



مستشفى الملك فيصل التخصصي ومركز الأبحاث
King Faisal Specialist Hospital & Research Centre

**CANCER CENTER OF EXCELLENCE
RESEARCH UNIT**

RIYADH

**TUMOR REGISTRY
ANNUAL REPORT**

2021





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TUMOR REGISTRY

ANNUAL REPORT

2021

Annual Report Prepared by the Staff of the Tumor Registry
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INTRODUCTION

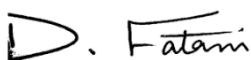
We are pleased to present 2021 Annual Tumor Registry Report for the King Faisal Specialist Hospital & Research Centre's Oncology Centre in Riyadh. The Cancer Registry maintains a complete database of information on all cancer cases diagnosed and/or treated at KFSH&RC. This database is an important patient care and quality assessment tool used by medical staff and administration for special studies, medical planning, resource allocation and utilization, education and research for comparing quality of care, monitoring patient care and continuous quality improvement. This report highlights the statistical overview of newly diagnosed cancer cases by site, gender, and AJCC Staging for both analytic and non-analytic cases. During 2021, the Tumor Registry abstracted 4,323 new cancer cases. 4,049 cases were analytic and 274 were non-analytic; the highest incidence of cancer among males by site was NHL, Leukemia and Brain, CNS and among females was carcinomas of Breast, Thyroid, and Brain, CNS. The Tumor Registry database includes over 109,265 cases and reports to the Saudi Cancer Registry (SCR).

Oncology Centre continues to provide comprehensive multidisciplinary care to our cancer patients. The Centre provides latest advances in radiation therapy, chemotherapy, hematopoietic stem cell transplantation, palliative and rehabilitation care to our patients. We also continue to be a center of excellence in cancer clinical research. Involvement in clinical trials allows our physicians and researchers to play an active role in advancing new cancer treatments and in providing the newest and most promising treatment options for our cancer patients. We have maintained our international cooperative group affiliations as the member of Southwest Oncology Group (SWOG), Radiation Therapy Oncology Group (RTOG/ NRG) and Canadian Blood & Marrow Transplantation Group (CBMTG). KFSH&RC has spearheaded the local and regional research consortiums as well, notably, Gulf Oncology Regional Group (GORG) and Eastern Mediterranean Blood and Marrow Transplantation (EMBM) Group. Research unit workload has mounted exponentially to keep pace with this exorbitant expansion of world-class clinical research.

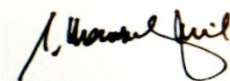
The Oncology Center is committed to serve as the pinnacle of excellence in the entire region. As we look to the future of cancer care in the Kingdom of Saudi Arabia, Oncology Centre will continue to deliver evidence-based care centered upon the state-of-the art clinical and translational research.

We are extremely grateful to the dedicated staff of the Tumor Registry for their hard work and commitment throughout the year. Hats off to our physicians, patient caregivers and support staff; it is their commitment and dedication that is the foundation for our success.

This report can be accessed online via Oncology Centre's website at:
<https://www.kfshrc.edu.sa/en/home/hospitals/riyadh/oncologycentreadults/tumorregistryreports>
Comments and suggestions are welcome to improve our future reports and can be sent to dfatani@kfshrc.edu.sa



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Director
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I. KING FAISAL SPECIALIST HOSPITAL & RESEARCH CENTRE TUMOR REGISTRY

The King Faisal Specialist Hospital and Research Centre (KFSH&RC) opened in June 1975 to provide specialized medical treatment to the people of Saudi Arabia and promote disease prevention through research and education. It is a national and international tertiary care hospital for Oncology and the principal center for cancer therapy in Saudi Arabia.

The mission of the Tumor Registry, a hospital-wide data system, is to describe the burden of cancer in KFSH&RC by collecting complete and high quality cancer data and compiling timely statistics so that data-driven, evidence-based cancer prevention and control programs can be implemented to reduce cancer morbidity and mortality.

The Registry was established to meet one of the requirements for an Approved Cancer Program of the American College of Surgeons (ACoS). The database now includes 109,265 malignant cases seen at KFSH&RC from June 1975 through December 31, 2021.

The Registry is primarily staffed with tumor registrars who support the database in case ascertainment, abstracting, follow up and statistical analyses. The basic source document is the patient's medical record from which pertinent information is abstracted for use in the Registry. The electronic data system used was the Cansur 3.0 designed by the ACoS, for cases seen from 1975 to 2007. Starting with 2008 cases, the software being used is CNExT, developed by C/NET Solutions, which is part of the U.S. Public Health Institute.

