**Read-me-first notes**

This documents provides an overview of key papers (typically first/last authored), assembled in themes, and descending order of recency. Where applicable, a given paper may be represented in more than one themes. Paper titles are accompanied by a brief overview in blue fonts, including the gist of the evidence – the reader can look at the righthand column first/mainly.

Themes:

1. Diagnostic intervals and pathways
2. Diagnosis of cancer as an emergency and other diagnostic routes
3. Using electronic health records to capture cancer incident /risk
4. Cancer patient experience (including associations between early/late diagnosis and patient experience)
5. Organisational (general practice or CCG) variation in early diagnosis
6. Advanced stage at diagnosis and its predictors
7. Effects of morbidity on the diagnostic process
8. Editorial, perspectives pieces or reviews on early diagnosis

[ Papers here comprise a shortlist out of 210 (Jan 2021), 125 (60%) as first/last author, full publication record: [http://tinyurl.com/lncqq7f](https://webmail.medschl.cam.ac.uk/owa/redir.aspx?C=6rMHIetz_Em8TXYCuDyrfyQ_5qARp9EIF1-mJcnsQsLKe5Lil2RRuPo-UGr3FAz7o-fxOaNxLsE.&URL=http%3a%2f%2ftinyurl.com%2flncqq7f)

*h*-index (*April 2023*) 41 (Web of Science) / 55 (Google Scholar) ].

1. **Research on diagnostic intervals and pathways (including symptom papers)**

| **Paper** | **Brief overview** |
| --- | --- |
| 1. Zhou Y, Walter FM, Mounce L, Abel GA, Singh H, Hamilton W, Stewart GD, Lyratzopoulos G. Identifying opportunities for timely diagnosis of bladder and renal cancer via abnormal blood tests: a longitudinal linked data study. Br J Gen Pract. 2021;72(714):e19-e25. [link](https://pubmed.ncbi.nlm.nih.gov/34903517/) |  |
| 1. Zhou Y, Walter FM, Singh H, Hamilton W, Abel GA, Lyratzopoulos G. Prolonged Diagnostic Intervals as Marker of Missed Diagnostic Opportunities in Bladder and Kidney Cancer Patients with Alarm Features: A Longitudinal Linked Data Study *Cancers.* 2021;13(1) [link](https://www.mdpi.com/2072-6694/13/1/156) | Many patients subsequently diagnosed with urological cancers who have presented with alarm symptoms do not receive a timely diagnosis, in spite of recommendations for two week wait referral. Example of using linked EHR records to profile diagnostic intervals. See also ‘3’ below. |
| 1. Koo MM, Lyratzopoulos G, Herbert A, Abel GA, Taylor RM, Barber JA, Gibson F, Whelan J, Fern LA. Association of Self-reported Presenting Symptoms With Timeliness of Help-Seeking Among Adolescents and Young Adults With Cancer in the BRIGHTLIGHT Study. *JAMA Netw Open*. 2020;3(9):e2015437. [link](https://pubmed.ncbi.nlm.nih.gov/32880648/) | Substantial variation in time from symptom onset to presentation by symptom category in a group of patients with different adolescent and young adult cancers. First large scale quantification of associations between symptoms and diagnostic intervals in Adolescents and Young Adults with cancer. |
| 1. Zhou Y, Abel GA, Hamilton W, Singh H, Walter FM, Lyratzopoulos G. Imaging activity possibly signalling missed diagnostic opportunities in bladder and kidney cancer: A longitudinal data-linkage study using primary care electronic health records. *Cancer Epidemiol*. 2020 Apr 22;66:101703. doi: 10.1016/j.canep.2020.101703. [Epub ahead of print] [link](https://www.ncbi.nlm.nih.gov/pubmed/32334389) | One in five patients with a urological cancer have ‘early’ imaging activity 5-8 months before their diagnosis, which may signal opportunities for earlier diagnosis. Risk of an ‘early’ investigation greater in patients with kidney cancer, GP-ordered imaging and if presenting with symptoms other than haematuria. See also ‘1’ above’. |
| 1. Swann R, Lyratzopoulos G, Rubin G, Pickworth E, McPhail S. The frequency, nature and impact of GP-assessed avoidable delays in a population-based cohort of cancer patients. *Cancer Epidemiology* 2020;64:101617. doi: 10.1016/j.canep.2019.101617. [link](https://www.ncbi.nlm.nih.gov/pubmed/31810885) | Characterisation of frequency, predictors and consequences of clinician self-reported ‘avoidable delay’ in the diagnostic process of cancer patients in the NCDA data. |
| 1. Koo MM, Swann R, McPhail S, Abel GA,, Elliss-Brookes L, Rubin GP, Lyratzopoulos G. Presenting symptoms of cancer and stage at diagnosis: evidence from a cross-sectional, population-based study. Lancet Oncology 2019; November 05, 2019DOI:https://doi.org/10.1016/S1470-2045(19)30595-9. [link](https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(19)30595-9/fulltext) | Among patients subsequently diagnosed with cancer, most common presenting symptoms are not associated with advanced stage disease at diagnosis |
| 1. Koo MM, Rubin G, McPhail S, Lyratzopoulos G. Incidentally diagnosed cancer and commonly preceding clinical scenarios: a cross-sectional descriptive analysis of English audit data. *BMJ Open* 2019;9(9):e028362. doi: 10.1136/bmjopen-2018-028362*.* [link](https://www.ncbi.nlm.nih.gov/pubmed/31530591) | About one in 20 patients with cancer may be diagnosed incidentally; certain cancer sites are over-represented and others under-represented among incidentally diagnosed cases. Certain common scenarios leading to incidental diagnosis highlighted. |
| 1. Herbert A, Lyratzopoulos G, Whelan J, Taylor RM, Barber J, Gibson F, Fern LA. Diagnostic timeliness in adolescents and young adults with cancer: a cross-sectional analysis of the BRIGHTLIGHT cohort. *The Lancet Child & Adolescent Health*. 2018;2(3):180-190. [link](https://www.ncbi.nlm.nih.gov/pubmed/29503844) | Characterisation of diagnostic timeliness (pre- / post- / symptom-to-diagnosis) in adolescents and young adults with cancer who responded to a patient survey. Girls have longer diagnostic intervals; as do those with lympohoma and bone tumour compared to those with melanoma |
