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New cancer cases at the time of SARS-Cov2 pandemic

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A persistent and concerning decrease long after the end of national lockdown

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Abstract

Introduction: The dissemination of SARS-Cov2 may have delayed the diagnosis of new cancers. This study aimed at assessing the number of new cancers during and after the lockdown.

Methods: We collected prospectively the clinical data of the 11.4 million of patients referred to the Assistance Publique Hôpitaux de Paris Teaching Hospital. We identified new cancer cases between January 1st 2018 and September 31st 2020, and compared indicators for 2018 and 2019 to 2020 with a focus on the French lockdown (March 17th to May 11th, 2020), across cancer types and patient age classes.

Results: Between January and September, 28,348, 27,272 and 23,734 new cancer cases were identified in 2018, 2019 and 2020, respectively. The monthly median number of new cases reached 3,168 (interquartile range, IQR, 3,027; 3,282), 3,054 (IQR 2,945; 3,127) and 2,723 (IQR 2,085; 2,2,863) in 2018, 2019 and 2020, respectively. From March 1st to May 31st, new cancer decreased by 30% in 2020 compared to the 2018-19 average; then by 9% from June 1st to September 31st. This evolution was consistent across all tumor types: -30% and -9% for colon, -27% and -6% for lung, -29% and -14% for breast, -33% and -12% for prostate cancers, respectively. For patients aged < 70 years, the decrease of colorectal and breast new cancers in April between 2018-2019 average and 2020 reached 41 % and 39%, respectively.

Conclusion: The SARS-Cov2 pandemic led to a substantial decrease of new cancer cases. Delays in cancer diagnoses may affect clinical outcomes in the coming years.

Keywords (MeSH terms): incidence, early detection of cancer, health policy, COVID-19

Introduction

The SARS-Cov2 pandemic led to specific health policies aiming at reducing both its dissemination and hospital crowding. Among them, lockdowns occurred worldwide, and from March 17th to May 12th, 2020 in France. Health services adapted to the health situation, in order to avoid contaminations. For example, specialized health care centers adopted triage strategies for patients with acute organ dysfunctions (1). As a result, in the US, cardiac catheterization for STEMI dropped by 38% during the outbreak, revealing a loss of opportunity for severe conditions due to pandemic-related health policy (2). In Paris area, the activity of interventional cardiology fell by 60% in April 2020 compared to April 2019 (unpublished data of Greater Paris University Hospital). Cancer screening was also affected. Cancer societies such as the American Society of Clinical Oncology asked to postpone any cancer screening procedures during the outbreak (3). On April 2nd, the French National Institute of Cancer (INCa) decided to interrupt the national cancer screening programs (4). Outpatient visits were also considerably reduced. In France, general practitioners' as well as specialists' consultations dropped by 40% and 50%, respectively, during the first month of lockdown (5). The number of cancer diagnostic procedures dropped significantly during the lockdown in France, with the use of consumables such as iodinated contrasts for CT-scan, Gadolinium contrasts for RMN and laxative liquids for colonoscopy preparation decreasing by 500,000 (up to -72%), 280,000 (up to -72%) and 250,000 (up to -86%), respectively, between March 16th and September 13th, 2020 (6). Reduced patient encounters and diagnostic procedures, postponed screening procedures may explain a drop in new cancer cases during and after the outbreak. This would mean that patients with a new cancer are seen later, and can therefore potentially suffer from a delay in the start of their treatment. Therefore, it is important to assess the importance of such drop, as treatment delays can dramatically impact the prognosis of patients with cancer (7)(8).

This study aimed at assessing the impact of the pandemic and related French public health policies on the number of new cancer cases, across each type of cancer and main class ages, in Paris and suburb area, during and after the national lockdown.

Methods

The Greater Paris University Hospital (Assistance Publique Hôpitaux de Paris, AP HP) is an organization comprising 39 specialized health care centers in Paris and suburb area. Since 2015, AP-HP deployed a clinical data warehouse (CDW) based on the Informatics for Integrating Biology and the Bedside (i2b2) open-source software. This CDW prospectively collects from the hospital information system structured data (data directly reusable for further analysis, e.g. demographics, diagnosis codes, procedures, drug prescriptions, laboratory test results...) and unstructured data (i.e. data that need to be transformed before secondary use, including, but not limited to data stored in free-text format such as radiology reports or discharge summaries). These data are refreshed daily (9), and the CDW presently contains medical data of 11.4 million of patients.

In the present study we used more specifically the AP HP administrative data used for the national hospital reporting system (PMSI – Programme de Medicalisation des Systemes d'Information), a system based on diagnosis-related groups (DRGs). A PMSI record contains, for each patient's hospital stay, diagnoses (coded using International Classification of Diseases 10th revision (ICD-10)), procedures (coded using the Classification Commune des Actes Medicaux (CCAM), age, gender and place of residence. The hospital stay is described by the following variables: diagnostic-related group, length of stay, type of admission and discharge (home, referral, death), month and year of discharge and additional information about specific wards (e.g. intensive care unit) attended.

Patients with cancer were selected using a list of the ICD-10 codes related to cancer diagnosis: C00 to D48, excluding benign tumors (D10 – D36) (10) (Supplementary Table 1). A patient was considered to have a newly diagnosed cancer if having a cancer-related ICD code and no cancer-related ICD code in the discharge summary recorded within the 2 previous years . We therefore counted cancer cases rather than patients, i.e. a patient with two primitive cancers during the study period was recorded twice, once for each cancer. We assessed the monthly number of new cancer cases for all types of cancer and for each cancer type, and for three patient age classes: <70 years, 70 – 84 years, and 85

years and older. We also assessed the number of *in situ* tumor cases: D00 to D09 (10) (Supplementary Table 1).

We compared the monthly number of cancers recorded in 2020 with those recorded in 2018 and in 2019 and with the average number recorded between 2018 and 2019. We performed aggregated comparisons between the 3-month periods corresponding to the French lockdown (March 1st to May 31st, 2020) and the post- lockdown (June 1st to September 31st, 2020).

Results

Characteristics of the patient population

Between January and September, 28,348, 27,272 and 23,734 patients with a new cancer were referred to the AP HP greater Paris University Hospital in 2018, 2019 and 2020, respectively. Table 1 summarizes the characteristics of the patient population between 2018 and 2020.