The data maintained in the Tumor Registry provides the statistics for the publication of the KFSH&RC Annual Report which summarizes the hospital's cancer experience. The data also supports a wide variety of reports at the request of physicians, researchers and ancillary personnel. These reports support patient management and outcome, basic and clinical research investigations, educational publications and presentations, and resource utilization. In 2021, the Tumor Registry supported myriad of data requests. It also identified and reported to the Saudi Cancer Registry 4,323 new cases seen in 2021.

II. ACKNOWLEDGEMENTS

The cancer program is a combined effort of the extraordinary team of professionals at the King Faisal Specialist Hospital and Research Centre. It is not possible to enumerate all those involved in providing hope and healing to cancer patients and their families. The Tumor Registry staff greatly appreciates the tireless efforts of all the caring professionals from all disciplines for their dedication, commitment and collaboration to ensure highest standards in community outreach, clinical trials, staff education, patient care improvement, outcome analysis and tumor registry quality.

The clinical expertise and proficiency demonstrated by our team, coupled with an incredible dedication to patient care and service excellence, allows the Oncology Centre to achieve remarkable outcomes and to consistently exceed the needs and expectations of patients and their families.

The information in this report includes cancer incidence, site, and extent of disease at diagnosis, treatment, cancer trends, and outcomes to better understand the changing patterns of cancer.

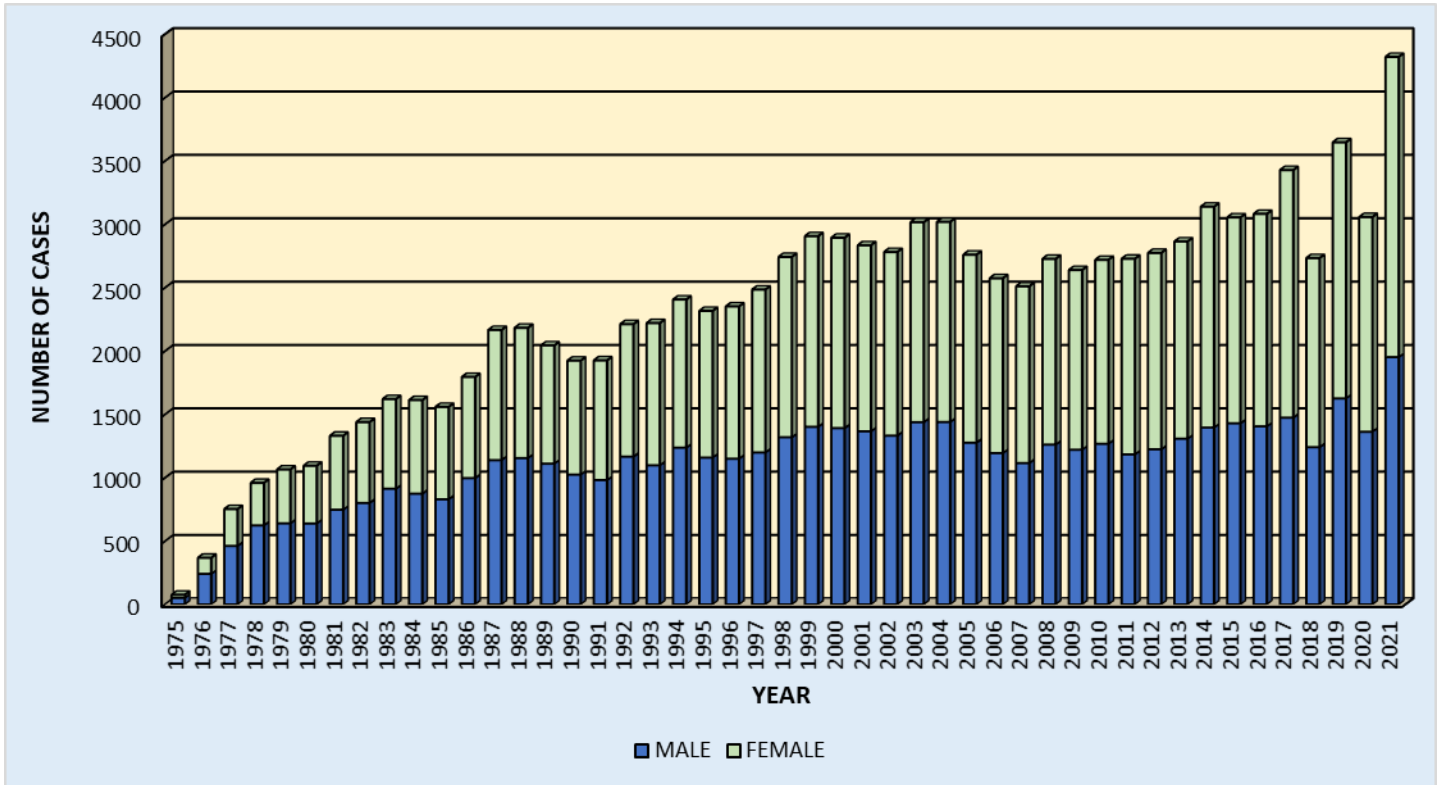
The following departments have assisted throughout the year and without their support, this report would not have been possible. The Tumor Registry staff takes pride in acknowledging these departments:

