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## Monitoring the impact of COVID-19 in France on cancer care: a differentiated impact

Christine Le Bihan Benjamin<sup>1</sup>, Julien-Aymeric Simonnet<sup>2</sup>, Mathieu Rocchi<sup>1</sup>, Inès Khati<sup>1</sup>, Estelle Ménard<sup>3</sup>, Emilie Houas-Bernat<sup>2</sup>, Jean-Baptiste Méric<sup>4</sup> & Philippe-Jean Bousquet<sup>3,5</sup>✉

The COVID-19 pandemic has had a substantial and lasting impact on care provision, particularly in the field of cancer care. National steering has helped monitor the health situation and adapt the provision and organisation of care. Based on data from the French administrative healthcare database (SNDS) on the entire French population (67 million people), screening, diagnostic and therapeutic activity was monitored and compared 2019 on a monthly basis. A noteworthy decline in all activities (with the exception of chemotherapy) was observed during the first lockdown in France. Over the months that followed, this activity returned to normal but did not make up for the shortfall from the first lockdown. Finally, during the lockdown in late 2020, cancer care activity was conserved. In brief, in 2020, the number of mammograms decreased by 10% (– 492,500 procedures), digestive endoscopies by 19% (– 648,500), and cancer-related excision by 6% (– 23,000 surgical procedures). Hospital radiotherapy activity was down 3.8% (– 4400 patients) and that in private practice was down 1.4% (– 1600 patients). Chemotherapy activity increased by 2.2% (7200 patients), however. To summarize, COVID-19 had a very substantial impact during the first lockdown. Safeguarding cancer care activity helped limit this impact over the months that followed, but the situation remains uncertain. Further studies on the medium- and long-term impact on individuals (survival, recurrence, after-effects) will be conducted.

Since early 2020, the world has been faced with a pandemic caused by SARS-Cov-2. In terms of health, this has resulted in more or less stringent measures, and restrictions up to and including full lockdown. More precisely, France was under lockdown from 17 March to 11 May 2020, with a travel ban, the closure of so-called non-essential retail and businesses and recreational facilities, and extensive remote working. A second lockdown took place from 28 October to 15 December 2020, which was less restrictive than the first (schools stayed open, and a limited number of businesses continued to operate). Following this lockdown, the entire country was placed under curfew. In March 2021, further measures were gradually introduced to supplement the measures in place, starting with some French departments and then extended throughout the country.

In the field of cancer care, some measures were specifically drafted with in particular a number of guidelines and tools being issued for healthcare professionals by the French Ministry for Health and the French National Cancer Institute (INCa), ranging from adaptation of medical practices in crisis situations, to the resumption of activity, along with the prioritisation of cancer patients for vaccination<sup>1–5</sup> <https://www.e-cancer.fr/Professionnels-de-sante/Coronavirus-COVID-19>. Furthermore, during the first lockdown, invitations for organised screening programmes (breast, colorectal, cervical) were suspended<sup>6</sup>, and a number of treatments directly linked with cancer care deferred (surgery, cancer-related hospitalisation, etc.). Similar initiatives have been adopted in most Western countries, repositioning screening with regard to risks due to COVID-19 and in the aim of adapting the healthcare system<sup>7–9</sup>.

In view of the risk of missing a diagnosis or of prolonging times to treatment for a substantial number of people, the measures in relation to screening were not renewed during subsequent lockdown periods, despite intensive care unit occupancy being on a par with or exceeding usual capacity. Indeed, a number of studies

<sup>1</sup>Health Data and Assessment Department, Survey Data Science and Assessment Division, National Cancer Institute, 52 Avenue André Morizet, 92100 Boulogne-Billancourt, France. <sup>2</sup>Care Paths Organization Department, Public Health Division, National Cancer Institute, 52 Avenue André Morizet, 92100 Boulogne-Billancourt, France. <sup>3</sup>Survey Data Science and Assessment Division, National Cancer Institute, 52 Avenue André Morizet, 92100 Boulogne-Billancourt, France. <sup>4</sup>Public Health Division, National Cancer Institute, 52 Avenue André Morizet, 92100 Boulogne-Billancourt, France. <sup>5</sup>Aix Marseille University, INSERM, IRD, Economics and Social Sciences Applied To Health and Analysis of Medical Information (SESSTIM), 27 Bd Jean Moulin, 13005, Marseille, France. ✉email: [pjbousquet@institutcancer.fr](mailto:pjbousquet@institutcancer.fr)

suggest a reduction in survival associated with increased waiting times to undergo screening<sup>10–12</sup>, diagnosis, or treatment<sup>13–15</sup>. This had led the health authorities to propose new strategies, prioritise cancer patients, and take action in the uncertainty.