| 1. Koo MM, von Wagner C, Abel GA, McPhail S, Hamilton W, Rubin GP, Lyratzopoulos G. The nature and frequency of abdominal symptoms in cancer patients and their associations with time to help-seeking: evidence from a national audit of cancer diagnosis. *J Public Health (Oxf).* 2018 Jan 27. doi: 10.1093/pubmed/fdx188. [Epub ahead of print] [link](https://www.ncbi.nlm.nih.gov/pubmed/29385513) | Presenting abdominal symptoms are common among patients with many different (abdominal and other organ) cancers; there is appreciable variation in the length of patient interval by presenting abdominal symptom which could support the design of public health awareness campaigns. |
| 1. Swann R, McPhail S, Witt J, Shand B, Abel G, Hiom S, Rashbass J, Lyratzopoulos G, Rubin G. The National Cancer Diagnosis Audit for England: new evidence to support quality improvement. *Br J Gen Pract* 2018;68(666):e63-e72. doi: 10.3399/bjgp17X694169. [link](https://www.ncbi.nlm.nih.gov/pubmed/29255111) | Characterisation of this new resource (including in respect of its representativeness) and key aspects of variation in diagnostic timeliness. |
| 1. Koo MM, Walter FM, Hamilton W, Rubin GP, Lyratzopoulos G. Symptom signatures and diagnostic timeliness in cancer patients: a review of current evidence. *Neoplasia* 2017;20(2):165-174. doi: 10.1016/j.neo.2017.11.005. [link](https://www.ncbi.nlm.nih.gov/pubmed/29253839) | A compilation of evidence (to end of 2017) on symptom signatures of different cancers and their diagnostic difficulty. |
| 1. Koo MM, von Wagner C, Abel GA, McPhail S, Rubin GP, Lyratzopoulos G. Typical and atypical presenting symptoms of breast cancer and their associations with diagnostic intervals: Evidence from a national audit of cancer diagnosis. *Cancer Epidemiology*. 2017; 48:140-146. doi: 10.1016/j.canep.2017.04.010. [link](https://www.ncbi.nlm.nih.gov/pubmed/28549339) | Women atypical presenting symptoms of breast cancer are more likely to have prolonged intervals to help-seeking |
| 1. Hughes DL, Neal RD, Lyratzopoulos G, Rubin G. Profiling for primary-care presentation, investigation and referral for liver cancers: evidence from a national audit. *Eur J Gastroenterol Hepatol*. 2016;28(4):428-32. doi: 10.1097/MEG.0000000000000555 [link](http://www.ncbi.nlm.nih.gov/pubmed/26684694) | Descrption of diagnostic intervals and presenting symptoms in patients with liver cancer |
| 1. Lyratzopoulos G, Saunders CL, Abel GA, McPhail S, Neal RD, Wardle J, Rubin GP. The relative length of the patient and the primary care interval in patients with 28 common and rarer cancers. *Br J Cancer*. 2015;112 Suppl 1:S35-40. doi: 10.1038/bjc.2015.40. [link](http://www.ncbi.nlm.nih.gov/pubmed/25734380) | Patients with easy-to-suspect cancers have relatively long patient intervals compared to the their primary care intervals, while harder-to-suspect cancers have relatively equal length of patient and primary care intervals. |
| 1. Rubin GP, Saunders CL, Abel GA, McPhail S, Lyratzopoulos G, Neal RD. Impact of investigations in general practice on timeliness of referral for patients subsequently diagnosed with cancer: analysis of national primary care audit data. *Br J Cancer*. 2015;112(4):676-87. doi: 10.1038/bjc.2014.634. [link](http://www.ncbi.nlm.nih.gov/pubmed/25602963) | The use of investigations in primary care prolongs the primary care interval by a median of 3 weeks |
| 1. Keeble S, Abel GA, Saunders CL, McPhail S, Walter FM, Neal RD, Rubin GP, Lyratzopoulos G. Variation in promptness of presentation among 10,297 patients subsequently diagnosed with one of 18 cancers: Evidence from a national audit of cancer diagnosis in primary care. *Int J Cancer.*2014;135(5):1220-8. [link](http://www.ncbi.nlm.nih.gov/pubmed/24515930) | Patients subsequently diagnosed with head & neck cancer, oesophageal cancer and melanoma have averagely longer patient intervals; in contrast, patients with bladder and renal cancer have relatively short patient intervals. The findings most likely reflect variable levels of public awareness of likely symptoms of different cancers, and the dramatic/undramatic nature of different symptoms |
| 1. Lyratzopoulos G, Abel GA, McPhail S, Neal RD, Rubin GP. Gender inequalities in the promptness of diagnosis of bladder and renal cancer after symptomatic presentation: evidence from secondary analysis of an English primary care audit survey. *BMJ Open.* 2013;3(6). pii: e002861. [link](http://www.ncbi.nlm.nih.gov/pubmed/23798742) | Women with bladder and renal cancer experience prolonged intervals to referral, even when they present with haematuria. |
| 1. Lyratzopoulos G, Abel GA, McPhail S, Neal RD, Rubin GP. Measures of promptness of cancer diagnosis in primary care: secondary analysis of national audit on patients with 18 common and rarer cancers. *Br J Cancer.* 2013;108(3):686-90. [link](http://www.ncbi.nlm.nih.gov/pubmed/23392082) | The number of pre-referral consultations is a valid surrogate marker of the primary care interval. There is wide variation in the the primary care interval of different cancers, with ‘harder-‘ and’easier-‘ to suspect cancer groups. See also below. |
| 1. Lyratzopoulos G, Neal RD, Barbiere JM, Rubin GP, Abel GA. Variation in number of general practitioner consultations before hospital referral for cancer: findings from the 2010 National Cancer Patient Experience Survey in England. *Lancet Oncol.* 2012;13(4):353-65. [link](http://www.ncbi.nlm.nih.gov/pubmed/22365494) | Among undiagnosed patients, large variations in number of pre-referral consultations depending on the symptom signature of subsequently diagnosed cancer and patient characteristics; ‘harder’-/ ‘easier’-to-suspect cancers. (See also Mendonca SC BJGP 2016 – within CPES; and Lyratzopoulos et al. BJC 2013 (above). |