- Department of Pathology and Laboratory Medicine
- Medical Records Services
- Patients Acceptance Affairs
- Information Technology Affairs
- Department of Pediatric Hematology/Oncology
- Central Data Unit, Dept. of Ped. Hem/Oncology
- Radiation Oncology Department
- Saudi Cancer Registry
- Home Health Care
- Cancer Center of Excellence

III. KFSH&RC CANCER PATIENT POPULATION

A total of 4,323 cases were accessioned in 2021, with 1,952 males and 2,371 females or a male/female ratio of 0.8:1.

FIGURE 1
DISTRIBUTION OF CASES ACCESSIONED BY YEAR (1975-2021)
 (TOTAL CASES = 109,265)



From the opening of the hospital (mid 1975) until December 2021, 109,265 cancer cases were registered (53,084 males and 56,181 females) with a male/female ratio of 0.9:1.

There were 13,139 (12%) pediatric cases (0 to 14 years of age) and 96,126 (88%) adults (15 years old and above). In 2021, the proportions were 8% (346) for pediatrics and 92% (3,977) for adults.

TABLE 1

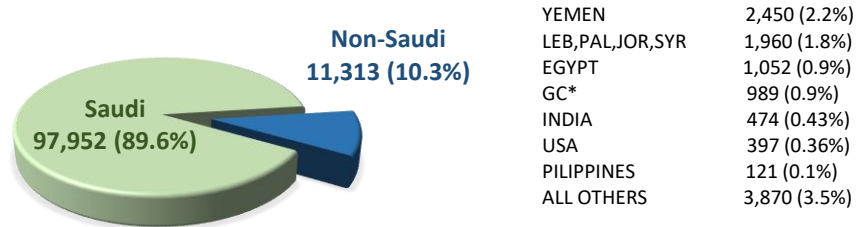
CASES SEEN AT KFSH&RC (MALE/FEMALE & PEDIATRICS/ADULTS) BY 5-YEAR PERIOD (1975-2021)

	1975-1976*	1977-1981	1982-1986	1987-1991	1992-1996	1997-2001	2002 - 2006	2007-2011	2012-2016	2017-2021	TOTAL
MALE	293	3,112	4,415	5,410	5,809	6,677	6,680	6,054	6,732	7,902	53,084
FEMALE	151	2,089	3,610	4,833	5,696	7,183	7,467	7,285	8,127	9,740	56,181
TOTAL	444	5,201	8,025	10,243	11,505	13,860	14,147	13,339	14,859	17,642	109,265
M/F RATIO	2.1:1	1.5:1	1.2:1	1.1:1	1.0:1	0.9:1	0.9:1	0.8:1	0.8:1	0.8:1	0.9:1
PEDIATRICS**	59	637	1,086	1,382	1,492	2,003	1,957	1,656	1,430	1,437	13,139
(%)	13.29%	12.25%	13.53%	13.49%	12.97%	14.45%	13.83%	12.41%	9.62%	8.15%	12.27%
ADULTS	385	4,564	6,939	8,861	10,013	11,857	12,190	11,690	13,440	16,187	96,126
(%)	86.71%	87.75%	86.47%	86.51%	87.03%	85.55%	86.17%	87.59%	90.45%	91.75%	87.98%
TOTAL	444	5,201	8,025	10,243	11,505	13,860	14,147	13,339	14,859	17,642	109,265

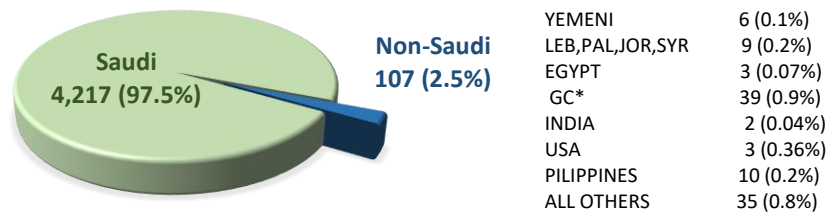
* First two years of KFSH&RC partial operation.