Number of new cases for all tumor types over time

The evolution of the monthly number of overall new cancer cases over time is summarized in Figure 1. The related figures can be found in Table 2. Between January and September, the monthly median number of new cancer cases reached 3,168 (interquartile range, IQR, 3,027; 3,282), 3,054 (IQR 2,945; 3,127) and 2,723 (IQR 2,085; 2,863). During the French national lockdown period (i.e., from March to May 2020), compared to the 2 previous years, the median number of new cases dropped: by 30% in 2020 compared to the average of 2018-2019. In April 2020, the decrease reached 43 % compared to April 2018 and April 2019. During the four months following the lockdown (i.e., from June to September 2020), the median number of new cases remained 9% lower than that recorded during the same period for the average of 2018-2019. In September 2020, the number of new cancer cases remained 3% and 4% lower than that recorded in September 2018 and September 2019, respectively.

Number of new cases across cancer types

Figure 2a summarizes the evolution of the monthly number of new breast, colorectal, prostate and lung cancer cases between 2018 and 2020. Table 3 displays the figures across all tumor subtypes from March to May (during the lockdown) and from June to September (after the lockdown) for 2018, 2019 and 2020. Full monthly data for each cancer subtype are provided in Supplementary Table 2.

The decrease in new cancer cases was consistent across all tumor types, and has continued after the lockdown: -30% and -9% for colon, -27% and -6% for lung, -29% and -14% for breast, -33% and -12% for prostate cancers, respectively, from March to May and from June to September 2020 compared to the 2018-2019 average, respectively. Similar decrease patterns were found for poor prognosis tumors: -34% and -16% for pancreatic, -30% and -17% for bladder, -32% and -7% for central nervous system and -29% and -9% for liver cancers, respectively.

Number of new cases across age classes

Figure 2b summarizes the consistent evolution of the monthly number of new cancer cases between 2018 and 2020 across patient age classes: < 70 years; 70 to 84 years; 85 years and over. Full monthly data per age class for each cancer subtype are provided in Supplementary Table 2. In April 2020, the new cases fell by 42%, 45% and 43% in patients aged < 70 years, 70 to 84 years, 85 years and older, respectively, compared to the April 2018-2019 average. Colorectal and breast cancer diagnoses are partially related to national screening programs that were interrupted during the lockdown. For patients aged less than 70 years, the decrease of colorectal and breast new cancer cases in April between 2018-2019 average and 2020 reached 41% and 39%, respectively (Supplementary Table 2).

Discussion

Public health policies applied for the SARS-Cov2 pandemic led to a substantial drop in new cancer cases in the Paris area. New cases were still lower than expected in September, showing that the situation had not come back to normal even after the lockdown was lifted. These results suggest a delay in new diagnoses and treatment of cancer cases.

Our results are in line with the published literature. In the Netherlands, the number of cancer diagnoses fell by 25% for cancers other than skin cancers, and by 60% for skin cancers (excluding basal cell carcinomas) after “social distancing” policies were implemented (11). A cross-sectional American study showed that the weekly incidence of six main types of cancer fell by 46% during the pandemic crisis compared to baseline (12). This decrease is consistent with other studies and reached 52% and 49% for breast and colorectal cancers, respectively (13). An English survey showed a 76%-decrease in urgent cancer referrals for early diagnosis across 8 tertiary care centers, during the crisis (14). An Italian study had reported a decrease in oral cancer screening during the 1st lockdown (15). Similarly, an American multicentric observational study concluded that the incidence of new cancers had been divided by 2 between April 2019 and April 2020 across a 28-million patient population (16). In this study, the drop of cancer incidence was higher for breast, prostate cancers, and melanoma. Screening for breast and colorectal cancers had decreased by 89% and 85%, respectively. An Italian survey concluded that the incidence of neuroendocrine neoplasia (NEN) decreased by 77% during the national lockdown (17).

This is the first study to assess the impact of the SARS-Cov2 outbreak on the number of new cancer cases of all tumour types across the main age classes during and after a national lockdown. Our results are based on administrative databases and should therefore be interpreted with caution, as this kind

of epidemiologic studies carries a risk of internal biases (18). However, since filling the medical record is mandatory for financing reasons, the probability of bias on the number of cases recorded is low. We will link our results with the national administrative database in order to neutralise false positive cases. Further studies are planned to exploit the content of patients' electronic health records and mitigate these risks of bias.

Our study results confirm the *distraction effect* induced by the SARS-Cov2 outbreak on the management of cancer patients (19). The pandemic may induce subtle unintended consequences such as psychological stress and social isolation, decrease in care provision for life-threatening conditions, economic and logistic disruptions in drug administrations. In a French study performed on 125,000 healthcare professional practices, patients reported that fear of contamination (38%), reluctance to unduly disturb a physician in the middle of a crisis (28%) and closed medical practices (17%) were the main reason for not seeking medical attention (20). In a context of reduced healthcare resources, efforts should be balanced between the acute threat of virus dissemination and the longer-term clinical issues related to severe diseases, such as cancer. Delaying tumor diagnosis might prevent curable tumors to be treated effectively and impair significantly patient clinical outcomes (21)(22). Through a statistical model, Lai et al. estimated that this insufficient care could lead to an excess of 6,270 and 33,890 deaths at one year in incident cancer English and American patients, respectively (23). Another model English study evaluated that the 5-year additional cancer-related deaths due to the pandemic would reach 3,500 for 4 main cancer types (24). International cancer societies urge cancer patients to come back to clinics, while SARS-Cov2 keeps on disseminating through subsequent waves (25). Anticipating a loss of opportunity for cancer patients, many scientific communities published guidelines related to cancer care during the pandemic (26)(27)(28). General practitioners have advocated for a timely diagnosis of symptomatic cancer (29). National cancer screening programs should go on while claiming patient safety regarding risk of virus contamination in order to address the

backlog within usual cancer screening programs (30). Innovative, non-invasive, resilient to scarce resources screening procedures should be developed and deployed (31). In an American survey of 3,055 cancer patients and survivors, half of them reported some impact of the pandemic on their health care and 27% of actively-treated patients expressed some delay to their treatment (32).

Conclusion

The SARS-Cov2 pandemic and related public health policies led to a significant decrease in the hospital visits of new patients with cancer in France. Stakeholders should pay attention to this issue during the next pandemic waves in order to avoid an excess in cancer-related deaths over the coming years. Further studies to analyse data from the second wave and the associated lockdown are warranted, as well as the assessment of the clinical prognostic impact of cancer diagnosis delays.

