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Baxter, M. A.; Cameron, D.; Jordan, J.; Murphy, J.; Crearie, C.; Lilley, C

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# The Impact of COVID-19 on Systemic Anti-Cancer Treatment Delivery in Scotland

**Baxter MA**

University of Dundee <https://orcid.org/0000-0002-5773-8650>

**Murphy J**

NHS Lanarkshire

**Cameron D**

Edinburgh Cancer Research Centre, University of Edinburgh

**Jordan J**

NHS Grampian

**Crearie C**

West of Scotland Cancer Network

**Lilley C**

Edinburgh Cancer Centre, Edinburgh

**Sadozye A**

West of Scotland Cancer Network

**Maclean M**

West of Scotland Cancer Network

**Hall P**

Edinburgh Cancer Research Centre, University of Edinburgh

**Phillips A**

Tayside Cancer Centre, Ninewells Hospital and Medical School, NHS Tayside

**Greger A**

NHS Grampian

**Madeleine J**

NHS Highland

**Petty RD** (✉ [r.petty@dundee.ac.uk](mailto:r.petty@dundee.ac.uk))

University of Dundee

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## Short Report

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# Abstract

Understanding the impact of the COVID19 pandemic on systemic anti-cancer therapy delivery (SACT) is crucial for a full appreciation of the short and long-term consequences for cancer patients and for planning future cancer care. In this article we report real-time national SACT delivery data from NHS Scotland. We demonstrate an initial rapid reduction in patient attendance for SACT of 28.7% with a subsequent rapid and full recovery following service re-design. Regional variation in the magnitude of impact on SACT delivery was observed, but nadirs occurred at the same time and the rate of recovery was similar across all regions. This recovery reflected a co-ordinated national approach and associated patient and clinician support structures which facilitated the creation of COVID-19 protected areas for SACT delivery in Scottish cancer centres and enabled rapid sharing of successful and innovative strategies. The data shows that these actions have limited the disadvantage to cancer patients.

## Introduction

COVID-19 (SARS-CoV-2) has impacted significantly on the delivery of cancer care including systemic anticancer therapy (SACT), in the United Kingdom (UK). It is estimated that during the pandemic a backlog of 2.4 million people awaiting cancer screening, diagnostic tests or treatment built up in the UK (1).

Early studies suggested that cancer patients were at increased risk of SARS-CoV-2 infection and that SACT was associated with severe COVID-19 outcomes (2). Additionally, delivery of SACT while maintaining social distancing is challenging. Patient attendance for treatment increases the risk of transmission of infection for both patients and staff. These factors led to uncertainty for cancer clinicians (3).

In response, the UK National Institute of Clinical Excellence (NICE) produced a guideline regarding the delivery of systemic anticancer treatments, while in Scotland, the Scottish Government introduced new interim governance arrangements and clinical guidance for cancer medicines(4, 5).

UK cancer units adapted and clinicians consulted with patients regarding the potential risk of continuing treatment. Focus turned to immunosuppressive regimes and immune checkpoint inhibitors due to the risk of neutropenia and cytokine storm respectively(6). Ultimately, these adaptations led to a reduction in delivery of SACT. In England and Northern Ireland, data suggested patient attendances for SACT reduced initially by 45-66%, (7).

The need for evidence to guide decisions led to the development of prospective observational studies such as, the UK Coronavirus Cancer Monitoring Project (UKCCMP)(8). UKCCMP has rapidly collected data with weekly reports provided to 96 participating centres.

The UKCCMP alongside the US COVID-19 and Cancer Consortium (CCC19)(9) have recently demonstrated that outcomes in cancer patients with COVID-19 is largely driven by age, gender and comorbidity. No

detrimental effect of SACT was observed on patient outcomes. These new data provide welcome reassurance that SACT including chemotherapy, should be offered to patients if possible. However, these studies had short follow-up time and their retrospective nature led to high proportions of missing data and incomplete adjustment for confounders, and consequently many unanswered questions (10).

Knowledge of the extent of the impact COVID-19 on cancer treatment delivery is important for future planning, and to minimise disadvantage to patients in the event of a resurgence of infection. In this rapid short report, we present real-time nationwide data from Scotland on cancer patient attendance for SACT during the COVID19 pandemic. We demonstrate the impact on a regional and national level and discuss reasons for patterns seen and conclusions for future SACT delivery during the ongoing COVID-19 pandemic.