In this context, the French National Cancer Institute has set up, with support from the French Ministry for Health, a national steering and monitoring committee in concert with major national and regional stakeholders in cancer care and user representatives. It is organised in a regional structure via local and regional steering committees, helping pass on alerts and important information, and report, on a national level, innovative and exemplary organisations along with issues encountered on a regional level.

The Institute has also developed activity monitoring and steering scorecards aimed at national, regional and local stakeholders. They are intended to monitor prevention, screening, and care activity in hospital and non-hospital settings.

The purpose of this study is to present the cancer care activity monitoring and steering scorecards, estimate the impact of the health crisis due to COVID-19, and present the measures adopted to limit their effects.

## Methodology

**Data source.** Several data sources were used. For non-hospital activity, data from the French administrative healthcare database (SNDS), medico-administrative data covering the entire French population<sup>16</sup> were used. These data are updated on a monthly basis.

For hospital activity, the study relied on activity data recorded by all French hospital facilities (Medicalised information system programme) for all inpatients and outpatients. Since the pandemic, these data have been updated on a weekly basis. Although they are also found in the SNDS, these data are processed on the secure ATIH (French agency for information on hospital management) due to quicker availability.

Three months after the activity completion date, these two data sources are sufficiently exhaustive for processing purposes.

**Data.** Activity monitoring concerns the analysis of medical procedures linked with cancer care for diagnosis, screening, or treatment (excision, chemotherapy, radiotherapy). Lines were selected according to the public health policy in France. For diagnosis, the lines of analysis are upper and lower digestive tract endoscopies, bronchial and ENT endoscopies (fibrosopies), prostate biopsies as per the CCAM (Common classification of medical procedures) list.

For screening, the lines are mammograms under the organised breast cancer screening programme or outside this screening programme, faecal blood screening tests for the organised colorectal cancer screening programme, cytological analyses or human papillomavirus detection for organised cervical screening or outside the organised cervical screening programme as per the different lists concerned (CCAM, NABM – list of medical pathology procedures, and NGAP – general list of professional procedures).

For cancer care-related excisions, the lines of analysis concern the 6 categories of cancer sites for which activity is subject to authorisation<sup>17</sup> and to minimum activity thresholds in France: digestive tract (stomach, liver, pancreas, colorectal), gynaecological (ovarian), breast, chest, urological, and ENT (ear, nose, throat) and maxillofacial cancers (CCAM). Oesophageal cancers are excluded from digestive tract, chest and ENT cancers, and presented separately for a better understanding. Stays with cancer removal surgery are identified by coding cancer as the main diagnosis and a surgical removal procedure. Thus, only histologically confirmed cancers should be counted.

For chemotherapy, the data used were from hospital admissions specifying a primary diagnostic code Z511 (ICD 10 – International Classification of Diseases); and, for radiotherapy, hospital admissions specifying a primary diagnostic code Z5101 (ICD 10), and private practice CCAM radiation procedures.

**Analyses.** Monthly comparisons (number and percent) of care consumption for the years 2019 and 2020 were made to account for seasonal factors in care activity.

**Ethic.** All methods were carried out in accordance with relevant guidelines and regulations. Data were pseudonymized prior to performing analyses. Access to SNDS and PMSI data is subject to authorisation from CNIL (French data protection authority)—decree of 26 December 2016 No. 2016–1871.

## Results

The study covered the entire French population, i.e. 67 million people, sex-ratio 0,93 and mean age 42,1 years.

**Diagnosis, screening (Table 1, Fig. 1).** Diagnostic and screening activity was substantially impacted by the first lockdown.