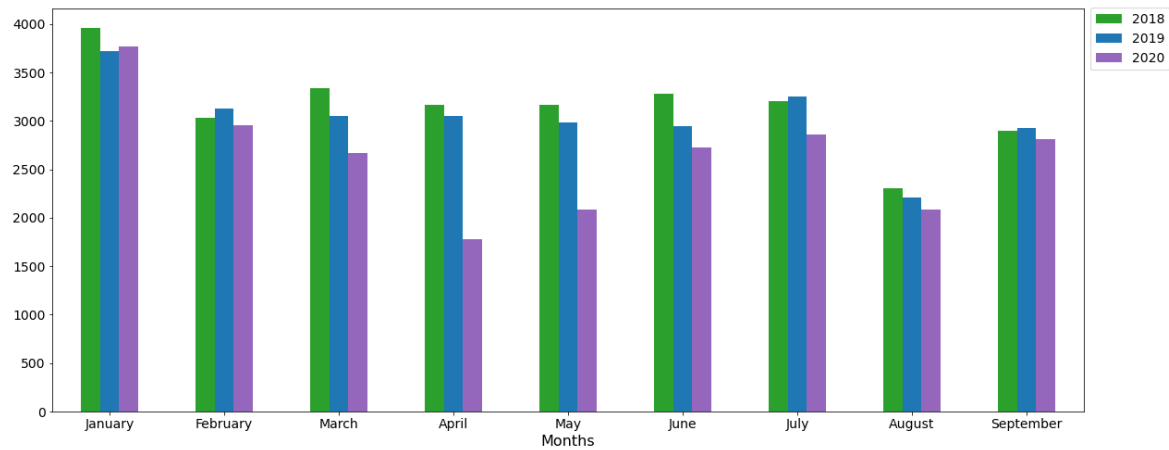


Figure 1. Evolution of the monthly number of new cancer cases of any type over time in 2018, 2019 and 2020 in the Assitance Publique Hopitaux de Paris Teaching hospital

Difference decrease (%)

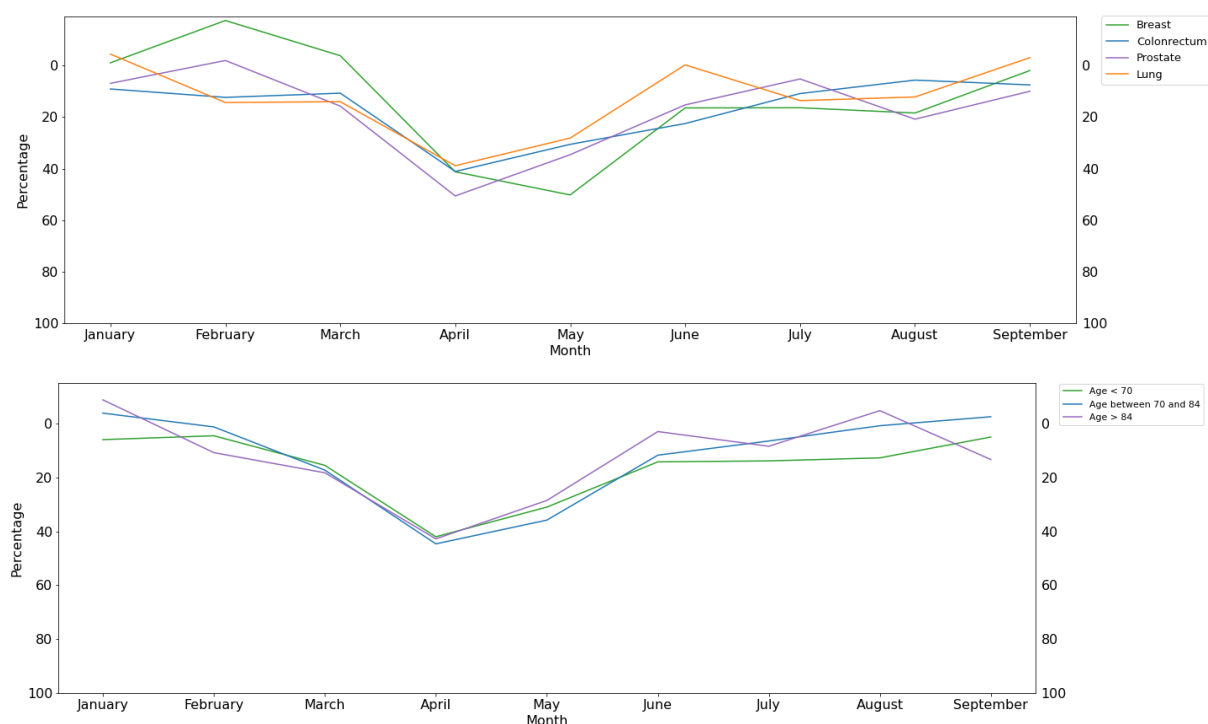


Figure 2. Difference (%) in the monthly number of new cancer cases between 2020 and the average of 2018-2019 in the Assistance Publique Hopitaux de Paris Teaching Hospital

Fig 2.a: according to main cancer type (breast, colorectal, prostate, lung cancer)

Fig 2.b: according to the patient's age class (< 70 yrs.; 70 to 84 yrs.; 85 yrs. and over)

Table 1. Characteristics of the patient population, between January and September each year

Year	2018	2019	2020
Number of new cancer cases	28,348	27,272	23,734
Number of patients with at least one cancer diagnosis	26,583	24,901	21,182
Number of patients with at least two cancer diagnoses	2,847	1,941	1,159
Age, median (IQR) (years)	65 (54 - 75)	66 (54 - 75)	66 (54 - 75)
Female gender, n (%)	13,098 (46%)	12,593 (46%)	10,980 (46%)

IQR: interquartile range

Table 2. Number of new cancer cases of any type in 2018, 2019 and 2020 in the AP HP hospitals