## Methods

Cancer care in NHS Scotland is delivered across 14 geographic health boards and co-ordinated by 3 Regional networks; North of Scotland Cancer Alliance (NCA, population 1,396,780), West of Scotland Cancer Network (WoSCAN, population 3,158,940), and South East Cancer Network (SCAN, population 1,509,500). In all Health boards SACT is prescribed using the same electronic prescribing system, ChemoCare® (CIS Oncology Ltd, Belfast, UK). This enables data on the numbers of patients attending for SACT to be extracted rapidly and in real time.

Following the UK wide lockdown on 23<sup>rd</sup> March 2020, patient attendance numbers were collated weekly from each health board and grouped by the responsible regional Cancer Network, for discussion and review at national level. Patient attendance for six weeks prior to lockdown were collected for comparison.

## Results

Adult patient attendances for SACT in NHS Scotland showed a sudden decrease that was not seen in previous years, in the week preceding the UK lockdown. This decrease continued until the week beginning 13<sup>th</sup> April 2020 (**Figure 1A**). A decrease of 28.7% was seen in the period 2<sup>nd</sup> March to 19<sup>th</sup> April 2020, by comparison to average weekly attendance in the six week period 20<sup>th</sup> January to 1<sup>st</sup> March (**Figure 1B**). Subsequently a recovery from this point is observed with patient attendances returning towards pre-COVID levels by the week beginning 20<sup>th</sup> July at -7.5% by comparison to average weekly attendance in the 6 week period 20<sup>th</sup> January – 1<sup>st</sup> March (**Figure 1A&B**). Comparing to 2019, attendance in April 2020 decreased by 17.2%, and in June 2020 by 3.1% (**Figure 1D**).

Our national data also enable us to explore regional variation between the three cancer networks (**Figure 1C**). Interestingly, a similar fall in patient attendances was seen in SCAN and in NCA, but a greater and more rapid decrease in WoSCAN. The rate of recovery in all regions appears similar.

On assessment of the impact of route, intravenous (IV), subcutaneous (SC) and oral (PO) administration of SACT were all reduced. The greatest decrease was seen for IV and SC, while PO SACT was largely maintained (data not shown). This pattern is the same for all regional networks.

## Discussion

In this report we demonstrate the impact of COVID-19 on SACT delivery in Scotland. The initial decrease observed reflects uncertainty of the risks associated with SACT at the beginning of the pandemic. This timing pre-dates the UK lockdown indicating an awareness of early, small cohort data from other countries. The subsequent rapid recovery reflects Scottish government interim governance arrangements for cancer medicines that enabled evidence based, co-ordinated and transparent quick adaptations to practice based on clinical consensus, and the creation of COVID-19 protected SACT delivery in Scottish cancer centres. Subsequently, larger observational studies, including UKCCMP provided weekly distribution of real-time data to UK investigators and provided reassurance that SACT should be offered to patients if possible. This generated confidence to sustain recovery of SACT delivery in NHS Scotland. Overall these actions, as our data shows, have been important in limiting the disadvantage to cancer patients.

A differing impact on SACT delivery was observed at a regional level, with a greater initial decrease seen in WoSCAN. This may reflect the highest incidence of COVID-19 in Scotland being observed in 2 of the 4 health boards (NHS Greater Glasgow and Clyde and NHS Lanarkshire), that together comprise 73% of the WoSCAN population. Despite differences in the extent and rate of decrease between regions, the rate of recovery in all regions appears similar. A key reason for this is likely to be the co-ordinated national recovery approach.

The lesser impact seen on oral SACT may be explained by the drugs mechanism of action and less need for hospital attendance which may have encouraged clinicians and patients to continue treatment.

The high quality and granularity of NHS Scotland cancer data is enabling further research to allow a deeper understanding of the impact of SACT in different tumour types. This includes reporting short term outcomes to allow rapid investigation of the impact of COVID-19 and associated response and recovery cancer pathway modifications.

