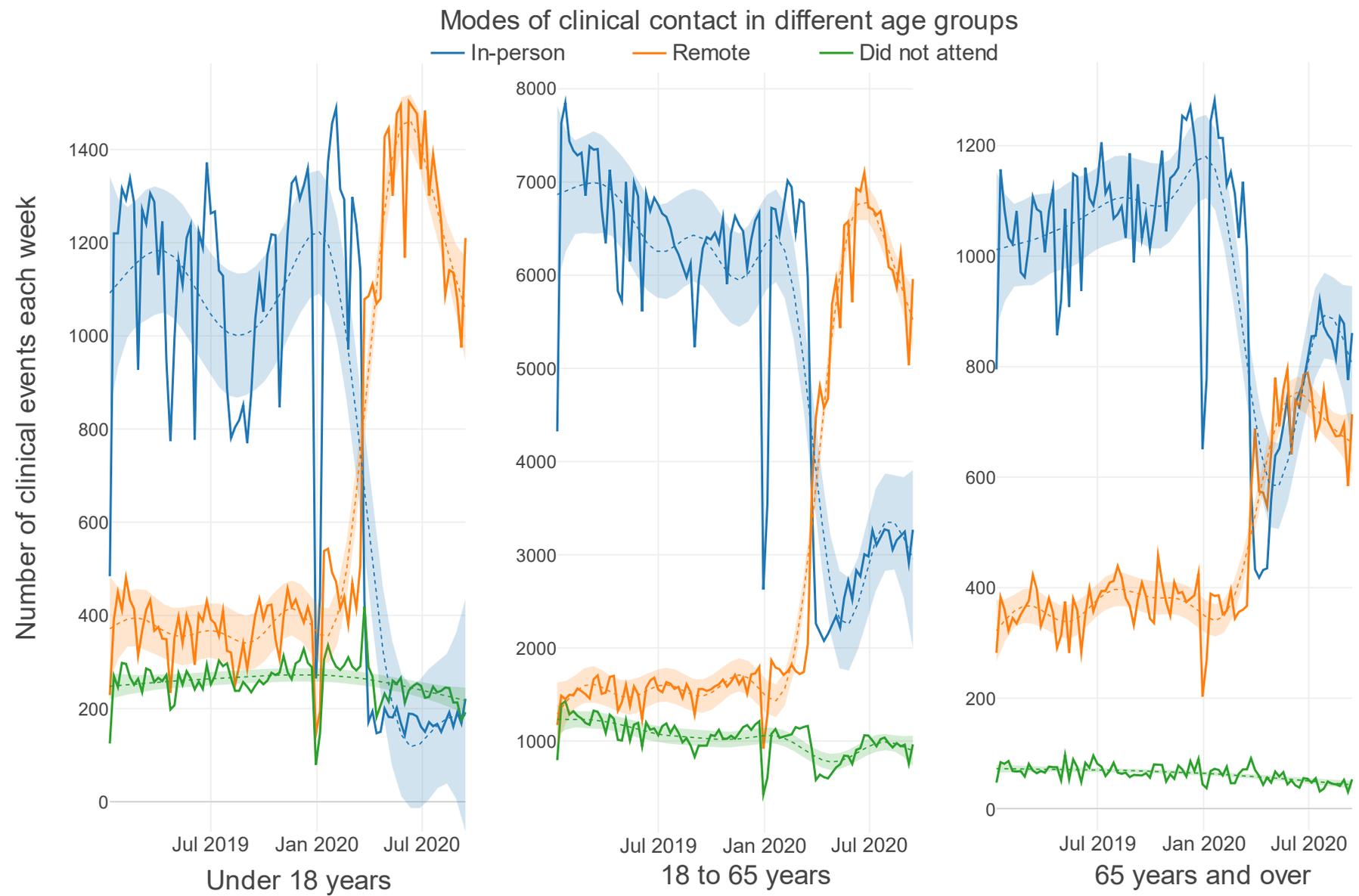
Remote mental healthcare in SLaM

- Rapid, unplanned shift to telephone/video appointments with patients following COVID-19 pandemic
- Impact of shift to remote care largely unknown
- Data visualisation of EHR data to determine indirect impacts on mental healthcare