Including <i>in situ</i> tumors	Number of new cancer cases			Between-year difference (%) 2020	
	2018	2019	2020	vs. 2018	2020 vs. 2019
Median monthly number of new cases (IQR)	3,168 (3,027 – 3,282)	3,054 (2,945 – 3,127)	2,723 (2,085 – 2,863)		
January	3,961	3,723	3,772	-5	1
February	3,027	3,127	2,952	-2	-6
March	3,333	3,054	2,672	-20	-13
April	3,168	3,055	1,776	-44	-42
May	3,166	2,984	2,082	-34	-30
June	3,282	2,945	2,723	-17	-8
July	3,205	3,248	2,863	-11	-12
August	2,307	2,211	2,085	-10	-6
September	2,899	2,925	2,809	-3	-4
<i>In situ</i> tumor cases solely					
Median monthly number of new cases (IQR)	27 (26 - 29)	41 (28 - 44)	19 (17 - 23)		
January	29	45	23	-21	-49
February	26	45	26	0	-42
March	30	44	17	-43	-61
April	29	28	19	-34	-32
May	42	33	17	-60	-48
June	27	41	18	-33	-56
July	27	42	22	-19	-48
August	16	17	16	0	-6
September	25	19	24	-4	26

iQR: interquartile range

Table 3. Number of new cancer cases (any type) during and after the French lockdown period in 2018, 2019 and 2020 in the AP HP hospitals

	From March 1st to May 31st				From June 1st to September 31st			
	Number of new cancer cases			Difference between 2020 and the 2018- 2019 average (%)	Number of new cancer cases			Decrease between 2020 and the 2018- 2019 average (%)
	2018	2019	2020		2018	2019	2020	
Overall	9,667	9,093	6,530	-30	11,693	11,329	10,480	-9
Colon	563	539	388	-30	738	648	629	-9
Rectum	210	209	167	-20	317	294	249	-18
Oesophagus	118	98	61	-44	126	127	99	-22
Gastric	185	168	111	-37	192	208	175	-13
Pancreas	375	340	235	-34	517	464	410	-16
Biliary duct	126	127	73	-42	173	173	119	-31
Bowel	74	77	38	-50	72	88	62	-23
Anus	45	31	35	-8	49	48	51	5
Liver	450	398	303	-29	513	522	469	-9
Digestive other	135	115	53	-58	124	183	116	-24
Endometrium	126	111	97	-18	143	140	143	1
Cervix	96	75	68	-20	103	91	96	-1
Ovary	119	130	117	-6	164	169	157	-6
Breast	792	638	507	-29	896	844	752	-14
Gynecology other	35	29	25	-22	45	48	39	-16
Lung	828	829	602	-27	1,047	949	939	-6
Mesothelioma	23	29	25	-4	27	19	26	13
Pneumo other	46	63	36	-34	57	65	59	-3
Head & neck	353	257	221	-28	409	385	321	-19

	From March 1st to May 31st				From June 1st to September 31st			
	Number of new cancer cases			Difference between 2020 and the 2018- 2019 average (%)	Number of new cancer cases			Decrease between 2020 and the 2018- 2019 average (%)
	2018	2019	2020		2018	2019	2020	
Eye	6	3	9	100	8	9	7	-18
CNS	500	430	317	-32	598	538	531	-7
PNS	4	15	3	-68	26	12	13	-32
Soft tissue	134	118	107	-15	164	141	131	-14
Osteosarcoma	132	111	94	-23	158	135	157	7
Myeloma	230	231	201	-13	286	315	318	6
Hodgkin lymphoma	110	95	94	-8	118	122	113	-6
Nonhodgkin lymphoma	510	465	363	-26	556	617	581	-1
Leukemia	339	338	258	-24	425	409	426	2
Other hematologic malignancies	378	370	217	-42	464	485	417	-12
Prostate	503	498	335	-33	664	576	544	-12
Testis	44	35	29	-27	62	48	45	-18
Kidney	301	291	195	-34	320	375	336	-3
Bladder	399	388	275	-30	493	487	407	-17
Other urothelial	16	16	11	-31	17	14	12	-23
Melanoma	245	261	213	-16	320	310	295	-6
Skin other	568	645	339	-44	715	693	646	-8
Thyroid	322	305	187	-40	287	297	332	14
CUP	74	54	51	-20	86	89	77	-12
Other endocrinal	153	161	70	-55	214	192	181	-11

Abbreviations: CNS, central nervous system; CUP, carcinoma of unknown primitive; PNS, peripheral nervous system

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Conflicts of interest

The authors have no conflicts of interest to disclose.

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Supplementary material

Supplementary Table 1. Classification of cancer types according to 10th revision of the International Classification of Diseases (ICD-10)

Cancer type	ICD-10 Code
Anus	C21
Biliary duct	C23 C24 D01.5 D37.6
Bladder	C66 C67 C68 D09.0 D09.1 D41.2 D41.3 D41.4 D41.7 D41.9
Bowel	C17 D01.4 D37.2
Breast	C50 D05 D48.6
Cervix	C53 D06
CNS	C70 C71 C72.0 C72.2 C72.3 C72.8 C72.9 D42 D43.0 D43.1 D43.2 D43.4 D43.7 D43.9
Colon	C18 C19 D01.0 D01.1 D37.3 D37.4
CUP	C76 C80 C97 D09.7 D09.9 D48.7 D48.9 D48.3
Endometrium	C54 C55 D07.0 D39.0
Eye	C69 D09.2
Gastric	C16 D00.2 D37.1
Head & neck	C0 C10 C11 C12 C13 C14 C30 C31 C32 D00.0 D02.0 D37.0 D38.0
Hodgkin lymphoma	C81
Kidney	C6.4 C6.5 D41.0 D41.1
Leukemia	C91 C92 C93 C94.0 C94.1 C94.2 C94.3 C94.4 C94.5 C94.7 C95
Liver	C22
Lung	C33 C34 D02.1 D02.2 D38.1
Melanoma	C43 D03
Mesothelioma	C45.0 C45.1 C45.2 C45.7 C45.9
Myeloma	C90
Non-Hodgkin lymphoma	C82 C83 C84 C85 C86
Esophagus	C15 D00.1
Osteosarcoma	C40 C41 D48.0
Other digestive	C26 C48 D01.7 D01.9 D37.7 D37.9 D48.4
Other endocrinal	C74 C75 D09.3 D44.1 D44.2 D44.3 D44.4 D44.5 D44.6 D44.7 D44.8 D44.9 D44.0 D44.8
Other gynecology	C51 C52 C57 C58 D07.1 D07.3 D39.2 D39.7 D39.9
Other hematologic malignancies	C88 C96 C94.6 D45 D46 D47
Other pneumology	C37 C38 C39 D02.3 D02.4 D38.2 D38.3 D38.4 D38.5 D38.6
Other urothelial	C60 C63 D07.4 D07.6 D40.7 D40.9
Ovary	C56 D39.1
Pancreas	C25
PNS	C47 C72.1 C72.4 C72.5 D43.3 D48.2
Prostate	C61 D07.5 D40.0
Rectum	C20 D01.2 D37.5
Skin other	C44 D04 D48.5
Soft tissue	C46 C49 D48.1
Testis	C62
Thyroid	C73 D44.0

Supplementary table 2. Figures of incident cancer cases according to patient age class and tumor subtype.