For digestive tract endoscopies, the shortfall was – 43.6% (– 134,784 procedures) in March, – 82.5% (– 251,353) in April, – 52.5% (– 157,036) in May, – 9.3% (– 26,865) in June, and – 5.1% (– 14,366) in July. Over the full year, a shortfall of – 19.1% (– 648,533) remained.

For mammograms, the shortfall was – 44.9% (– 207,400 procedures) in March, – 85% (– 378,437) in April, – 37.1% (– 164,182) in May. Despite there being no further decreases in activity from June, a shortfall of – 9.6% (– 492,536) remained over the full year.

Similar findings were observed for bronchial and ENT fibrosopies and prostate biopsies. An overall increased in colorectal screening and decrease in cervical screening (HPV test and cytopathology) were observed between 2019 and 2020. (see Table 1 and Fig. 1).

	January	February	March	April	May	June	July	August	September	October	November	December	Total
<b>Digestive tract endoscopies</b>													
2019	308,959	286,816	308,816	304,647	298,963	289,361	284,372	170,407	290,696	318,586	282,356	253,945	3,397,924
2020	308,279	281,211	174,032	53,294	141,927	262,496	270,006	175,477	294,410	289,393	254,132	244,734	2,749,391
2021	279,495	263,955	286,928										830,378
Difference 2019/2020	-680	-5605	-134,784	-251,353	-157,036	-26,865	-14,366	5070	3714	-29,193	-28,224	-9211	-648,533
Percent 2019/2020	-0.2	-2.0	-43.6	-82.5	-52.5	-9.3	-5.1	3.0	1.3	-9.2	-10.0	-3.6	-19.1
Difference 2019/2021	-29,464	-22,861	-21,888										-74,213
Percent 2019-2021	-9.5	-8.0	-7.1										
<b>Bronchial and ENT endoscopies</b>													
2019	107,085	95,901	106,923	103,516	101,351	96,611	98,820	66,621	99,083	106,101	95,484	88,893	1,166,389
2020	104,733	97,579	64,651	28,750	60,831	92,028	85,333	60,821	93,928	87,278	85,568	81,283	942,783
2021	87,914	82,669	94,018										264,601
Difference 2019/2020	-2352	1678	-42,272	-74,766	-40,520	-4583	-13,487	-5800	-5155	-18,823	-9916	-7610	-223,606
Percent 2019/2020	-2.2	1.7	-39.5	-72.2	-40.0	-4.7	-13.6	-8.7	-5.2	-17.7	-10.4	-8.6	-19.2
Difference 2019/2021	-19,171	-13,232	-12,905										-45,308
Percent 2019-2021	-17.9	-13.8	-12.1										
<b>Mammograms</b>													
2019	473,347	421,823	461,522	445,034	442,258	423,883	404,342	284,033	449,133	494,668	445,629	386,486	5,132,158
2020	478,150	437,774	254,122	66,597	278,076	455,482	406,343	316,109	504,807	508,138	495,773	438,251	4,639,622
2021	474,674	445,114	523,430										1,443,218
Difference 2019/2020	4803	15,951	-207,400	-378,437	-164,182	31,599	2001	32,076	55,674	13,470	50,144	51,765	-492,536
Percent 2019/2020	1.0	3.8	-44.9	-85.0	-37.1	7.5	0.5	11.3	12.4	2.7	11.3	13.4	-9.6
Difference 2019/2021	1327	23,291	61,908										86,526
Percent 2019-2021	0.3	5.5	13.4										
<b>Colorectal screening</b>													
2019	212,938	199,831	200,709	160,751	116,359	92,929	72,041	68,759	139,420	225,007	273,084	240,014	2,001,842
2020	293,675	310,605	206,161	12,976	68,865	169,754	212,947	215,809	325,936	353,617	324,902	305,949	2,801,196
2021	288,421	276,819	406,604										971,844
Difference 2019/2020	80,737	110,774	5452	-147,775	-47,494	76,825	140,906	147,050	186,516	128,610	51,818	65,935	799,354
Percent 2019/2020	37.9	55.4	2.7	-91.9	-40.8	82.7	195.6	213.9	133.8	57.2	19.0	27.5	39.9
Difference 2019/2021	75,483	76,988	205,895										358,366
Percent 2019-2021	35.4	38.5	102.6										
<b>Cervix screening (HPV and cytopathology)</b>													
2019	411,678	378,100	416,419	399,230	397,281	377,125	370,493	242,953	398,372	424,446	369,701	337,462	4,523,260
2020	410,798	377,973	252,407	80,142	260,984	433,787	366,413	259,785	430,692	414,737	393,093	342,051	4,022,862
2021	369,688	342,946	360,992										1,073,626
Difference 2019/2020	-880	-127	-164,012	-319,088	-136,297	56,662	-4080	16,832	32,320	-9709	23,392	4589	-500,398
Percent 2019/2020	-0.2	0.0	-39.4	-79.9	-34.3	15.0	-1.1	6.9	8.1	-2.3	6.3	1.4	-11.1
Difference 2019/2021	-41,990	-35,154	-55,427										-132,571
Percent 2019-2021	-10.2	-9.3	-13.3										
<b>Prostatic biopsies</b>													
2019	9562	8447	9075	8810	8675	8247	7826	5120	9099	9004	8102	6853	98,820
2020	10,151	8560	6217	2975	6601	9176	7549	5042	9201	8621	8673	7451	90,217
Continued													