**External collaborations in this theme:**

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| 1. Price S, Spencer A, Zhang X, Ball S, Lyratzopoulos G, Mujica-Mota R, Stapley S, Ukoumunne OC, Hamilton W. Trends in time to cancer diagnosis around the period of changing national guidance on referral of symptomatic patients: A serial cross-sectional study using UK electronic healthcare records from 2006-17. Cancer Epidemiol. 2020;69:101805. [link](https://pubmed.ncbi.nlm.nih.gov/32919226/) | Modest reduction overall in diagnostic intervals for different cancers, with NIGE 2015 acting as a point in the journey rather then a step change catalyst |

1. **Research on diagnosis of cancer as an emergency and other diagnostic routes**

| **Paper** | **Twitter message** |
| --- | --- |
| 1. McPhail S, Swann R, Johnson SA, Barclay ME, Abd Elkader H, Alvi R, Barisic A, Bucher O, Clark GRC, Creighton N, Danckert B, Denny CA, Donnelly DW, Dowden JJ, Finn N, Fox CR, Fung S, Gavin AT, Gomez Navas E, Habbous S, Han J, Huws DW, Jackson CGCA, Jensen H, Kaposhi B, Kumar SE, Little AL, Lu S, McClure CA, Møller B, Musto G, Nilssen Y, Saint-Jacques N, Sarker S, Te Marvelde L, Thomas RS, Thomas RJS, Thomson CS, Woods RR, Zhang B, Lyratzopoulos G; ICBP Module 9 Emergency Presentations Working Group. Risk factors and prognostic implications of diagnosis of cancer within 30 days after an emergency hospital admission (emergency presentation): an International Cancer Benchmarking Partnership (ICBP) population-based study. Lancet Oncol. 2022 Apr 6:S1470-2045(22)00127-9 | See [here](https://twitter.com/GLyratzopoulos/status/1512062865166897169) |
| 1. Bright CJ, Gildea C, Lai J, Elliss-Brookes L, Lyratzopoulos G. Does geodemographic segmentation explain differences in route of cancer diagnosis above and beyond person-level sociodemographic variables? *J Public Health (Oxf).* 2020 Aug 12:fdaa111. doi: 10.1093/pubmed/fdaa111. Online ahead of print. [link](https://pubmed.ncbi.nlm.nih.gov/32785586/) | Geodemographic segementation explains risk of emergency diagnosis of cancer above and beyond conventional socio-demographicvariables (including age and deprivation status) |
| 1. Herbert A, Winters S, McPhail S, Elliss-Brookes L, Lyratzopoulos G, Abel G. Population trends in emergency cancer diagnoses: The role of changing patient case-mix. *Cancer Epidemiol* 2019;63:101574. doi: 10.1016/j.canep.2019.101574.[link](https://www.ncbi.nlm.nih.gov/pubmed/31655434) | During 2006-2015, the decrease in the % of patients diagnosed through an Emergency Presentation chiefly (81%) reflects factors other than enabling secular changes in case-mix (e.g. progressive reduction in the incidence of high risk for EP cancers, such as lung cancer). Case-mix influences have some influence (19%) – chiefly mediated through change in cancer site case mix (as opposed to changes in the average deprivation and age). |
| 1. Herbert A, Abel G, Winters S, McPhail S, Elliss-Brookes L, Lyratzopoulos G. Predictors and time trends (2006-2015) of cancer diagnosis after emergency GP referral or A&E attendance in England. *Br J Gen Practice* 2019;69(687):e724-e730. doi: 10.3399/bjgp19X705473.. [Epub ahead of print] [link](https://www.ncbi.nlm.nih.gov/pubmed/31455644) | During 2006-2015, the decrease in the % of patients diagnosed through an Emergency Presentation likely reflects drop in GP emergency referrals to hospital (which likely reflects depopulating of pool of possible emergencies through increasing use of 2ww referrals). |
| 1. Pham TM, Gomez-Cano M, Salika T, Jardel D, Abel GA, Lyratzopoulos G. Diagnostic route is associated with care satisfaction independently of tumour stage: Evidence from linked English Cancer Patient Experience Survey and cancer registration data. *Cancer Epidemiol.* 2019;61:70-78. doi: 10.1016/j.canep.2019.04.011. [link](https://www.ncbi.nlm.nih.gov/pubmed/31153049) | Among patients with lung, colon,rectal, breast and prostate cancer, emergency presentation is associated with worse and screening (colon, rectal and breast only) with optimal care satisfaction independently of tumour stage.  *Expands on Salika et al (Frontline Gastroenterology 2018) by adding stage adjustment and considering another 4 sites)* |
| 1. Herbert A, Abel GA, Winters S, McPhail S, Elliss-Brookes L, Lyratzopoulos G. Are inequalities in cancer diagnosis through emergency presentation narrowing, widening or remaining unchanged? Longitudinal analysis of English population-based data 2006-2013*. J Epidemiol Community Health.* 2019;73(1):3-10. doi: 10.1136/jech-2017-210371. [link](https://www.ncbi.nlm.nih.gov/pubmed/30409920) | Large inequalities by age and deprivation in risk of emergency presentation prevail; each year 11K fewer emergency presentations attainable with modest inequality reductions |
| 1. Salika T, Abel GA, Mendonca S, Renzi C, Herbert A, McPhail S, Lyratzopoulos G. Associations between diagnostic pathways and care experience in colorectal cancer: Evidence from patient-reported data. *Frontline Gastroeneterology*. 2018;9(3):241-248. doi: 10.1136/flgastro-2017-100926 [link](https://www.ncbi.nlm.nih.gov/pubmed/30046429) | Cancer patients diagnosed following an emergency presentation or an elective (non-fast track) referral more likely to evaluate their care more critically than those fast-tracked or diagnosed through screening.  *Forerunner to Pham TM et al. Cancer Epidemiology 2019.* |
| 1. Zhou Y, Mendonca SC, Abel GA, Hamilton W, Walter FM, Johnson S, Shelton J, Elliss-Brookes L, McPhail S, Lyratzopoulos G. Variation in ‘fast-track’ referrals for suspected cancer by patient characteristic and cancer diagnosis: Evidence from 670,000 patients with cancers of 35 different sites*. Br J Cancer,* 2017. doi: 10.1038/bjc.2017.381. [link](https://www.ncbi.nlm.nih.gov/pubmed/29182609) | Cancer sites with poorer symptom signatures and patients ‘in the wrong demographic’ group (e.g. older men-testicular; premenopausal women-endometrial) less likely to be diagnosed after 2ww referral; highlights the need for MDC-like approaches |
| 1. Abel GA, Mendonca SC, McPhail S, Zhou Y, Elliss-Brookes L, Lyratzopoulos G. Emergency diagnosis of cancer and previous general practice consultations: Insights from linked patient survey data. *Br J Gen Pract*. 2017;67(659):e377-e387. doi: 10.3399/bjgp17X690869. [link](https://www.ncbi.nlm.nih.gov/pubmed/28438775) | 1/3 of patients with emergency presentation have not previously seen GP; particularly cancers with limited prodromal symptoms phase |
| 1. Zhou Y, Abel GA, Hamilton W, Pritchard-Jones K, Gross CP, Walter FM, Renzi C, Johnson S, McPhail S, Elliss-Brookes L, Lyratzopoulos G. Diagnosis of cancer as an emergency: a critical review of current evidence. *Nat Rev Clin Oncol.* 2017;14(1):45-56. doi: 10.1038/nrclinonc.2016.155 [link](https://www.ncbi.nlm.nih.gov/pubmed/27725680) | Emergency presentation is a multi-factorial problem and a global challenge (not an ‘English NHS’ problem) |
| 1. Abel GA, Shelton J, Johnson S, Elliss-Brookes L, Lyratzopoulos G. Cancer-specific variation in emergency presentation by sex, age and deprivation across 27 common and rarer cancers. *Br J Cancer*. 2015;112 Suppl 1:S129-36. doi: 10.1038/bjc.2015.52. [link](http://www.ncbi.nlm.nih.gov/pubmed/25734396) | Appreciable variation in risk of emergency presentation within the same cancer site stratum – highlights the social and healthcare system factors (in addition to tumour/disease/biological factors) contributing to EP. |
| 1. Lyratzopoulos G, Saunders CL, Abel GA. Are emergency diagnoses of cancer avoidable? A proposed taxonomy to motivate study design and support service improvement. *Future Oncol.* 2014;10(8):1329-33. [link](http://www.ncbi.nlm.nih.gov/pubmed/24983838) | A conceptual paper aiming to introduce the disease-host-system logic to understanding EP |

**External collaborations in this theme:**

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| 1. Danckert B, Falborg AZ, Christensen NL, Frederiksen H, Lyratzopoulos G, McPhail S, Ryg J, Vedsted P, Thomsen LA, Jensen H. Routes to diagnosis and the association with the prognosis in patients with cancer - A nationwide register-based cohort study in Denmark. Cancer Epidemiol. 2021;74:101983. [link](https://pubmed.ncbi.nlm.nih.gov/34352658/) | First ever study of ‘routes to diagnosis’ approach (registry & hospital statistics) outside England |

1. **Research using electronic health records to capture cancer incident /risk**

| **Paper** | **Twitter message** |
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| 1. Herbert A, Rafiq M, Pham TM, Renzi C, Abel GA, Price S, Hamilton W, Petersen I, Lyratzopoulos G. Predictive values for different cancers and inflammatory bowel disease of 6 common abdominal symptoms among more than 1.9 million primary care patients in the UK: A cohort study. PLoS Med. 2021 Aug 2;18(8):e1003708. doi: 10.1371/journal.pmed.1003708. [link](https://pubmed.ncbi.nlm.nih.gov/34339405/) |  |
| 1. White B, Rafiq M, Gonzalez-Izquierdo A, Hamilton W, Price S, Lyratzopoulos G. Risk of cancer following primary care presentation with fatigue: a population-based cohort study of a quarter of a million patients. Br J Cancer. 2022 Feb 18. doi: 10.1038/s41416-022-01733-6. [link](https://pubmed.ncbi.nlm.nih.gov/35181753/) |  |
| 1. Majano SB, Lyratzopoulos G, Rachet B, de Wit NJ, Renzi C. Do presenting symptoms, use of pre-diagnostic endoscopy and risk of emergency cancer diagnosis vary by comorbidity burden and type in patients with colorectal cancer? Br J Cancer. 2022;126(4):652-663. [link](https://pubmed.ncbi.nlm.nih.gov/34741134/) |  |
| 1. Wiering B, Lyratzopoulos G, Hamilton W, Campbell J, Abel G. Concordance with urgent referral guidelines in patients presenting with any of six 'alarm' features of possible cancer: a retrospective cohort study using linked primary care records. BMJ Qual Saf. 2021 Oct 4:bmjqs-2021-013425. doi: 10.1136/bmjqs-2021-013425. [link](https://pubmed.ncbi.nlm.nih.gov/34607914/) |  |

See also papers 3-5 here <https://pubmed.ncbi.nlm.nih.gov/?term=lyratzopoulos+g%2C+renzi+c%2C+rachet+b&sort=pubdate> (Cristina Renzi PhD studies) also <https://pubmed.ncbi.nlm.nih.gov/32919226/>

Our colleague Meena Rafiq also has a paper in press with BJGP from our production (Hodkin’s lymphoma diagnostic interval).

1. **Research on cancer patient experience (including associations between early/late diagnosis and patient experience)**