A. All patients

Year	Month	Overall	Colon	Rectum	Oesophagus	Gastric	Pancreas	Biliary duct	Bowel	Anus	Liver	Digistive other	Endo-metrium	Cervix	Ovary	Breast	Gynecology other	Lung	Meso-thelioma	Pneumo other	Head & neck	Eye
2018	1	3961	246	97	46	76	162	51	32	16	170	31	57	36	54	333	12	309	13	12	115	3
2019		3723	228	85	38	76	139	53	24	23	168	54	69	35	54	273	21	310	9	15	102	6
2020		3772	215	83	36	66	147	44	19	15	169	45	45	23	53	306	13	323	8	23	104	2
2018	2	3027	178	83	39	53	111	23	15	16	126	34	39	26	49	243	5	269	5	18	89	1
2019		3127	177	78	29	55	128	52	25	17	140	44	42	20	33	234	13	266	6	18	106	
2020		2952	150	76	26	50	115	38	12	13	145	28	41	25	41	280	10	229	7	17	81	2
2018	3	3333	204	67	39	56	118	46	24	18	163	52	43	37	40	259	11	248	9	18	120	1
2019		3054	194	64	35	48	111	40	27	9	135	37	37	19	40	221	12	278	9	18	80	
2020		2672	172	64	26	45	76	26	16	11	125	21	48	35	44	249	10	226	10	13	79	4
2018	4	3168	180	69	50	53	129	40	24	16	139	43	39	25	41	254	8	288	10	14	103	2
2019		3055	161	69	31	58	123	38	22	15	135	34	42	31	46	226	9	275	10	23	82	2
2020		1776	88	53	16	23	70	19	10	14	85	15	24	14	31	141	9	172	11	10	77	3
2018	5	3166	179	74	29	76	128	40	26	11	148	40	44	34	38	279	16	292	4	14	130	3
2019		2984	184	76	32	62	106	49	28	7	128	44	32	25	44	191	8	276	10	22	95	1
2020		2082	128	50	19	43	89	28	12	10	93	17	25	19	42	117	6	204	4	13	65	2
2018	6	3282	212	82	29	62	125	46	23	20	142	37	39	28	39	237	13	283	9	10	123	1
2019		2945	145	80	30	53	108	42	19	14	129	56	33	26	46	230	13	228	5	18	105	1
2020		2723	146	55	23	42	96	28	8	13	103	27	38	20	27	195	12	256	9	11	81	2
2018	7	3205	216	97	41	46	151	56	23	14	150	32	42	27	52	251	14	305	4	12	110	3
2019		3248	196	77	43	58	146	56	34	13	138	45	48	25	42	230	14	281	4	14	120	1
2020		2863	187	74	29	49	103	35	19	15	134	37	47	25	42	201	16	253	7	18	85	3
2018	8	2307	148	61	24	39	109	31	13	6	93	29	35	22	34	205	6	215	7	11	84	2
2019		2211	132	62	23	49	103	30	12	10	111	32	29	26	37	185	8	218	4	11	65	5
2020		2085	135	55	22	38	91	28	13	12	99	19	25	23	36	159	5	190	4	15	78	1
2018	9	2899	162	77	32	45	132	40	13	9	128	26	27	26	39	203	12	244	7	24	92	2
2019		2925	175	75	31	48	107	45	23	11	144	50	30	14	44	199	13	222	6	22	95	2
2020		2809	161	65	25	46	120	28	22	11	133	33	33	28	52	197	6	240	6	15	77	1

Year	Month	CNS	PNS	Soft tissue	Osteo-sarcoma	Myeloma	Hodgkin lymphoma	Non hodgkin lymphoma	Leukemia	Other hematologic malignancies	Prostate	Testis	Kidney	Bladder	Other urothelial	Melanoma	Skin other	Thyroid	CUP	Other endocrinal
2018	1	191	5	52	42	127	40	207	201	181	205	13	106	157	1	105	229	122	40	66
2019		162	3	59	38	94	43	210	161	150	197	11	119	150	8	94	239	116	30	57
2020		154	3	46	46	140	43	211	223	190	187	12	106	137	4	101	232	102	30	66
2018	2	154	2	42	33	87	28	145	106	120	162	13	96	135	2	83	226	109	16	46
2019		142	4	37	31	82	39	160	122	133	154	12	90	126	4	90	235	93	21	69
2020		144	4	37	38	70	42	169	126	118	161	18	76	109	2	96	180	95	26	55
2018	3	159	1	44	50	95	36	182	117	122	189	8	104	164	1	91	191	121	27	58
2019		144	6	36	26	77	36	148	116	148	172	5	100	132	6	94	209	100	17	68
2020		103		48	40	84	35	134	86	81	152	16	93	109	3	97	160	74	19	38
2018	4	203	1	46	44	74	37	162	108	132	154	22	93	115	11	83	181	102	23	50
2019		154	3	43	43	67	32	152	118	108	174	13	83	140	7	95	223	99	20	49
2020		99	3	33	25	50	33	106	73	55	81	4	44	73	4	62	71	50	19	6
2018	5	138	2	44	38	61	37	166	114	124	160	14	104	120	4	71	196	99	24	45
2019		132	6	39	42	87	27	165	104	114	152	17	108	116	3	72	213	106	17	44
2020		115		26	29	67	26	123	99	81	102	9	58	93	4	54	108	63	13	26
2018	6	161	6	38	47	78	31	166	131	156	174	24	90	140	1	81	212	95	26	65
2019		143	4	36	42	85	29	150	114	136	159	8	104	134	2	83	178	82	19	56
2020		171	5	19	42	104	24	155	116	110	141	15	91	117	2	80	183	98	15	43
2018	7	161	9	48	43	59	28	121	102	135	174	15	77	130	11	100	207	61	23	55
2019		158	4	36	44	86	32	173	107	143	149	21	104	134	5	91	213	81	24	58
2020		129	5	44	38	79	32	151	104	110	153	11	94	114	4	76	173	86	22	59
2018	8	126	2	40	30	69	27	111	90	62	137	11	58	95	2	69	111	43	15	35
2019		97	2	33	23	70	31	128	74	91	98	12	72	98	2	57	104	31	15	21
2020		109	2	27	37	60	30	117	105	85	93	9	54	77	2	53	89	44	22	22
2018	9	150	9	38	38	80	32	158	102	111	179	12	95	128	3	70	185	88	22	59
2019		140	2	36	26	74	30	166	114	115	170	7	95	121	5	79	198	103	31	57
2020		122	1	41	40	75	27	158	101	112	157	10	97	99	4	86	201	104	18	57