	January	February	March	April	May	June	July	August	September	October	November	December	Total
2021	<b>9390</b>	<b>8251</b>	<b>8989</b>										26,630
<i>Difference 2019/2020</i>	589	113	-2858	-5835	-2074	929	-277	-78	102	-383	571	598	-8603
<i>Percent 2019/2020</i>	6.2	1.3	-31.5	-66.2	-23.9	11.3	-3.5	-1.5	1.1	-4.3	7.0	8.7	-8.7
<i>Difference 2019/2021</i>	-172	-196	-86										-454
<i>Percent 2019-2021</i>	-1.8	-2.3	-0.9										

**Table 1.** Diagnosis and screening. Number of screening and diagnostic acts observed are in [bold]. *HPV* human papilloma viridae.



**Figure 1.** Screening and diagnosis trends. (A) Fibrosopies (ear, nose and throat—ENT and lung). (B) Endoscopies (Digestive track). (C) Mammograms. (D) Prostatic biopsies.

**Surgery (excision) (Table 2).** For all excisions, the reduction in activity was very substantial, primarily in April, in which the whole month was spent under lockdown, in line with surgical activity cancellation directives. As such, for colorectal cancer excision, the shortfall was -28.2% (-902 procedures) in April, -29.7% (-938) in May, -11.0% (-318) in June, -12.2% (-421) in July, and -1.6% (-42) in August. For breast cancer, the greatest decrease was in May, -38.0% (-2604 procedures). The cumulative shortfall over the year came to 3505 surgical procedures, i.e. -4.5% despite greater activity in 2020 in the last months of the year.

For other cancer types, impacts on cancer excision are reported in Table 2.

**Chemotherapy (Table 3).** The number of chemotherapy sessions was slightly up in January, February and March (+1.6%, 3,829 sessions/admissions), down -7.7% (-19,903) in April, and -11.3% (-29,143) in May, and subsequently fluctuated depending on the month. The number of patients treated over the year increased by 2.2% (+7,187).

**Radiotherapy (Table 3).** The number of patients receiving radiotherapy treatment dropped considerably both in the hospital sector and in private practice in April (-16.7%, -3091 patients, and -10.4%, -1797, respectively) and in May (-15.7%, -2849 and 9.9%, -1695), and subsequently fluctuated depending on the month. Over the year, the decrease was 3.8% (-4378 patients) in the hospital sector, and -1.5% (-1595) in private practice.