A re-surgence of SARS-CoV-2 infection is predicted as lockdown restrictions are lifted. The ability to learn from experience will form a key part of future strategies aimed at avoiding any subsequent decrease in patient attendance for SACT if a COVID-19 resurgence occurs. It is evident that not all regions of the United Kingdom have been affected equally in terms of COVID-19 incidence [8]. Similarly the impact of SACT delivery may differ according to administration route. The impact of COVID-19 upon cancer referrals, diagnostic services, and other treatment modalities will also impact SACT delivery, and may disproportionately affect some tumour types. This is the subject of ongoing analysis to ensure the observed recovery in SACT in NHS Scotland is sustained.

# Declarations

## Acknowledgements

We are grateful the support of the cancer clinicians, pharmacists, service managers and their teams across all the 14 geographic health boards, and the 3 regional cancer networks in NHS Scotland for their assistance in facilitating the provision of data for this manuscript.

## Authors' contributions

RDP and MAB conceived the initial concept and designed the study, collected, verified, analysed and interpreted data, and drafted manuscript text.

CC and CL helped with the design of the study and collected verified, analysed and interpreted data.

JM, DC, PAH and MM verified and interpreted data.

AP, AG, JJ and JMad collected verified, analysed and interpreted data.

All authors helped write the manuscript and all approved the final manuscript.

## Ethics approval

The study was performed with prospective authorisation of the SACT leads from the NHS Scotland regional Cancer Networks for provision and use of the data consistent with the networks published information governance frameworks and Caldicott requirements. The study was performed in accordance with the declaration of Helsinki.

## Data availability.

The authors are committed to the responsible sharing of our research data that is consistent with patient consent, protects confidentiality, and meets the highest standards of integrity and ethics. The data is available upon request to the corresponding author indicating the intended objectives and specific details of use of data, and will only be provided consistent with existing ethical approvals and governance standards in place for the data.

## Conflict of interest

RDP has undertaken speaking, consulting and advisory roles for Eli Lilly, BMS, Pfizer, Sanofi, Servier; and received research funding (not related to the work in this manuscript) from Astra Zeneca, Roche, MSD, Merck serrano, Eli Lilly, Five Prime Therapeutics, Clovis, Boston Biomedical, and Janssen

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## References

1. Over 2 million people in backlog for cancer care [press release]. 1st June
2. Dai M, Liu D, Liu M, Zhou F, Li G, Chen Z, et al. Patients with Cancer Appear More Vulnerable to SARS-COV-2: A Multicenter Study during the COVID-19 Outbreak. *Cancer Discov.*
3. The Lancet O. COVID-19: global consequences for oncology. *Lancet Oncol.* 2020;21(4):467.
4. Scottish Government . Coronavirus (COVID-19): interim governance framework for cancer medicines in adults. <https://www.gov.scot/publications/coronavirus-covid-19-interim-governance-framework-for-cancer-medicines-in-adults/>.
5. Scottish Government . Coronavirus (COVID-19): clinical guidelines for cancer treatment. <https://www.gov.scot/publications/coronavirus-covid-19-clinical-guidelines-for-cancer-treatment/>.
6. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet.* 2020;395(10223):497- 506.
7. Lai A, Pasea L, Banerjee A, Denaxas S, Katsoulis M, Chang WH, et al. Estimating excess mortality in people with cancer and multimorbidity in the COVID-19
8. Anil I, Arnold R, Benkwitz-Beford S, Branford S, Campton N, Cazier J-B, et al. The UK Coronavirus Cancer Monitoring Project: protecting patients with cancer in the era of COVID-19. *The Lancet Oncology.* 2020;21(5):622-4.
9. Kuderer NM, Choueiri TK, Shah DP, Shyr Y, Rubinstein SM, Rivera DR, et al. Clinical impact of COVID-19 on patients with cancer (CCC19): a cohort study. *The Lancet.* 2020;395(10241):1907-18.
10. Poortmans PM, Guarneri V, Cardoso M-J. Cancer and COVID-19: what do we really know? *The Lancet.* 2020;395(10241):1884-5.