| **Paper** | **Twitter message** |
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| 1. Gomez-Cano M, Lyratzopoulos G, Abel GA. Patient Experience Drivers of Overall Satisfaction With Care in Cancer Patients: Evidence From Responders to the English Cancer Patient Experience Survey. J Patient Exp. 2020;7(5):758-765. [link](https://pubmed.ncbi.nlm.nih.gov/33294612/) | Focusing improvement efforts on care administration and coordination has potential to improve overall satisfaction with oncological care across diverse patient groups/care pathways. |
| 1. Pham TM, Gomez-Cano M, Salika T, Jardel D, Abel GA, Lyratzopoulos G. Diagnostic route is associated with care satisfaction independently of tumour stage: Evidence from linked English Cancer Patient Experience Survey and cancer registration data. *Cancer Epidemiol.* 2019;61:70-78. doi: 10.1016/j.canep.2019.04.011. [link](https://www.ncbi.nlm.nih.gov/pubmed/31153049) | Among patients with lung, colon,rectal, breast and prostate cancer, emergency presentation is associated with worse and screening (colon, rectal and breast only) with optimal care satisfaction independently of tumour stage.  *Expands on Salika et al (Frontline Gastroenterology 2018) by adding stage adjustment and considering another 4 sites)* |
| 1. Salika T, Abel GA, Mendonca S, Renzi C, Herbert A, McPhail S, Lyratzopoulos G. Associations between diagnostic pathways and care experience in colorectal cancer: Evidence from patient-reported data. *Frontline Gastroenterology*. 2018;9(3):241-248. doi: 10.1136/flgastro-2017-100926 [link](https://www.ncbi.nlm.nih.gov/pubmed/30046429) | Cancer patients diagnosed following an emergency presentation or an elective (non-fast track) referral more likely to evaluate their care more critically than those fast-tracked or diagnosed through screening.  *Forerunner to Pham TM et al. Cancer Epidemiology 2019.* |
| 1. Abel GA, Mendonca SC, McPhail S, Zhou Y, Elliss-Brookes L, Lyratzopoulos G. Emergency diagnosis of cancer and previous general practice consultations: Insights from linked patient survey data. *Br J Gen Pract*. 2017;67(659):e377-e387. doi: 10.3399/bjgp17X690869. [link](https://www.ncbi.nlm.nih.gov/pubmed/28438775) | 1/3 of patients with emergency presentation have not previously seen GP; particularly cancers with limited prodromal symptoms phase |
| 1. Mendonca SC, Abel GA, Saunders CL, Wardle J, Lyratzopoulos G. Pre-referral general practitioner consultations and subsequent experience of cancer care: Evidence from the English Cancer Patient Experience Survey. *Eur J Cancer Care*. 2016;25(3):478-90. doi: 10.1111/ecc.12353. [link](http://www.ncbi.nlm.nih.gov/pubmed/26227343) | Cancer patients who greater number of pre-referral consultations evaluate their subsequent cancer care experience more critically than those with fewer |
| 1. Mendonca SC, Abel GA, Lyratzopoulos G. Pre-referral GP consultations in patients subsequently diagnosed with rarer cancers: a study of patient-reported data. *Br J Gen Pract*. 2016; 66(644):e171-81. doi: 10.3399/bjgp16X683977 [link](http://www.ncbi.nlm.nih.gov/pubmed/26917657) | Augmentation of the ‘sibling’ paper (Lyratzopoulos G, Neal RD, Barbiere JM, Rubin GP, Abel GA, 2012: [link](http://www.ncbi.nlm.nih.gov/pubmed/22365494) ) to an additional 12 (rarer) cancers – see below |
| 1. Lyratzopoulos G, Neal RD, Barbiere JM, Rubin GP, Abel GA. Variation in number of general practitioner consultations before hospital referral for cancer: findings from the 2010 National Cancer Patient Experience Survey in England. *Lancet Oncol.* 2012;13(4):353-65. [link](http://www.ncbi.nlm.nih.gov/pubmed/22365494) | Among undiagnosed patients, large variations in number of pre-referral consultations depending on the symptom signature of subsequently diagnosed cancer and patient characteristics; ‘harder’-/ ‘easier’-to-suspect cancers |

**E. Organisational (general practice or CCG) variation in early diagnosis**

| **Paper** | **Twitter message** |
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| 1. Barclay ME, Abel GA, Elliss-Brookes L, Greenberg DC, Lyratzopoulos G. The influence of patient case-mix on public health area statistics for cancer stage at diagnosis: a cross-sectional study. *Eur J Public Health.* 2019. Mar 14. pii: ckz024. doi: 10.1093/eurpub/ckz024. [Epub ahead of print] [link](https://www.ncbi.nlm.nih.gov/pubmed/30869123) | CCG indicators for early/late stage diagnosis should be adjusted for case-mix; non-adjusted indicators more likely to reward CCGs with enabling case-mix (e.g. lower than average incidence of lung, higher than average incidence of breast cancer) |
| 1. Barclay M, Lyratzopoulos G, Greenberg DC, Abel GA. Missing data and chance variation in public reporting of cancer stage at diagnosis: Cross-sectional analysis of population-based data in England. *Cancer Epidemiol* 2017;52:28-42. doi: 10.1016/j.canep.2017.11.005. [link](https://www.ncbi.nlm.nih.gov/pubmed/29175263) | CCG indicators for early/late stage diagnosis should be adjusted for case-mix; non-adjusted indicators more likely to reward CCGs with enabling case-mix (e.g. lower than average incidence of lung, higher than average incidence of breast cancer) |
| 1. Mendonca SC, Abel GA, Gildea C, McPhail S, Peake MD, Rubin G, Singh H, Hamilton W, Walter FM, Roland MO, Lyratzopoulos G. Associations between general practice characteristics with use of urgent referrals for suspected cancer and endoscopies: a cross-sectional ecological study. Fam Pract. 2018 Dec 12. doi: 10.1093/fampra/cmy118. [Epub ahead of print] [link](https://www.ncbi.nlm.nih.gov/pubmed/30541076) | English general practices with averagely older GPs tend to use gastro-intestinal endoscopy (upper / colonoscopy / flexible sigmoidoscopy) and fast-track (2-week-wait) referral pathways less often than those with averagely younger GPs; other team characteristics matter little, though socio-demographics (age and deprivation) of the practice population matter a lot |
| 1. Lyratzopoulos G, Mendonca SC, Gildea C, McPhail S, Peake M, Rubin G, Singh H, Hamilton W, Walter FM, Roland M, Abel GA. Associations between diagnostic activity and measures of patient experience in primary care: A cross-sectional ecological study of English general practices. *Br J Gen Pract* 2018;68(666):e9-e17. doi: 10.3399/bjgp17X694097. [link](https://www.ncbi.nlm.nih.gov/pubmed/29255108) | English general practices rated higher than average for care continuity tend to use gastro-intestinal endoscopy (upper / colonoscopy / flexible sigmoidoscopy) and fast-track (2-week-wait) referral pathways less often; and those rated higher than average for doctor communication more often |
| 1. Abel GA, Saunders CL, Mendonca SC, Gildea C, Lyratzopoulos G. Variation and statistical reliability of publicly reported primary care diagnostic activity indicators for cancer: A cross-sectional ecological study of routine data. *BMJ Qual Saf* . 2018;27(1):21-30. doi: 10.1136/bmjqs-2017-006607. [link](https://www.ncbi.nlm.nih.gov/pubmed/28847789) | Practice-level diagnostic process measures (fast-track referral rate, endoscopy use, screening coverage) can be reliably measured in English general practices using annual samples; diagnostic outcomes measures (e.g. emergency presentation, detection / conversion rate) are not |