B. Patient age < 70 years

Year	Month	Overall	Colon	Rectum	Oesophagus	Gastric	Pancreas	Biliary duct	Bowel	Anus	Liver	Digestive other	Endo-metrium	Cervix	Ovary	Breast	Gynecology other	Lung	Meso-thelioma	Pneumo other	Head & neck	Eye
2018	1	2451	153	65	32	47	87	23	23	14	112	16	32	32	39	248	8	176	6	5	89	3
2019		2229	131	48	23	41	74	28	13	12	111	27	41	32	43	188	12	178		12	64	4
2020		2199	116	58	21	45	67	27	13	8	108	25	22	19	31	214	8	171	3	17	69	1
2018	2	1815	96	44	24	27	65	13	8	8	74	25	22	24	39	180	2	151	3	15	59	1
2019		1860	95	45	21	31	70	34	15	12	79	26	28	18	22	164	11	166	1	11	72	
2020		1753	80	52	16	27	61	19	10	8	86	17	23	18	30	197	8	130	1	13	56	1
2018	3	2081	116	45	21	32	54	28	15	9	106	32	25	34	29	178	7	152	2	11	90	
2019		1801	111	41	19	27	64	26	15	6	86	22	19	18	28	152	9	140	1	13	48	
2020		1639	88	36	18	28	39	16	9	5	71	15	34	29	34	168	7	130	3	8	51	4
2018	4	1924	98	40	32	29	74	20	14	8	85	31	25	20	34	183	7	170	4	11	77	2
2019		1812	78	43	23	32	61	25	14	10	71	22	30	27	33	153	2	163	5	17	58	1
2020		1083	42	34	12	13	32	11	7	9	52	8	17	12	18	103	6	104	3	9	47	3
2018	5	1985	98	47	15	46	81	25	15	8	92	21	30	28	24	204	13	162	1	10	94	1
2019		1756	89	39	21	40	62	29	14	7	70	25	22	18	34	132	5	148	2	15	64	1
2020		1290	75	30	12	22	50	13	7	7	59	10	15	17	32	81	4	121	1	7	53	2
2018	6	1997	96	46	19	42	64	29	16	12	85	25	23	24	28	172	9	165	2	6	89	1
2019		1745	80	39	14	30	54	20	13	9	74	32	17	19	32	156	8	128	2	14	74	
2020		1604	79	35	15	31	55	14	6	9	63	16	13	16	20	126	10	130	1	9	56	1
2018	7	2047	131	63	28	34	90	33	15	9	102	19	23	24	34	200	10	177	3	11	83	2
2019		1951	99	43	26	38	78	32	17	6	91	35	29	19	29	167	12	167		11	78	
2020		1721	95	36	16	30	55	19	9	9	84	25	26	22	27	140	9	129	3	15	67	2
2018	8	1419	69	40	13	24	64	18	6	2	60	17	22	17	25	148	5	130	1	7	61	2
2019		1349	61	43	10	23	58	14	8	7	64	22	19	25	27	133	5	130	2	7	41	3
2020		1207	63	31	8	24	44	13	7	10	65	12	15	19	20	97	4	108		12	57	1
2018	9	1803	94	49	23	25	61	21	10	4	69	20	17	19	27	144	7	148	1	16	65	2
2019		1755	90	49	18	30	62	27	15	7	76	26	19	11	31	152	10	118	1	16	62	2
2020		1689	82	35	17	26	70	13	18	6	73	23	21	24	38	122	5	141	4	14	62	1

Year	Month	CNS	PNS	Soft tissue	Osteo-sarcoma	Myeloma	Hodgkin lymphoma	Non hodgkin lymphoma	Leukemia	Other hematologic malignancies	Prostate	Testis	Kidney	Bladder	Other urothelial	Mela-noma	Skin other	Thyroid	CUP	Other endocrinal
2018	1	153	5	40	35	67	37	131	102	88	109	13	56	77		62	90	102	25	49
2019		132	2	44	33	48	41	130	100	70	98	11	75	59	5	49	81	98	22	49
2020		124	3	30	40	52	38	106	141	87	100	11	63	61	3	60	76	92	16	53
2018	2	119	2	30	24	41	26	85	59	61	90	13	58	73	2	47	64	88	14	39
2019		105	4	28	19	45	35	103	64	55	89	12	54	55	2	51	76	79	9	54
2020		109	4	28	31	35	40	91	76	53	82	18	42	30	2	54	65	77	19	44
2018	3	137	1	31	39	62	32	118	72	60	109	8	66	78		59	54	101	17	51
2019		105	4	26	16	45	32	86	65	75	104	5	56	63	6	51	63	87	10	57
2020		84		41	29	39	32	92	52	41	84	16	54	51	2	61	53	67	15	33
2018	4	162		28	35	34	36	88	55	61	85	21	59	42	8	44	62	84	14	42
2019		133	3	32	35	35	29	91	57	50	85	12	54	53	5	56	74	86	15	39
2020		84	2	25	18	21	26	61	38	30	45	4	33	34	2	35	26	45	8	4
2018	5	115	2	36	33	32	35	94	70	63	92	13	75	61	3	43	73	81	14	35
2019		112	5	26	29	42	24	112	59	56	78	17	66	52	2	41	65	88	11	34
2020		89		21	20	32	23	78	71	45	49	9	37	41	4	32	41	49	9	22
2018	6	120	4	27	39	51	27	102	81	83	92	24	61	64		49	65	80	22	53
2019		111	4	24	35	55	26	92	68	58	85	8	65	55	2	53	64	70	10	45
2020		142	5	15	32	53	21	89	68	56	77	15	52	48	2	43	56	82	8	35
2018	7	135	9	39	34	32	23	74	61	68	97	15	51	59	5	65	67	55	17	50
2019		122	4	24	34	50	31	101	58	72	74	21	66	59	1	52	70	70	18	47
2020		101	5	37	33	43	29	99	69	55	78	10	61	51		46	50	68	12	56
2018	8	92	2	28	22	38	23	62	52	25	82	11	35	44	2	52	40	36	11	31
2019		75	1	21	22	49	30	77	45	37	45	12	44	52	2	37	45	28	8	17
2020		80	2	22	28	33	24	60	65	37	47	9	36	30		22	30	40	14	18
2018	9	113	8	34	29	52	31	95	70	61	90	11	63	60	2	50	69	77	16	50
2019		111	2	25	21	45	26	92	61	60	96	6	62	59	5	44	72	85	17	44
2020		96	1	27	27	42	23	98	66	48	93	9	55	45	4	48	65	84	12	51