## Figures



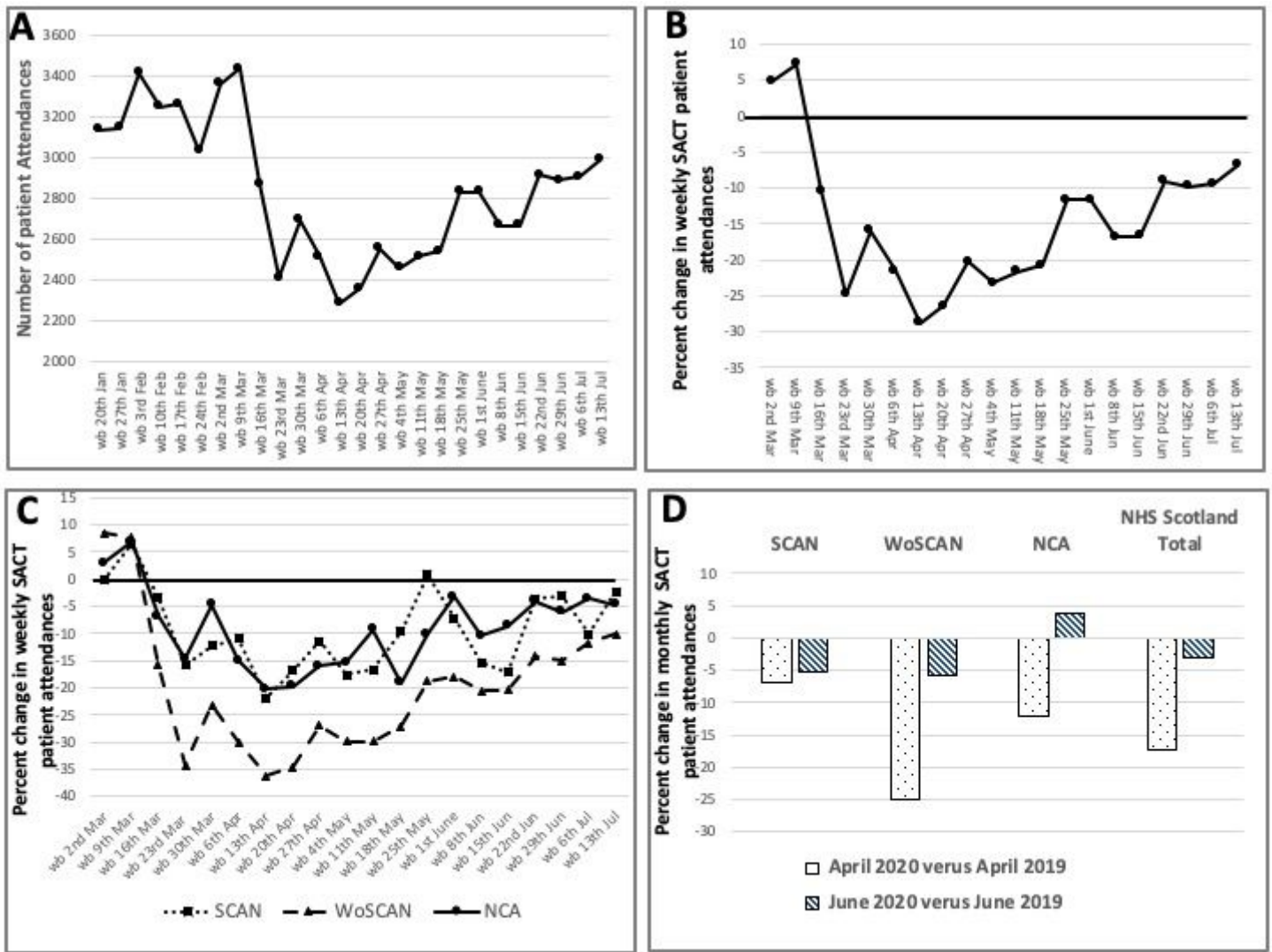


Figure 1

A-Weekly number of patient attendances for systemic anti-cancer treatment (SACT) in NHS Scotland between the week beginning (wb) 20th January 2020 and the wb 20th July 2020. B- Percent change in weekly patient attendances for systemic anti-cancer treatment (SACT) in NHS Scotland and C- Regional cancer networks. Percentage change calculated relative to a baseline value determined by the average number of national patient attendances in the 6 weeks prior to the week beginning 2nd March 2020. South of Scotland Cancer Network (SCAN), West of Scotland Cancer Network (WoSCAN), North of Scotland Cancer Alliance (NCA). National lockdown implemented week beginning 23rd March 2020. Week beginning (Wb).