	January	February	March	April	May	June	July	August	September	October	November	December	Total
<b>Oesophagus</b>													
2019	67	90	99	111	108	107	124	93	81	115	90	125	1210
2020	89	83	99	65	65	97	121	66	81	95	87	90	1038
2021	83	80	91										254
<i>Difference 2019/2020</i>	22	-7	0	-46	-43	-10	-3	-27	0	-20	-3	-35	-172
<i>percent 2019/2020</i>	32.8	-7.8	0.0	-41.4	-39.8	-9.3	-2.4	-29.0	0.0	-17.4	-3.3	-28.0	-14.2
<i>Difference 2019/2021</i>	16	-10	-8										-2
<i>Percent 2019/2021</i>	23.9	-11.1	-8.1										
<b>Stomach</b>													
2019	252	254	297	270	262	266	296	216	248	312	270	270	3213
2020	244	271	276	193	217	266	278	173	204	261	253	283	2919
2021	232	224	231										687
<i>Difference 2019/2020</i>	-8	17	-21	-77	-45	0	-18	-43	-44	-51	-17	13	-294
<i>Percent 2019/2020</i>	-3.2	6.7	-7.1	-28.5	-17.2	0.0	-6.1	-19.9	-17.7	-16.3	-6.3	4.8	-9.2
<i>Difference 2019/2021</i>	-20	-30	-66										-116
<i>Percent 2019/2021</i>	-7.9	-11.8	-22.2										
<b>Liver</b>													
2019	544	595	654	618	585	618	605	422	576	667	545	564	6993
2020	517	576	628	450	478	583	577	424	523	596	546	610	6508
2021	502	562	601										1665
<i>Difference 2019/2020</i>	-27	-19	-26	-168	-107	-35	-28	2	-53	-71	1	46	-485
<i>Percent 2019/2020</i>	-5.0	-3.2	-4.0	-27.2	-18.3	-5.7	-4.6	0.5	-9.2	-10.6	0.2	8.2	-6.9
<i>Difference 2019/2021</i>	-42	-33	-53										-128
<i>Percent 2019/2021</i>	-7.7	-5.5	-8.1										
<b>Pancreas</b>													
2019	280	337	364	381	323	305	371	294	275	347	300	397	3974
2020	308	329	355	248	256	333	389	258	300	362	301	371	3810
2021	265	366	345										976
<i>Difference 2019/2020</i>	28	-8	-9	-133	-67	28	18	-36	25	15	1	-26	-164
<i>Percent 2019/2020</i>	10.0	-2.4	-2.5	-34.9	-20.7	9.2	4.9	-12.2	9.1	4.3	0.3	-6.5	-4.1
<i>Difference 2019/2021</i>	-15	29	-19										-5
<i>Percent 2019/2021</i>	-5.4	8.6	-5.2										
<b>Colon – Rectum</b>													
2019	2645	2907	3139	3200	3163	2898	3453	2571	2624	3097	2732	3018	35,447
2020	2509	2794	3344	2298	2225	2580	3032	2529	2672	2912	2839	3138	32,872
2021	2558	2692	2961										8211
<i>difference 2019/2020</i>	-136	-113	205	-902	-938	-318	-421	-42	48	-185	107	120	-2575
<i>percent 2019/2020</i>	-5.1	-3.9	6.5	-28.2	-29.7	-11.0	-12.2	-1.6	1.8	-6.0	3.9	4.0	-7.3
<i>difference 2019/2021</i>	-87	-215	-178										-480
<i>percent 2019/2021</i>	-3.3	-7.4	-5.7										
<b>ENT + Maxillofacial</b>													
2019	1968	1836	2109	1956	2069	1896	2062	1545	1908	2071	2002	2026	23,448
2020	2040	1915	1938	1402	1538	1683	1813	1469	1913	1916	1872	1903	21,402
2021	1865	1811	1883										5559
<i>Difference 2019/2020</i>	72	79	-171	-554	-531	-213	-249	-76	5	-155	-130	-123	-2046
<i>Percent 2019/2020</i>	3.7	4.3	-8.1	-28.3	-25.7	-11.2	-12.1	-4.9	0.3	-7.5	-6.5	-6.1	-8.7
<i>Difference 2019/2021</i>	-103	-25	-226										-354
<i>Percent 2019/2021</i>	-5.2	-1.4	-10.7										
<b>Thorax (chest)</b>													
2019	1290	1332	1554	1448	1562	1385	1536	1029	1426	1531	1320	1303	16,716
2020	1355	1396	1465	1033	1278	1310	1270	1048	1380	1490	1406	1471	15,902
2021	1342	1411	1452										4205
<i>Difference 2019/2020</i>	65	64	-89	-415	-284	-75	-266	19	-46	-41	86	168	-814
<i>Percent 2019/2020</i>	5.0	4.8	-5.7	-28.7	-18.2	-5.4	-17.3	1.8	-3.2	-2.7	6.5	12.9	-4.9
<i>Difference 2019/2021</i>	52	79	-102										29
<i>Percent 2019/2021</i>	4.0	5.9	-6.6										
Continued													