C. Patient age 70 to 84 years

Year	Month	Overall	Colon	Rectum	Oesophagus	Gastric	Pancreas	Biliary duct	Bowel	Anus	Liver	Digistive other	Endo-metrium	Cervix	Ovary	Breast	Gynecology other	Lung	Meso-thelioma	Pneumo other	Head & neck	Eye
2018	1	1218	62	27	11	25	64	24	9	1	51	13	22	4	14	67	3	117	4	5	22	2
2019		1212	76	29	13	31	56	20	10	7	51	24	24	3	10	68	7	119	8	2	28	
2020		1261	80	17	13	16	70	13	6	7	56	15	20	4	21	83	5	130	4	6	33	
2018	2	966	52	34	13	23	37	9	6	7	38	9	16	2	8	51	1	102	1	2	24	1
2019		1006	68	25	7	19	53	15	10	4	50	16	10	1	10	58	1	90	3	7	29	
2020		973	55	18	8	21	41	15	2	3	52	8	13	4	9	71	2	83	3	4	21	
2018	3	1011	67	18	16	20	51	13	8	4	47	20	16	2	10	68	2	87	7	5	24	1
2019		997	62	20	10	19	41	12	11	2	39	12	15		10	56	3	123	4	5	28	
2020		830	63	20	8	13	31	9	7	5	46	6	13	4	7	65	3	89	6	4	26	
2018	4	1005	62	23	16	20	46	16	10	7	45	9	13	4	4	56	1	101	5	3	24	1
2019		975	69	23	8	23	53	8	7	4	60	12	9	3	12	53	3	102	3	5	17	
2020		548	36	17	4	7	27	6	3	4	29	7	6	2	10	29	2	57	6	1	26	
2018	5	927	61	23	10	24	43	12	9	3	48	18	13	6	12	57	3	103	2	3	25	2
2019		950	64	28	9	19	40	17	13		48	15	8	5	8	39	2	111	7	6	26	
2020		602	30	16	3	16	33	10	5	2	30	6	6	2	7	27	2	69	3	4	10	
2018	6	1016	88	29	8	18	47	15	7	5	48	9	14	4	11	57	3	97	5	4	29	1
2019		943	46	35	15	18	44	16	6	3	49	22	12	7	13	59	5	83	1	4	21	
2020		864	52	15	8	10	34	12	2	3	35	10	24	3	6	52	2	102	8	1	20	
2018	7	896	60	27	12	12	51	18	8	3	42	13	14	3	14	42	4	106	1	1	20	1
2019		1017	65	27	16	13	57	21	15	5	38	6	15	3	11	58	1	98	3	3	35	
2020		894	66	30	12	13	40	13	8	6	47	11	16	2	12	49	5	108	2	2	12	
2018	8	699	61	16	10	12	37	12	7	3	31	11	11	4	8	49		69	3	4	18	2
2019		669	43	15	11	25	39	15	3	3	40	10	6		8	41	3	76	2	4	20	
2020		678	57	19	10	8	40	14	5	2	32	6	9	4	14	48		65	3	2	17	
2018	9	836	51	22	5	19	57	16	2	4	48	5	8	7	11	41	3	74	3	8	21	
2019		915	64	17	9	16	41	16	8	3	59	23	9	1	10	34	3	85	3	4	26	
2020		897	58	25	4	15	47	13	2	5	54	9	10	3	12	60	1	82	1	1	13	

Year	Month	CNS	PNS	Soft tissue	Osteo- sarcoma	Myeloma	Hodgkin lymphoma	Non hodgkin lymphoma	Leukemia	Other hematologic malignancies	Prostate	Testis	Kidney	Bladder	Other urothelial	Mela- noma	Skin other	Thyroid	CUP	Other endocrinal
2018	1	35		11	4	53	2	67	80	75	78		45	65		30	84	19	10	15
2019		29		15	4	38	2	69	45	59	92		39	68	2	35	98	17	4	8
2020		27		14	4	66	5	69	63	75	76	1	35	67		30	100	10	7	12
2018	2	30		11	6	36	2	53	34	48	62		35	49		30	106	21	1	7
2019		32		6	10	31	3	39	46	55	56		32	56	1	33	97	12	7	14
2020		33		9	6	27	1	68	44	47	74		30	70		32	66	17	5	10
2018	3	18		13	9	26	3	49	37	45	72		35	75	1	22	86	20	9	5
2019		35	2	10	8	30	3	53	44	44	60		41	56		30	84	10	6	9
2020		18		6	11	39	2	34	20	24	64		33	42		29	68	7	4	4
2018	4	39		13	9	36	1	60	46	54	59	1	30	56	2	26	77	17	7	7
2019		17		8	5	27	2	54	46	44	76	1	24	55	2	29	84	12	5	9
2020		13	1	7	5	25	4	36	31	18	31		11	27	2	20	27	4	5	2
2018	5	18		7	2	24	2	57	33	44	54	1	25	48	1	19	81	18	7	9
2019		18	1	11	12	37	3	44	31	47	61		36	53	1	24	77	15	4	10
2020		20		5	8	30	2	36	22	24	42		19	35		18	44	10	2	4
2018	6	38	2	8	5	21	4	49	37	57	70		27	62	1	24	84	15	3	11
2019		25		10	5	26	2	44	38	51	63		35	67		22	66	12	8	9
2020		25		3	7	39	2	53	37	40	54		31	49		27	72	15	4	7
2018	7	25		7	6	21	4	41	33	47	63		22	62	4	25	72	6	2	4
2019		32		7	8	30	1	65	33	49	64		32	62	4	28	87	9	4	11
2020		23		4	4	28	2	41	27	35	64	1	29	54	3	24	77	14	6	3
2018	8	28		10	6	24	4	40	23	21	46		18	46		13	41	7	2	4
2019		18	1	7	1	15	1	38	22	36	46		23	35		15	33	3	5	4
2020		26		4	6	22	5	44	29	33	37		15	35	1	22	31	3	6	4
2018	9	33	1	4	8	21	1	51	26	31	76	1	28	48	1	14	67	10	3	7
2019		26		6	5	22	4	59	36	44	69	1	29	48		27	70	15	11	12
2020		23		11	9	29	3	46	22	47	56	1	38	46		28	95	19	3	6