**F. Advanced stage at diagnosis and its predictors**

| **Paper** | **Twitter message** |
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| 1. Barclay ME, Abel GA, Greenberg DC, Rous B, Lyratzopoulos G. The Socio-demographic variation in stage at diagnosis of breast, bladder, colon, endometrial, lung, melanoma, prostate, rectal, renal and ovarian cancer in England and its population impact. *Br J Cancer.* 2021;124(7):1320-1329 [link](https://pubmed.ncbi.nlm.nih.gov/33564123/) | Elimination of socio-demographic variation in stage at diagnosis would help to reduce the 17% gap towards attaining target to early stage at diagnosis by 4% (i.e. to 13%) |
| 1. Herbert A, Barclay ME, Koo MM, Rous B, Greenberg DC, Able GA, Lyratzopoulos G. Stage–specific incidence trends of renal cancers in the East of England, 1999-2016. *Cancer Epidemiology.* 2021. 71(Pt A):101883 [link](https://pubmed.ncbi.nlm.nih.gov/33493782/) | There is a reduction in advanced stage renal cancer, above and beyond likely overdiagnosis of early state tumours |
| 1. Barclay ME, Abel GA, Elliss-Brookes L, Greenberg DC, Lyratzopoulos G. The influence of patient case-mix on public health area statistics for cancer stage at diagnosis: a cross-sectional study. *Eur J Public Health.* 2019. Mar 14. pii: ckz024. doi: 10.1093/eurpub/ckz024. [Epub ahead of print] [link](https://www.ncbi.nlm.nih.gov/pubmed/30869123) | CCG indicators for early/late stage diagnosis should be adjusted for case-mix; non-adjusted indicators more likely to reward CCGs with enabling case-mix (e.g. lower than average incidence of lung, higher than average incidence of breast cancer) |
| 1. Pham TM, Gomez-Cano M, Salika T, Jardel D, Abel GA, Lyratzopoulos G. Diagnostic route is associated with care satisfaction independently of tumour stage: Evidence from linked English Cancer Patient Experience Survey and cancer registration data. *Cancer Epidemiol.* 2019;61:70-78. doi: 10.1016/j.canep.2019.04.011. [Epub ahead of print] [link](https://www.ncbi.nlm.nih.gov/pubmed/31153049) | Among patients with lung, colon,rectal, breast and prostate cancer, emergency presentation is associated with worse and screening (colon, rectal and breast only) with optimal care satisfaction independently of tumour stage.  *Expands on Salika et al (Frontline Gastroenterology 2018) by adding stage adjustment and considering another 4 sites)* |
| 1. Herbert A, Koo MM, Barclay ME, Greenberg DC, Abel GA, Levell NJ, Lyratzopoulos G. Stage-specific incidence trends of melanoma in an English region, 1996-2015: longitudinal analyses of population-based data. Melanoma Res. 2018 Aug. doi: 10.1097/CMR.0000000000000489. [Epub ahead of print] [link](https://www.ncbi.nlm.nih.gov/pubmed/30106842) | Melanoma incidence is rising, particularly in stage I, whether this represents earlier diagnosis or over-detection is debatable, but interaction analysis (year by socio-demographic) argues for earlier detection. |
| 1. Barclay M, Lyratzopoulos G, Greenberg DC, Abel GA. Missing data and chance variation in public reporting of cancer stage at diagnosis: Cross-sectional analysis of population-based data in England. *Cancer Epidemiol* 2017;52:28-42. doi: 10.1016/j.canep.2017.11.005. [link](https://www.ncbi.nlm.nih.gov/pubmed/29175263) | CCG indicators for early/late stage diagnosis should be adjusted for case-mix; non-adjusted indicators more likely to reward CCGs with enabling case-mix (e.g. lower than average incidence of lung, higher than average incidence of breast cancer) |
| 1. Mwaka AD, Garimoi CO, Were EM, Roland M, Wabinga H, Lyratzopoulos G. Social, demographic and healthcare factors associated with stage at diagnosis of cervical cancer: cross-sectional study in a tertiary hospital in Northern Uganda. *BMJ Open*. 2016;6(1):e007690. doi: 10.1136/bmjopen-2015-007690 [link](http://www.ncbi.nlm.nih.gov/pubmed/26801459) | Case-series of Ugandan women with cervical cancer indicates socio-demographic patterning of advanced stage disease |
| 1. Rutherford MJ, Abel GA, Greenberg DC, Lambert PC, Lyratzopoulos G. The impact of eliminating age inequalities in stage at diagnosis on breast cancer survival for older patients. *Br J Cancer*. 2015;112 Suppl 1:S124-8. doi: 10.1038/bjc.2015.51 [link](http://www.ncbi.nlm.nih.gov/pubmed/25734394) | Extension of paper ‘8’ below, to include age. |
| 1. Rutherford MJ, Ironmonger L, Ormiston-Smith N, Abel GA, Greenberg DC, Lyratzopoulos G, Lambert PC. Estimating the potential survival gains by eliminating socioeconomic and sex inequalities in stage at diagnosis of melanoma. *Br J Cancer*. 2015;112 Suppl 1:S116-23. doi: 10.1038/bjc.2015.50. [link](http://www.ncbi.nlm.nih.gov/pubmed/25734390) | Similar to paper ‘8’ below, but focusing on melanoma. |
| 1. Lyratzopoulos G, Pang-Hsiang M, Abel GA, Wardle J, Keating NL. The association between fatalistic beliefs and late stage at diagnosis of lung and colorectal cancer. *Cancer Epidemiol Biomarkers Prev*. 2015;24(4):720-6. doi: 10.1158/1055-9965.EPI-14-0969. Feb 3. pii: cebp.0969.2014. [link](http://www.ncbi.nlm.nih.gov/pubmed/25650183) | US patients with lung and colorectal cancer who responded to the CanCORS survey were more likely to be diagnosed at advanced stage if they had higher fatalism score (post-diagnosis) |
| 1. Rutherford MJ, Hinchliffe SR, Abel GA, Lyratzopoulos G, Lambert PC, Greenberg DC. How much of the deprivation gap in cancer survival can be explained by variation in stage at diagnosis: An example from breast cancer in the East of England. *Int J Cancer.* 2013;133(9):2192-200. [link](http://www.ncbi.nlm.nih.gov/pubmed/23595777) | Population health impact of potential elimination of deprivation differences in stage at diagnosis. |
| 1. Lyratzopoulos G, Abel GA, Brown CH, Rous BA, Vernon SA, M. Roland, Greenberg DC. Socio-demographic inequalities in stage of cancer diagnosis: evidence from patients with female breast, lung, colon, rectal, prostate, renal, bladder, melanoma, ovarian and endometrial cancer. *Ann Oncol.* 2013;24(3):843-5. [link](http://www.ncbi.nlm.nih.gov/pubmed/23149571) | Characterising socio-demographic inequalities in stage at diagnosis of 10 common cancers; variable patterns, with inequalities being concentrated in ‘easy to suspect’ (post-presentation) cancers, pointing to delays in presentation being the source of inequalities (breast, melanoma, endometrial) |
| 1. Lyratzopoulos G, Abel GA, Barbiere JM, Brown CH, Rous RA, Greenberg DC. Variation in advanced stage at diagnosis of lung and female breast cancer in an English region 2006–2009. *Br J Cancer.* 2012;106(6):1068-75. [link](http://www.ncbi.nlm.nih.gov/pubmed/22382691) | As for ‘9’ above, but focusing on lung and breast (a primer of ‘9’) |
| 1. Barbiere JM, Greenberg DC, Wright KA, Brown CH, Palmer C, Neal DE, Lyratzopoulos G. The association of diagnosis in the private or NHS sector on prostate cancer stage and treatment. *J Public Health (Oxf).* 2012;34(1):108-14. [link](http://www.ncbi.nlm.nih.gov/pubmed/21745831) | Patients diagnosed with prostate cancer at a non-NHS facility more likely to have localised disease |

**G. Effects of morbidity on the diagnostic process (see also H)**

| **Paper** | **Twitter message** |
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| 1. Majano SB, Lyratzopoulos G, Rachet B, de Wit NJ, Renzi C. Do presenting symptoms, use of pre-diagnostic endoscopy and risk of emergency cancer diagnosis vary by comorbidity burden and type in patients with colorectal cancer? Br J Cancer. 2022;126(4):652-663. doi: 10.1038/s41416-021-01603-7. | Patients with colorectal cancer who have physical morbidities experience substantially longer intervals to colonoscopy pre-diagnosis |
| 1. Koo MM, Swann R, McPhail S, Abel GA, Renzi C, Rubin GP, Lyratzopoulos G. The prevalence of chronic conditions in patients diagnosed with one of 29 common and rarer cancers: A cross-sectional study using primary care data. Cancer Epidemiol. 2020;69:101845. doi: 10.1016/j.canep.2020.101845. [link](https://pubmed.ncbi.nlm.nih.gov/33227628/) | Basic characterisation of common morbidity burden and patterns in patients with different cancers. |
| 1. Kaushal A, Waller J, von Wagner C, Kummer S, Whitaker K, Puri A, Lyratzopoulos G, Renzi C. The role of chronic conditions in influencing symptom attribution and anticipated help-seeking for potential lung cancer symptoms: a vignette-based study. BJGP Open. 2020;4(4):bjgpopen20X101086. [link](https://www.ncbi.nlm.nih.gov/pubmed/29175263) | Basic characterisation of possible canacer symptom awareness and attribution in patients with morbidity |
| 1. Renzi C, Lyratzopoulos G, Hamilton W, Maringe C, Rachet B. Contrasting effects of comorbidities on emergency colon cancer diagnosis. A longitudinal data-linkage study in England. BMC Health Services Research. 2019 (in press). *BMC Health Serv Res.* 2019;19(1):311. doi: 10.1186/s12913-019-4075-4. [link](https://www.ncbi.nlm.nih.gov/pubmed/31092238) | Exlporation of effect heterogeneity for morbidities in diagnosis of colon cancer as an emergency |