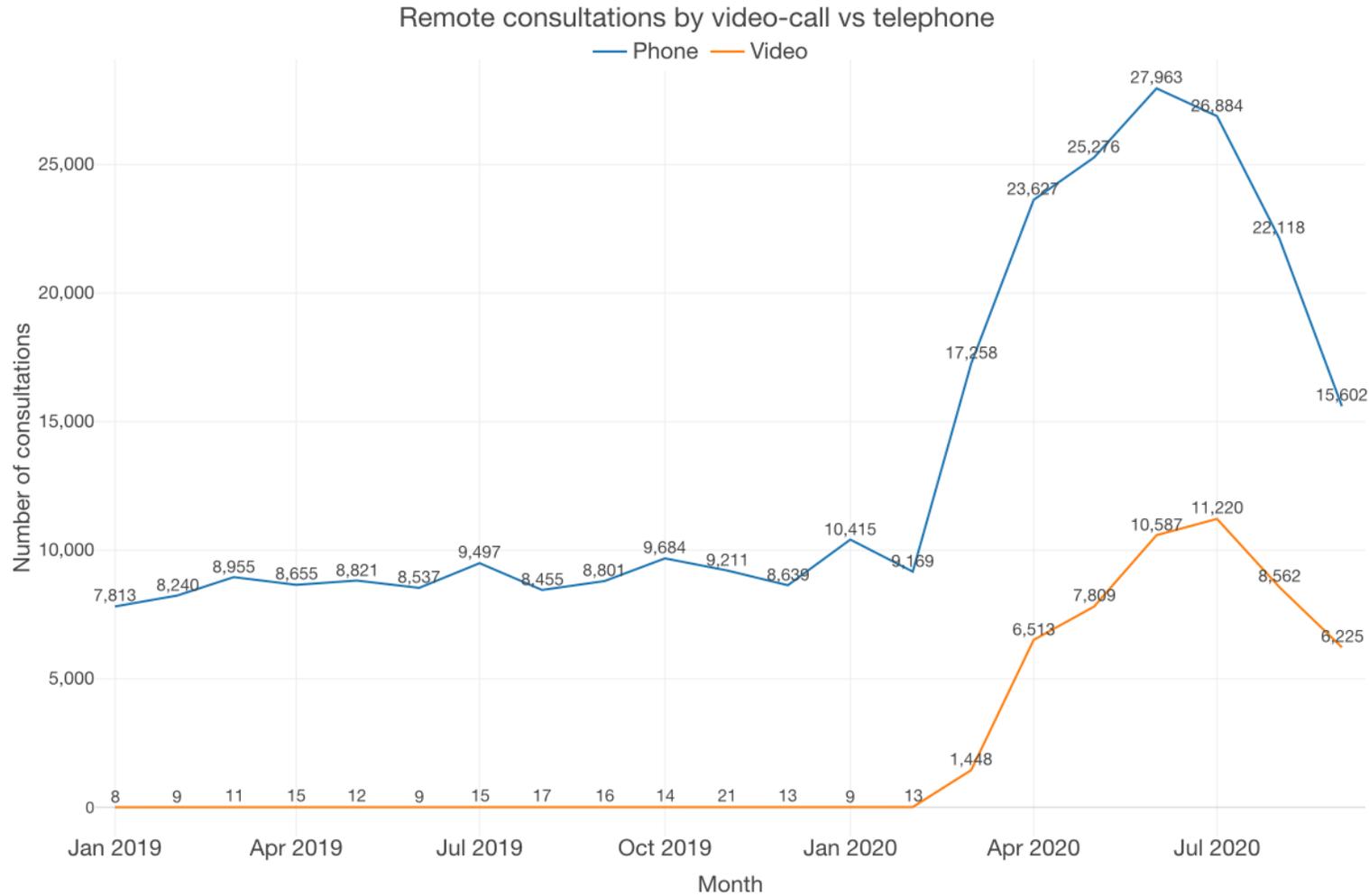
Breakdown by in-person/remote/DNA



Clinical contacts by age group



Phone vs video call



- Risk of Crisis algorithm developed using existing evidence base and statistical analyses validated with the Biomedical Research Unit, Kings College London (CRIS data)
- Identifies who might be more likely to use crisis services either in the community or as an inpatient
- COVID-19 module developed to identify people shielding or at risk from COVID-19 with support from Innovate UK
- At-risk/shielding people proactively contacted, assessed and received support to address potential mental health impact of isolation
- **Between April and June 2020: 24% increase in engagement with mental health services**

	Highly Complex	Medium Complexity	Less Complex	
In Crisis	Grey	Grey	Grey	
High Risk of Crisis	Red	Red	Red	
Medium Risk of Crisis	Purple	Purple	Purple	
Low Risk of Crisis	Blue	Blue	Blue	Discharge Ready?



Summary

- COVID-19 has led to rapid shift to remote mental healthcare
 - Need to ensure equity of access and manage resources
 - Ensure people are still able to access in-person care when necessary
 - Future research into most effective/safe use of remote technology for mental healthcare
 - Natural language processing of free text records from remote care
 - **EHR data visualisation tools could help deliver more effective care**
- <http://rpatel.co.uk/TelepsychiatryDashboard>

Acknowledgements



- IoPPN (KCL)/Psychosis CAG (KHP):
 - Jessica Irving
 - Aimee Brinn
 - Philip McGuire
 - Robert Harland
 - Johnny Downs
 - Robert Stewart
- NIHR Maudsley BRC (SLaM):
 - Hitesh Shetty
 - Megan Pritchard
 - Matthew Broadbent
- Mersey Care:
 - Adam Drage

Further data available from:

<https://bmjopen.bmj.com/content/11/3/e046365>