D. Patient age 85 years and older

Year	Month	Overall	Colon	Rectum	Oesophagus	Gastric	Pancreas	Biliary duct	Bowel	Anus	Liver	Digistive other	Endo-metrium	Cervix	Ovary	Breast	Gynecology other	Lung	Meso-thelioma	Pneumo other	Head & neck	Eye
2018	1	292	31	5	3	4	11	4		1	7	2	3		1	18	1	16	3	2	4	
2019		282	21	8	2	4	9	5	1	4	6	3	4		1	17	2	13	1	1	10	
2020		312	19	8	2	5	10	4			5	5	3		1	9		22	1		2	
2018	2	246	30	5	2	3	9	1	1	1	14		1		2	12	2	16	1	1	6	
2019		261	14	8	1	5	5	3		1	11	2	4	1	1	12	1	10	2		5	
2020		226	15	6	2	2	13	4		2	7	3	5	3	2	12		16	3		4	
2018	3	241	21	4	2	4	13	5	1	5	10		2	1	1	13	2	9		2	6	
2019		256	21	3	6	2	6	2	1	1	10	3	3	1	2	13		15	4		4	
2020		203	21	8		4	6	1		1	8		1	2	3	16		7	1	1	2	
2018	4	239	20	6	2	4	9	4		1	9	3	1	1	3	15		17	1		2	
2019		268	14	3		3	9	5	1	1	4		3	1	1	20	4	10	2	1	7	
2020		145	10	2		3	11	2		1	4		1		3	9	1	11	2		4	
2018	5	254	20	4	4	6	4	3	2		8	1	1		2	18		27	1	1	11	
2019		278	31	9	2	3	4	3	1		10	4	2	2	2	20	1	17	1	1	5	
2020		190	23	4	4	5	6	5		1	4	1	4		3	9		14		2	2	
2018	6	269	28	7	2	2	14	2		3	9	3	2			8	1	21	2		5	
2019		257	19	6	1	5	10	6		2	6	2	4		1	15		17	2		10	
2020		255	15	5		1	7	2		1	5	1	1	1	1	17		24		1	5	1
2018	7	262	25	7	1		10	5		2	6		5		4	9		22			7	
2019		280	32	7	1	7	11	3	2	2	9	4	4	3	2	5	1	16	1		7	
2020		248	26	8	1	6	8	3	2		3	1	5	1	3	12	2	16	2	1	6	
2018	8	189	18	5	1	3	8	1		1	2	1	2	1	1	8	1	16	3		5	
2019		193	28	4	2	1	6	1	1		7		4	1	2	11		12			4	
2020		200	15	5	4	6	7	1	1		2	1	1		2	14	1	17	1	1	4	
2018	9	260	17	6	4	1	14	3	1	1	11	1	2		1	18	2	22	3		6	
2019		255	21	9	4	2	4	2		1	9	1	2	2	3	13		19	2	2	7	
2020		223	21	5	4	5	3	2	2		6	1	2	1	2	15		17	1		2	

Year	Month	CNS	PNS	Soft tissue	Osteo- sarcoma	Myeloma	Hodgkin lymphoma	Non hodgkin lymphoma	Leukemia	Other hematologic malignancies	Prostate	Testis	Kidney	Bladder	Other urothelial	Mela- noma	Skin other	Thyroid	CUP	Other endocrinal
2018	1	3		1	3	7	1	9	19	18	18	5	15	1	13	55	1	5	2	3
2019		1	1		1	8		11	16	21	7	5	23	1	10	60	1	4		1
2020		3		2	2	22		36	19	28	11	8	9	1	11	56		7	1	3
2018	2	5		1	3	10		7	13	11	10	3	13		6	56		1		5
2019		5		3	2	6	1	18	12	23	9	4	15	1	6	62	2	5	1	5
2020		2			1	8	1	10	6	18	5	4	9		10	49	1	2	1	2
2018	3	4			2	7	1	15	8	17	8	3	11		10	51		1	2	4
2019		4			2	2	1	9	7	29	8	3	13		13	62	3	1	2	4
2020		1		1		6	1	8	14	16	4	6	16	1	7	39			1	1
2018	4	2	1	5		4		14	7	17	10	4	17	1	13	42	1	2	1	2
2019		4		3	3	5	1	7	15	14	13	5	32		10	65	1		1	4
2020		2		1	2	4	3	9	4	7	5		12		7	18	1	6		2
2018	5	5		1	3	5		15	11	17	14	4	11		9	42		3	1	5
2019		2		2	1	8		9	14	11	13	6	11		7	71	3	2		2
2020		6			1	5	1	9	6	12	11	2	17		4	23	4	2		6
2018	6	3		3	3	6		15	13	16	12	2	14		8	63		1	1	3
2019		7		2	2	4	1	14	8	27	11	4	12		8	48		1	2	7
2020		4		1	3	12	1	13	11	14	10	8	20		10	55	1	3	1	4
2018	7	1		2	3	6	1	6	8	20	14	4	9	2	10	68		4	1	1
2019		4		5	2	6		7	16	22	11	6	13		11	56	2	2		4
2020		5		3	1	8	1	11	8	20	11	4	9	1	6	46	4	4		5
2018	8	6		2	2	7		9	15	16	9	5	5		4	30		2		6
2019		4		5		6		13	7	18	7	5	11		5	26		2		4
2020		3		1	3	5	1	13	11	15	9	3	12	1	9	28	1	2		3
2018	9	4			1	7		12	6	19	13	4	20		6	49	1	3	2	4
2019		3		5		7		15	17	11	5	4	14		8	56	3	3	1	3
2020		3		3	4	4	1	14	13	17	8	4	8		10	41	1	3		3