**H. Editorial, perspectives pieces or reviews on early diagnosis**

***Morbidity and cancer diagnosis (editorial, review)***

1. Renzi C, Lyratzopoulos G. Comorbidity and the diagnosis of symptomatic-but-as-yet-undiagnosed cancer. *Br J Gen Pract.* 2020;70(698):e598-e599. doi: 10.3399/bjgp20X712193. [link](https://pubmed.ncbi.nlm.nih.gov/32855148/)
2. Renzi C, Kaushal A, Emery J, Hamilton W, Neal R, Rachet B, Rubin G, Singh H, Walter FM, de Wit NJ, Lyratzopoulos G. Comorbid chronic diseases and the diagnosis of cancer: A review of disease- specific effects and underlying mechanisms. *Nat Reviews Clin Oncol* 2019;16(12):746-761. doi: 10.1038/s41571-019-0249-6. [link](https://www.ncbi.nlm.nih.gov/pubmed/31350467)

***Diagnosis of cancer as an emergency (editorial, review)***

1. Zhou Y, Abel GA, Hamilton W, Pritchard-Jones K, Gross CP, Walter FM, Renzi C, Johnson S, McPhail S, Elliss-Brookes L, Lyratzopoulos G. Diagnosis of cancer as an emergency: a critical review of current evidence. *Nat Rev Clin Oncol.* 2017;14(1):45-56. doi: 10.1038/nrclinonc.2016.155 [link](https://www.ncbi.nlm.nih.gov/pubmed/27725680)
2. Lyratzopoulos G, Saunders CL, Abel GA. Are emergency diagnoses of cancer avoidable? A proposed taxonomy to motivate study design and support service improvement. *Future Oncol.* 2014;10(8):1329-33. [link](http://www.ncbi.nlm.nih.gov/pubmed/24983838)

***Early diagnosis reviews or perspectives papers***

1. Koo MM, Mwaka A, Corbex M, Ginsburgh O, Walter FM, Unger-Saldaña K, Moodley J, Calanzani C, Rubin GP, Lyratzopoulos G. A conceptual framework to guide early diagnosis programmes for symptomatic cancer as part of global cancer control. JCO Global Oncology. In press 2021.
2. Lai J, Mak V, Bright CJ, Lyratzopoulos G, Elliss-Brookes L, Gildea C. Reviewing the impact of 11 national Be Clear on Cancer public awareness campaigns, England 2012-2016: a synthesis of published evaluation results. *Int J Cancer.* 2020. doi: 10.1002/ijc.33277. [link](https://pubmed.ncbi.nlm.nih.gov/32875560/)
3. Koo MM, Walter FM, Hamilton W, Rubin GP, Lyratzopoulos G. Symptom signatures and diagnostic timeliness in cancer patients: a review of current evidence. *Neoplasia* 2018;20(2):165-174. doi: 10.1016/j.neo.2017.11.005. [link](https://www.ncbi.nlm.nih.gov/pubmed/29253839)

***Electronic health recods used in eatly diagnosis research (editorials)***

1. Lyratzopoulos G, Abel GA. Assessing patients at risk of symptomatic-but-as-yet-undiagnosed cancer in primary care using information from patient records. *Br J Cancer*. 2020. doi: 10.1038/s41416-020-0828-4. [link](https://www.ncbi.nlm.nih.gov/pubmed/32291393)
2. Lyratzopoulos G. Electronic patient records research to aid diagnostic reasoning for possible cancer in primary care. *Br J Gen Pract.* 2018;68(674):408-409. doi: 10.3399/bjgp18X698585. [link](https://www.ncbi.nlm.nih.gov/pubmed/30166371)
3. Koo MM, Zhou Y, Lyratzopoulos G. Delays in diagnosis and treatment of lung cancer: Lessons from US healthcare settings. *Cancer Epidemiol*. 2015;39(6):1145-7.

***Other cancer early diagnosis editorials***

1. Koo MM, Mwaka A, Corbex M, Ginsburgh O, Walter FM, Unger-Saldaña K, Moodley J, Calanzani C, Rubin GP, Lyratzopoulos G. A conceptual framework to guide early diagnosis programmes for symptomatic cancer as part of global cancer control. *JCO Global Oncology*. In press 2020.
2. Zhou Y, Funston G, Lyratzopoulos G, Walter FM. Improving the Timely Detection of Bladder and Kidney Cancer in Primary Care. *Adv Ther.* 2019;36(7):1778-1785. doi: 10.1007/s12325-019-00966-x. [link](https://www.ncbi.nlm.nih.gov/pubmed/31102201)
3. Forster A, Renzi C, Lyratzopoulos G. Diagnosing cancer in patients with ‘non-alarm’ symptoms: Learning from diagnostic care innovations in Denmark. *Cancer Epidemiol.* 2018; 54: 101–103. doi.org/10.1016/j.canep.2015.08.008. [link](https://pubmed.ncbi.nlm.nih.gov/29702426/)
4. Lyratzopoulos G, Vedsted P, Singh H. Understanding missed opportunities for more timely diagnosis of cancer in symptomatic patients after presentation. *Br J Cancer*. 2015;112 Suppl 1:S84-91. doi: 10.1038/bjc.2015.47. [link](http://www.ncbi.nlm.nih.gov/pubmed/25734393)
5. Lyratzopoulos G, Wardle J, Rubin GP. Rethinking diagnostic delay in cancer: how difficult is the diagnosis? *BMJ*. 2014;349:g7400. doi: 10.1136/bmj.g740 [link](http://www.ncbi.nlm.nih.gov/pubmed/25491791)
6. Lyratzopoulos G. Markers and measures of timeliness of cancer diagnosis after symptom onset: A conceptual framework and its implications. *Cancer Epidemiol.* 2014;38(3):211-3. [link](http://www.ncbi.nlm.nih.gov/pubmed/24742794)
7. Lyratzopoulos G, Abel G. Earlier diagnosis of breast cancer: focusing on symptomatic women. *Nat Rev Clin Oncol.* 2013;10(9):544. [link](http://www.ncbi.nlm.nih.gov/pubmed/23881030)
8. Lyratzopoulos G, Greenberg DC, Rubin GP, Abel GA, Walter FM, Neal RD. Advanced stage diagnosis of cancer: who is at greater risk? *Expert Rev Anticancer Ther.* 2012;12(8):993-6. [link](http://www.ncbi.nlm.nih.gov/pubmed/23030217)

**OTHER RESEARCH THEMES (OTHER THAN EARLY DIAGNOSIS)**

1. **COVID-19 and Cancer diagnosis or treatment and outcomes**
2. Loveday C, Sud A, Jones ME, Broggio J, Scott S, Gronthound F, Torr B, Garrett A, Nicol DL, Jhanji S, Boyce SA, Williams M, Barry C, Riboli E, Kipps E, McFerran E, Muller DC, Lyratzopoulos G, Lawler M, Abulafi M, Houlston RS, Turnbull C. **Prioritisation by FIT to mitigate the impact of delays in the 2-week wait colorectal cancer referral pathway during the COVID-19 pandemic: a UK modelling study.** *Gut*. 2020 Aug 27:gutjnl-2020-321650. doi: 10.1136/gutjnl-2020-321650. [link](https://pubmed.ncbi.nlm.nih.gov/32855306/)
3. Sud A, Torr B, Jones ME, Broggio J, Scott S, Loveday C, Garrett A, Gronthoud F, Nicol DL, Jhanji S, Boyce SA, Williams M, Riboli E, Muller DC, Kipps E, Larkin J, Navani N, Swanton C, Lyratzopoulos G, McFerran E, Lawler M, Houlston R, Turnbull C. **Effect of delays in the 2-week-wait cancer referral pathway during the COVID-19 pandemic on cancer survival in the UK: a modelling study.** *Lancet Oncol.* 2020 Jul 20:S1470-2045(20)30392-2. doi: 10.1016/S1470-2045(20)30392-2. [link](https://pubmed.ncbi.nlm.nih.gov/32702311)
4. Sud A, Jones ME, Broggio J, Loveday C, Torr B, Garrett A, Nicol DL, Jhanji S, Boyce SA, Gronthoud F, Ward P, Handy JM, Yousaf N, Larkin J, Suh YE, Scott S, Pharoah PDP, Swanton C, Abbosh C, Williams M, Lyratzopoulos G, Houlston R, Turnbull C. **Collateral damage: the impact on outcomes from cancer surgery of the COVID-19 pandemic.** *Ann Oncol.* 2020 May 19;31(8):1065-74. doi: 10.1016/j.annonc.2020.05.009. [link](https://pubmed.ncbi.nlm.nih.gov/32442581)
5. **Cancer Patient Experience Survey (CPES) papers**