	January	February	March	April	May	June	July	August	September	October	November	December	Total
<b>Breast</b>													
2019	7036	6178	7025	6314	6845	6551	7103	5261	6270	6645	6309	6162	77,699
2020	7203	6278	7150	5513	4241	5023	6343	5144	6712	6637	6977	6973	74,194
2021	7204	6555	7022										20,781
<i>Difference 2019/2020</i>	167	100	125	-801	-2604	-1528	-760	-117	442	-8	668	811	-3505
<i>Percent 2019/2020</i>	2.4	1.6	1.8	-12.7	-38.0	-23.3	-10.7	-2.2	7.0	-0.1	10.6	13.2	-4.5
<i>Difference 2019/2021</i>	168	377	-3										542
<i>Percent 2019/2021</i>	2.4	6.1	0.0										
<b>Ovary</b>													
2019	609	631	727	626	672	635	714	484	664	723	626	662	7773
2020	593	642	691	492	549	686	708	576	668	675	644	684	7608
2021	598	671	662										1931
<i>Difference 2019/2020</i>	-16	11	-36	-134	-123	51	-6	92	4	-48	18	22	-165
<i>Percent 2019/2020</i>	-2.6	1.7	-5.0	-21.4	-18.3	8.0	-0.8	19.0	0.6	-6.6	2.9	3.3	-2.1
<i>Difference 2019/2021</i>	-11	40	-65										-36
<i>Percent 2019/2021</i>	-1.8	6.3	-8.9										
<b>Urology</b>													
2019	3411	3474	3902	3527	3692	3539	3575	2217	3575	3894	3259	3348	41,413
2020	3594	3575	3546	2644	3408	3520	3147	2088	3449	3646	3689	3622	39,928
2021	3571	3616	3588										10,775
<i>Difference 2019/2020</i>	183	101	-356	-883	-284	-19	-428	-129	-126	-248	430	274	-1485
<i>Percent 2019/2020</i>	5.4	2.9	-9.1	-25.0	-7.7	-0.5	-12.0	-5.8	-3.5	-6.4	13.2	8.2	-3.6
<i>Difference 2019/2021</i>	160	142	-314										-12
<i>Percent 2019/2021</i>	4.7	4.1	-8.0										
<b>Overall</b>													
2019	32,190	29,650	33,569	30,649	32,358	30,822	32,679	22,249	31,100	33,330	30,707	29,571	368,874
2020	33,000	30,679	30,127	20,370	23,671	28,733	30,346	21,996	31,896	31,456	32,246	31,207	345,727
2021	31,276	29,421	30,906										91,603
<i>Difference 2019/2020</i>	810	1029	-3442	-10,279	-8687	-2089	-2333	-253	796	-1874	1539	1636	-23,147
<i>Percent 2019/2020</i>	2.5	3.5	-10.3	-33.5	-26.8	-6.8	-7.1	-1.1	2.6	-5.6	5.0	5.5	-6.3
<i>Difference 2019/2021</i>	-914	-229	-2663										-3806
<i>Percent 2019/2021</i>	-2.8	-0.8	-7.9										

**Table 2.** Surgery (excision). Number of excisions observed are in [bold].

## Discussion

Regardless of the type of activity (diagnosis, screening and excision), the impact of the first lockdown is roughly the same: a shortfall in March, which worsened in April, partial recovery in May. The activity in the months following the easing of lockdown restrictions failed to bridge the gap observed, with activity reaching a similar level to the previous year.

Over the last months of the year, greater activity was observed in 2020 for mammograms, prostate biopsies, and excisions as a whole. Nevertheless, for oesophageal cancers and ENT cancers, the activity remained lower in 2020 compared to 2019 even at year end. Unlike the first lockdown, the restrictions applied from the end of October 2020 were not associated with a significant decrease in activity, suggesting a safeguarding of cancer care activity and the application of the guidelines issued following the first lockdown.