| **Paper** | **Twitter message** |
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| 1. Gomez-Cano M, Lyratzopoulos G, Abel GA. Patient Experience Drivers of Overall Satisfaction With Care in Cancer Patients: Evidence From Responders to the English Cancer Patient Experience Survey. *Journal Patient Experience.* [link](https://doi.org/10.1177/2374373519889435) | Care administration and coordination are the strongest predictors of satisfaction with cancer care (above and beyond other experience domains, including provider communication skills and waiting time). These findings generally apply across different care pathways. |
| 1. Abel GA, Gomez-Cano M, Pham TM, Lyratzopoulos G. The reliability of hospital scores for the Cancer Patient Experience Survey: analysis of publicly reported patient survey data. *BMJ Open.* 2019; 9(7):e029037. doi: 10.1136/bmjopen-2019-029037 [link](https://www.ncbi.nlm.nih.gov/pubmed/31345975) | CPES hospital scores are not statistically reliable in 70% of instances (hospital-question pairs). Re-design of survey sampling processes required. |
| 1. Pham TM, Gomez-Cano M, Salika T, Jardel D, Abel GA, Lyratzopoulos G. Diagnostic route is associated with care satisfaction independently of tumour stage: Evidence from linked English Cancer Patient Experience Survey and cancer registration data. *Cancer Epidemiol.* 2019;61:70-78. doi: 10.1016/j.canep.2019.04.011. [Epub ahead of print] [link](https://www.ncbi.nlm.nih.gov/pubmed/31153049) | Among patients with lung, colon,rectal, breast and prostate cancer, emergency presentation is associated with worse and screening (colon, rectal and breast only) with optimal care satisfaction independently of tumour stage.  *Expands on Salika et al (Frontline Gastroenterology 2018) by adding stage adjustment and considering another 4 sites)* |
| 1. Pham TM, Abel GA, Gomez-Cano M, Lyratzopoulos G. Predictors of postal or online response mode and associations with patient experience and satisfaction in the English Cancer Patient Experience Survey. *J Med Internet Res.* 2019;21:5 [Iink](http://jmir.org/2019/5/e11855/) | Younger, women, higher income and ethnic minority patients more likely to respond online; online response mode not materially/consistently affecting ratings of experience |
| 1. Salika T, Abel GA, Mendonca S, Renzi C, Herbert A, McPhail S, Lyratzopoulos G. Associations between diagnostic pathways and care experience in colorectal cancer: Evidence from patient-reported data. *Frontline Gastroenterology*. 2018;9(3):241-248. doi: 10.1136/flgastro-2017-100926 [link](https://www.ncbi.nlm.nih.gov/pubmed/30046429) | Cancer patients diagnosed following an emergency presentation or an elective (non-fast track) referral more likely to evaluate their care more critically than those fast-tracked or diagnosed through screening.  *Forerunner to Pham TM et al. Cancer Epidemiology 2019.* |
| 1. Saunders CL, Meads C, Abel GA, Lyratzopoulos G. Associations between sexual orientation, and overall and site-specific diagnosis of cancer: evidence from two national patient surveys in England. *J Clin Ocol* 2017; 35(32):3654-3661. doi: 10.1200/JCO.2017.72.5465. [link](https://www.ncbi.nlm.nih.gov/pubmed/28945501) | HPV- and HIV-related cancers are more common in GLBT individuals; using patient survey data to examine associations between sexual orientation and cancer risk |
| 1. Abel GA, Mendonca SC, McPhail S, Zhou Y, Elliss-Brookes L, Lyratzopoulos G. Emergency diagnosis of cancer and previous general practice consultations: Insights from linked patient survey data. *Br J Gen Pract*. 2017;67(659):e377-e387. doi: 10.3399/bjgp17X690869. [link](https://www.ncbi.nlm.nih.gov/pubmed/28438775) | 1/3 of patients with emergency presentation have not previously seen GP; particularly cancers with limited prodromal symptoms phase |
| 1. Mendonca SC, Abel GA, Saunders CL, Wardle J, Lyratzopoulos G. Pre-referral general practitioner consultations and subsequent experience of cancer care: Evidence from the English Cancer Patient Experience Survey. *Eur J Cancer Care*. 2016;25(3):478-90. doi: 10.1111/ecc.12353. [link](http://www.ncbi.nlm.nih.gov/pubmed/26227343) | Cancer patients who greater number of pre-referral consultations evaluate their subsequent cancer care experience more critically than those with fewer |
| 1. Mendonca SC, Abel GA, Lyratzopoulos G. Pre-referral GP consultations in patients subsequently diagnosed with rarer cancers: a study of patient-reported data. *Br J Gen Pract*. 2016; 66(644):e171-81. doi: 10.3399/bjgp16X683977 [link](http://www.ncbi.nlm.nih.gov/pubmed/26917657) | Augmentation of the ‘sibling’ paper (Lyratzopoulos G, Neal RD, Barbiere JM, Rubin GP, Abel GA, 2012: [link](http://www.ncbi.nlm.nih.gov/pubmed/22365494) ) to an additional 12 (rarer) cancers – see below |
| 1. Abel GA, Saunders CL, Lyratzopoulos G. Post-sampling mortality and non-response patterns in the English Cancer Patient Experience Survey: Implications for epidemiological studies based on surveys of cancer patients. *Cancer Epidemiol*. 2016;41:34-41. doi: 10.1016/j.canep.2015.12.010. [link](http://www.ncbi.nlm.nih.gov/pubmed/26797675) | 6% of initially sampled patients die before survey mail-out, particularly those with poorer prognosis cancers; men, younger, deprived, ethnic minority survivors more likely not to respond |
| 1. \*Saunders CL, Elliott MN, Lyratzopoulos G, Abel GA. Do Differential Response Rates to Patient Surveys Between Organizations Lead to Unfair Performance Comparisons?: Evidence From the English Cancer Patient Experience Survey. *Med Care*. 2016;54(1):45-54. doi: 10.1097/MLR.0000000000000457. [link](http://www.ncbi.nlm.nih.gov/pubmed/26595223) | Hospitals with lower CPES scores and lower survey response rates would have likely had even lower scores had their non-responders responded (non-responders are likely to have been more critical than responders) |
| 1. Saunders CL, Abel GA, Lyratzopoulos G.  Inequalities in reported cancer patient experience by socio-demographic characteristic and cancer site. Evidence from respondents to the English Cancer Patient Experience Survey. *European Journal of Cancer Care.* 2015;24(1):85-98. doi: 10.1111/ecc.12267 [link](http://www.ncbi.nlm.nih.gov/pubmed/25327713) | Cancer patients who are younger, women, more deprived, ethnic minority and with poorer prognosis / hard-to-suspect cancers more likely to evaluate their cancer care critically. |
| 1. Saunders CL, Abel GA, Lyratzopoulos G. What explains worse patient experience in London? Evidence from secondary analysis of the Cancer Patient Experience Survey. *BMJ Open.* 2014;4(1):e004039. [link](http://www.ncbi.nlm.nih.gov/pubmed/24390383) | The more negative evaluation of cancer care by patients treated in London hospitals is not explained by socio-demographic factors (e.g. higher % ethnic minority pts), cancer site case-mix (e.g. greater % of rarer cancers) or higher concentration of teaching hospital status |
| 1. Abel GA, Saunders CL, Lyratzopoulos G. Cancer patient experience, hospital performance and case mix: evidence from England. *Future Oncol.* 2014;10(9):1589-98. [link](http://www.ncbi.nlm.nih.gov/pubmed/24341422) | CPES survey scores need to be adjusted for patient (socio-demographic and cancer site) case-mix |
| 1. Saunders CL, Abel GA, El Turabi A, Ahmed F, Lyratzopoulos G. Accuracy of routinely recorded ethnic group information compared with self-reported ethnicity: evidence from the English Cancer Patient Experience survey. *BMJ Open*. 2013;3(6). :pii: e002882. [link](http://www.ncbi.nlm.nih.gov/pubmed/23811171) | PAS (HES) data during the study period (~2010) were reliably identifying White and major (‘ONS6’) ethnic minority groups, but not granular denominations of ethnicity (‘ONS16’). |
| 1. El Turabi A, Abel GA, Roland M, Lyratzopoulos G. Variation in reported experience of involvement in cancer treatment decision making: evidence from the National Cancer Patient Experience Survey. *Br J Cancer.* 2013;109(3):780-7. [link](http://www.ncbi.nlm.nih.gov/pubmed/23807170) | A prodrome to Saunders CL, Abel GA, Lyratzopoulos G. EJCC 2015 above: ([link](http://www.ncbi.nlm.nih.gov/pubmed/25327713) )  Similar findings but focused on experience of shared-decision-making |
| 1. Lyratzopoulos G, Neal RD, Barbiere JM, Rubin GP, Abel GA. Variation in number of general practitioner consultations before hospital referral for cancer: findings from the 2010 National Cancer Patient Experience Survey in England. *Lancet Oncol.* 2012;13(4):353-65. [link](http://www.ncbi.nlm.nih.gov/pubmed/22365494) | Among undiagnosed patients, large variations in number of pre-referral consultations depending on the symptom signature of subsequently diagnosed cancer and patient characteristics; ‘harder’-/ ‘easier’-to-suspect cancers |