As such, over 2020, a substantial shortfall in activity remains, in terms of diagnosis, screening, and excisions. For the organised colorectal cancer screening programme, the results are deceptive, as the slight difference needs to be put into perspective with the disruptions in the supply of tests in 2019.

The main strength of this study is that it allowed regular monitoring of the health situation in cancer care based on exhaustive data, relating to prevention, screening, diagnosis, and care. The SNDS contains data from non-hospital settings and hospital data for the entire population. Although this medico-administrative database contains no clinical data, it enables effective monitoring of care activity. A further advantage of this study is that it covered a population of 67 million inhabitants, and included all patients regardless of their social or economic status or insurance scheme. Due to its exhaustive nature, it made it possible to monitor the health impact of the different lockdown periods, and of the different measures following the first lockdown and applied during subsequent months.

A number of lessons can be taken from these scorecards. During the first lockdown in March 2020, a substantial decline in activity as a whole was observed, both for the diagnostic and treatment activity. In the case of the latter, a lag occurred with a slight decrease in activity during March, but a later recovery came in June after the lockdown was lifted in May. This particularly reflects the impact of the health crisis on scheduled activity

	January	February	March	April	May	June	July	August	September	October	November	December	Total
<b>Chemotherapy – Stay and session</b>													
2019	261,746	232,029	246,942	260,052	257,065	232,361	268,008	251,344	245,514	277,457	240,063	248,137	3,020,718
2020	269,722	240,690	250,771	240,149	227,922	251,182	262,722	239,286	257,318	260,488	252,180	272,040	3,024,470
2021	251,887	246,226	278,241										776,354
Difference 2019/2020	7976	8661	3829	-19,903	-29,143	18,821	-5286	-12,058	11,804	-16,969	12,117	23,903	3752
Percent 2019/2020	3.0	3.7	1.6	-7.7	-11.3	8.1	-2.0	-4.8	4.8	-6.1	5.0	9.6	0.12
Difference 2019/2021	-9859	14,197	31,299										-
Percent 2019-2021	-3.8	6.1	12.7										-
<b>Chemotherapy – Persons</b>													
2019	130,222	126,275	129,884	131,058	130,385	127,105	132,862	129,612	130,700	134,232	130,891	130,016	323,394
2020	135,370	132,347	133,626	125,052	128,920	132,364	134,565	131,316	135,563	137,184	137,370	139,049	330,581
2021	139,452	138,822	141,513										186,927
Difference 2019/2020	5148	6072	3742	-6006	-1465	5259	1703	1704	4863	2952	6479	9033	7187
Percent 2019/2020	4.0	4.8	2.9	-4.6	-1.1	4.1	1.3	1.3	3.7	2.2	4.9	6.9	2.22
Difference 2019/2021	9230	12,547	11,629										-
Percent 2019-2021	7.1	9.9	9.0										-
<b>Radiotherapy – Inpatients</b>													
2019	18,251	17,825	18,393	18,511	18,202	17,556	19,271	17,947	17,795	19,074	17,334	17,182	114,930
2020	18,115	17,549	17,576	15,420	15,353	17,652	17,805	15,730	16,440	16,990	16,603	16,922	110,552
2021	17,012	17,504	18,775										36,250
Difference 2019/2020	-136	-276	-817	-3091	-2849	96	-1466	-2217	-1355	-2084	-731	-260	-4378
Percent 2019/2020	-0.7	-1.5	-4.4	-16.7	-15.7	0.5	-7.6	-12.4	-7.6	-10.9	-4.2	-1.5	-3.8
Difference 2019/2021	-1239	-321	382										-
Percent 2019-2021	-6.8	-1.8	2.1										-
<b>Radiotherapy – outpatients</b>													
2019	17,944	16,652	17,340	17,308	17,105	16,563	18,352	15,967	16,567	17,780	16,191	16,678	108,979
2020	17,665	16,743	16,829	15,511	15,410	17,143	16,763	14,943	16,173	16,929	16,360	16,956	107,384
2021	16,410	15,622	15,001										32,161
Difference 2019/2020	-279	91	-511	-1797	-1695	580	-1589	-1024	-394	-851	169	278	-1595
Percent 2019/2020	-1.6	0.5	-2.9	-10.4	-9.9	3.5	-8.7	-6.4	-2.4	-4.8	1.0	1.7	-1.5
Difference 2019/2021	-1534	-1030	-2339										-
Percent 2019-2021	-8.5	-6.2	-13.5										-

**Table 3.** Chemotherapy and radiotherapy activities. Numbers of persons, stays and sessions observed are in [bold].

(particularly surgical activity). Furthermore, the shortfall in activity was not bridged in the months that followed the lifting of the lockdown. A further lesson relates to the lockdown initiated in November 2020. Unlike the first lockdown, the directives given to safeguard diagnostic and therapeutic activities in cancer care appear to have been followed, thus limiting the impact of this further lockdown period.

The impact of the health crisis is observed in many countries. For example, in the USA, several studies on medico-administrative databases report decreases of over 75% in breast, colorectal and cervical cancer screening activity during lockdown<sup>12,18,19</sup>. Similar findings are observed in Europe, with treatment-related activity also being impacted, with changes in practices and times to complete treatments<sup>20-25</sup>.

One limitation stems from the three-month time-frame for obtaining data, but scorecard processing is nonetheless not affected. Indeed, even though the aim is to enable accurate steering of the health crisis, these scorecards provide a good overview of the situation. This limitation is explained by the need to obtain exhaustive data. In the context of COVID-19, it is necessary to have daily monitoring of all hospitalisations due to COVID-19 in order to adapt health measures on a day-by-day basis. As regards cancer care activity monitoring, it is necessary to differentiate between a decrease in activity due to underreporting (lack of exhaustive data) and an actual decrease in activity. Furthermore, the measures adopted by the authorities on a national and local level and by

healthcare professionals are measures to be applied over subsequent weeks or even months and do not require day-to-day steering.

Following on from these scorecards, further processing may be conducted to study the impact on a department or regional level. This could be compared to the spread of the virus in these areas. Besides these scorecards which do not allow monitoring of diagnostic and treatment activity for each individual, it would be beneficial to conduct follow-up studies on cancer patients' care pathways. It will then be possible to estimate times to treatment, the potential transfer of activity particularly from surgery to chemotherapy and hormone therapy, or the forgoing of care. The number of chemotherapy inpatients is slightly higher in 2020, and there may be a carryover to oral therapies in non-hospital settings. The number of patients treated with radiotherapy is also lower, suggesting that the decrease in the number of sessions is not only due to the higher frequency of hypofractionated regimens. Follow-up studies will also help assess the impact of the current health crisis on recurrence and survival rates.

The primary causes identified during the first wave are the closure of so-called "non-emergency" medical activities, and low uptake of care, whether from primary care professionals or from cancer care professionals. According to a study by the Observatory on non-uptake of social rights and public services (Odenore) and the French national health insurance fund<sup>26</sup>, 60% of those surveyed report having decided not to receive one care that they needed at least once during the first lockdown. Similarly, 50% are of the view that not receiving care worsened their health problems.

It is difficult to obtain an accurate idea of the proportion attributable to these different causes of a shortfall in activity during the first wave and over time. Nevertheless, besides the waiting lists generated by the reduction in activity, non-uptake of care is likely to continue despite increased screening, diagnostic, and treatment capacities.

## Conclusion

Monitoring cancer care activity using SNDS data makes it possible to assess the impact of COVID-19 and the resulting health measures, particularly in the field of cancer care. The impact was greater in the first lockdown; however, despite the health measures adopted, the gap in activity does not appear to have been bridged. In some time, further studies will make it possible to assess the impact of COVID-19 not only on care pathways, recurrence, after-effects, and survival, but also on the forgoing of care.

## Data availability

According to the European general data privacy regulation, an interested party interested in accessing data has to obtain an authorization from the French national ethic committee (CESREES) and the Cnil (French data protection authority) (contact: French national cancer institute).

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## Author contributions

C.L.B.B.: conceptualization, methodology, writing, supervision M.R.: software, data curation, review I.K.: software, data curation, review E.M.: software, data curation, review J.A.S.: validation, review E.H.B.: validation, review J.B.M.: validation, review P.J.B.: conceptualization, methodology, writing, supervision.

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## Competing interests

The authors declare no competing interests.

## Additional information

**Correspondence** and requests for materials should be addressed to P.-J.B.

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