**3. Treatment / survival variation**

| **Paper** | **Twitter message** |
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| 1. Hsu RCJ, Barclay M, Loughran MA, Lyratzopoulos G, Gnanapragasam VJ, Armitage JN. Impact of Hospital Nephrectomy Volume on Intermediate to Long-term Survival in Renal Cell Carcinoma   *BJU Int.* 2019;125(1):56-63. doi: 10.1111/bju.14848.] [link](https://www.ncbi.nlm.nih.gov/pubmed/31206987) | Further specification of impact of hospital volume on outcomes. |
| 1. Hsu RCJ, Barclay M, Loughran MA, Lyratzopoulos G, Gnanapragasam VJ, Armitage JN. Time trends in service provision and survival outcomes for patients with renal cancer treated by nephrectomy in England 2000-2010*. BJU Int.* 2018;122(4):599-609. doi: 10.1111/bju.14217. [link](https://www.ncbi.nlm.nih.gov/pubmed/29603575) | Centralisation during the study period has been associated with increase in nephron-sparing surgery and minimally invasive approaches to nephrectomy. Short- and long-term survival particularly for elderly patients and those with locally advanced disease increased during the study period, though attributing these improvements to specialisation is hard. |
| 1. Hounsome LS, Abel GA, Verne J, Neal DE, Lyratzopoulos G. Predictors of the use of orthotopic bladder reconstruction after radical cystectomy for bladder cancer: data from a pilot study of 1756 cases 2004-2011. *BJU Int.* 2013;111(7):1061-7. [link](http://www.ncbi.nlm.nih.gov/pubmed/23388085) | Use of orthotopic surgery was relatively rare (7% of all cystectomised patients) and variable between patients with different characteristics but not between different cancer networks. |
| 1. Barbiere JM, Greenberg DC, Wright KA, Brown CH, Palmer C, Neal DE, Lyratzopoulos G. The association of diagnosis in the private or NHS sector on prostate cancer stage and treatment. *J Public Health (Oxf).* 2012;34(1):108-14. [link](http://www.ncbi.nlm.nih.gov/pubmed/21745831) | Among patients with prostate cancer, private hospital diagnosis predicts earlier disease stage, higher use of surgery and lower use of radiotherapy, independently of case-mix differences between the two sectors. |
| 1. McMahon M, Barbiere JM, Greenberg DC, Wright KA, Lyratzopoulos G. Population-based trends in use of surgery for non-small cell lung cancer in a UK region, 1995-2006. *Thorax.* 2011;66(5):453-5. [link](http://www.ncbi.nlm.nih.gov/pubmed/21422037) | Use of surgery in patients with NSCLC decreased during the study period, possibly reflecting increasing quality of preoperative staging processes. Initial socioeconomic inequalities in surgery use became undetectable at the end of the study period. |
| 1. Lyratzopoulos G, Barbiere JM, Rachet B, Baum M, Thompson MR, Coleman MP. Changes over time in socioeconomic inequalities in breast and rectal cancer survival in England and Wales during a 32-year period (1973-2004): the potential role of health care. *Ann Oncol.* 2011;22(7):1661-6. [link](http://www.ncbi.nlm.nih.gov/pubmed/21199888) | There were contrasing (narrowing / widening) patterns of trends in inequality I in breast cancer and rectal cancer survival. The sequential introduction into clinical practice of new treatments of progressively smaller incremental benefit may partly explain the reduction in inequality in breast cancer survival. |
| 1. Lyratzopoulos G, Newsome H, Barbiere J, Bolton K, Wright K, Kitchener H, Greenberg D. Trends in the surgical management of epithelial ovarian cancer in East Anglia 1995-2006. *Eur J Surg Oncol.* 2011;37(5):435-41. [link](http://www.ncbi.nlm.nih.gov/pubmed/21377312) | Use of chemotherapy and of surgery remained stable over time (59% and 69% of patients, respectively). Use of surgery was less frequent in most deprived compared with most affluent patients. Use of omentectomy and of exenteration increased over time (37% in 1995-8 vs. 56% in 2003-6 for omentectomy, and 2% vs. 8% for exenteration respectively). More deprived patients less likely to be treated with omentectomy. |
| 1. Barbiere JM, Saeb-Parsy K, Greenberg DC, Wright KA, Brown CH, Neal DE, Lyratzopoulos G. Trends in the use of radiotherapy and radical surgery for patients with bladder urothelial cell carcinoma in East Anglia, 1995-2006. *BJU Int.* 2011;108(7):1106-14. [link](http://www.ncbi.nlm.nih.gov/pubmed/21314887) | Use of radical surgery in UCC invading bladder muscle increased and use of radiotherapy decreased during the study period. There was lower use of radiotherapy in women. |
| 1. Lyratzopoulos G, Barbiere JM, Greenberg DC, Wright KA, Neal DE. Population-based time trends and socioeconomic variation in use of radiotherapy and radical surgery for prostate cancer: a continuous survey. *BMJ.* 2010;340:c1928. [link](http://www.ncbi.nlm.nih.gov/pubmed/20413566) | After a diagnosis of prostate cancer, men from lower socioeconomic groups were substantially less likely to be treated with radical surgery or radiotherapy |
| 1. Hoy AR, Patrick H, Campbell B, Lyratzopoulos G. Measuring the influence of colleagues on a consultant team’s use of breast conserving surgery. *Int J Technol Assess Health Care.* 2010;26(2):156-62. [link](http://www.ncbi.nlm.nih.gov/pubmed/20392318) | Surgical teams performing breast conserving surgery are geographically concentrated / inter-related / co-clustered |
| 1. Lyratzopoulos G, Barbiere JM, Gajperia C, Rhodes M, Greenberg DC, Wright KA. Trends and variation in the management of oesophagogastric cancer patients: a population-based survey. *BMC Health Services Research.* 2009;9:231. [link](http://www.ncbi.nlm.nih.gov/pubmed/20003488) | During the study period, curative surgery decreased by a third and chemotherapy use increased by more than three-fold, reflecting improvements in the appropriateness and quality of management, but chemotherapy use, in particular, was unequal, both by socioeconomic status and gender. |
| 1. Mannion RJ, Wilby M, Godward S, Lyratzopoulos G, Laing RJ. The surgical management of metastatic spinal disease: prospective assessment and long-term follow-up. *Br J Neurosurg.* 2007;21(6):593-8. [link](http://www.ncbi.nlm.nih.gov/pubmed/18071987) | Acceptable functional outcomes among patients treated surgically for metastatic spinal disease. |
| 1. Lyratzopoulos G, Tyrrell C, Yelloly J, Smith P. Recent trends in liver resection surgery activity and population utilisation rates in English regions. *HPB (Oxford).* 2007;9(4):277-80. [link](http://www.ncbi.nlm.nih.gov/pubmed/18345304) Erratum: Lyratzopoulos, G., Tyrrell, C., Smith, P., Yelloly, J. Recent trends in liver resection surgery activity and population utilization rates in English regions (HPB (2007) vol. 9(4) (277-280). HPB, Volume 10, Issue 6, 2008, Page 508. | Rapid increase in use of liver resection surgery during study years, chiefly to manage metastatic disease but with substantial regional variation in population utilization rates. |
| 1. Lyratzopoulos G, Sheridan GF, Michie HR, McElduff P, Hobbiss JH. Absence of socio-economic variation in survival from colorectal cancer in patients receiving surgical treatment in one health district: Cohort study. *Colorectal Disease.* 2004;6:512-517. [link](http://www.ncbi.nlm.nih.gov/pubmed/15521945) | Survival of patients with colorectal cancer treated in a single healthcare setting (district hospital, Bolton) did not vary by deprivation group |