** Pediatrics = 0 to 14 years of age; Adults = 15 years and above.

FIGURE 2
DISTRIBUTION OF CASES BY NATIONALITY (1975 – 2021)
(TOTAL CASES = 109,265)



2021 (TOTAL CASES = 4,323)

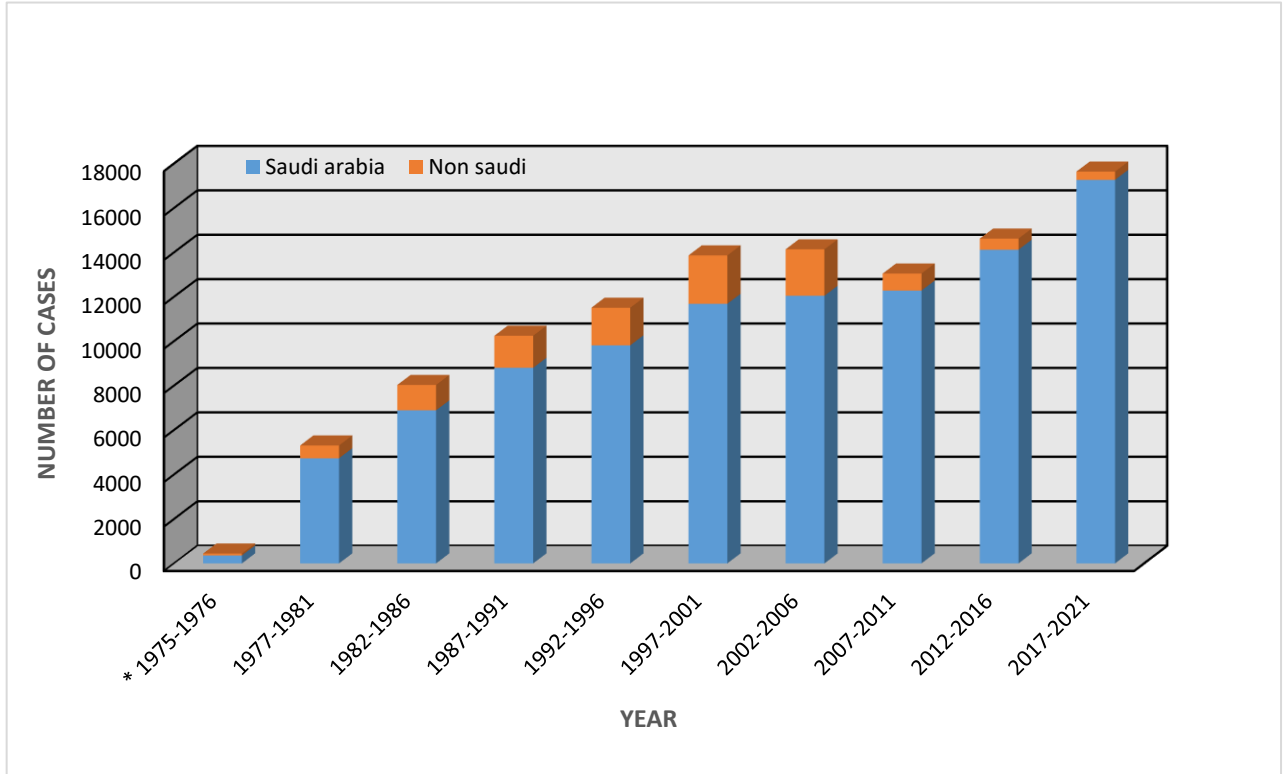


*GC: Gulf countries (Bahrain, Kuwait, Qatar, Oman and United Arab Emirates).

Saudi nationals totaled 4,217 (97.5%) in 2021 and the non-Saudi, 107 (2.5%). During the period 1975 to 2021, the former accounted for 89.6% (97,952) while the latter, 10.3% (11,313).

FIGURE 3

**DISTRIBUTION OF CASES BY NATIONALITY
BY 5-YEAR PERIOD (1975-2021)**



* First two years of KFSH&RC partial operation.

Geographically, the referral pattern in 2021 was mainly from the Riyadh region with 43.1% of all cases, followed by the Eastern Province with 8.7% then Qassim region with 8.5% respectively. During the 46 years in review, 35.2% were referred from Riyadh, 12.8% from the Eastern Province and 9.4% from Mekkah.

These percentages reflect the KFSH&RC actual experience rather than adjusted to reflect the population of those regions.

FIGURE 4
DISTRIBUTION OF CASES BY REGION (1975–2021)
 (Based on Given Address at Time of Diagnosis)
 (TOTAL CASES = 109,265)

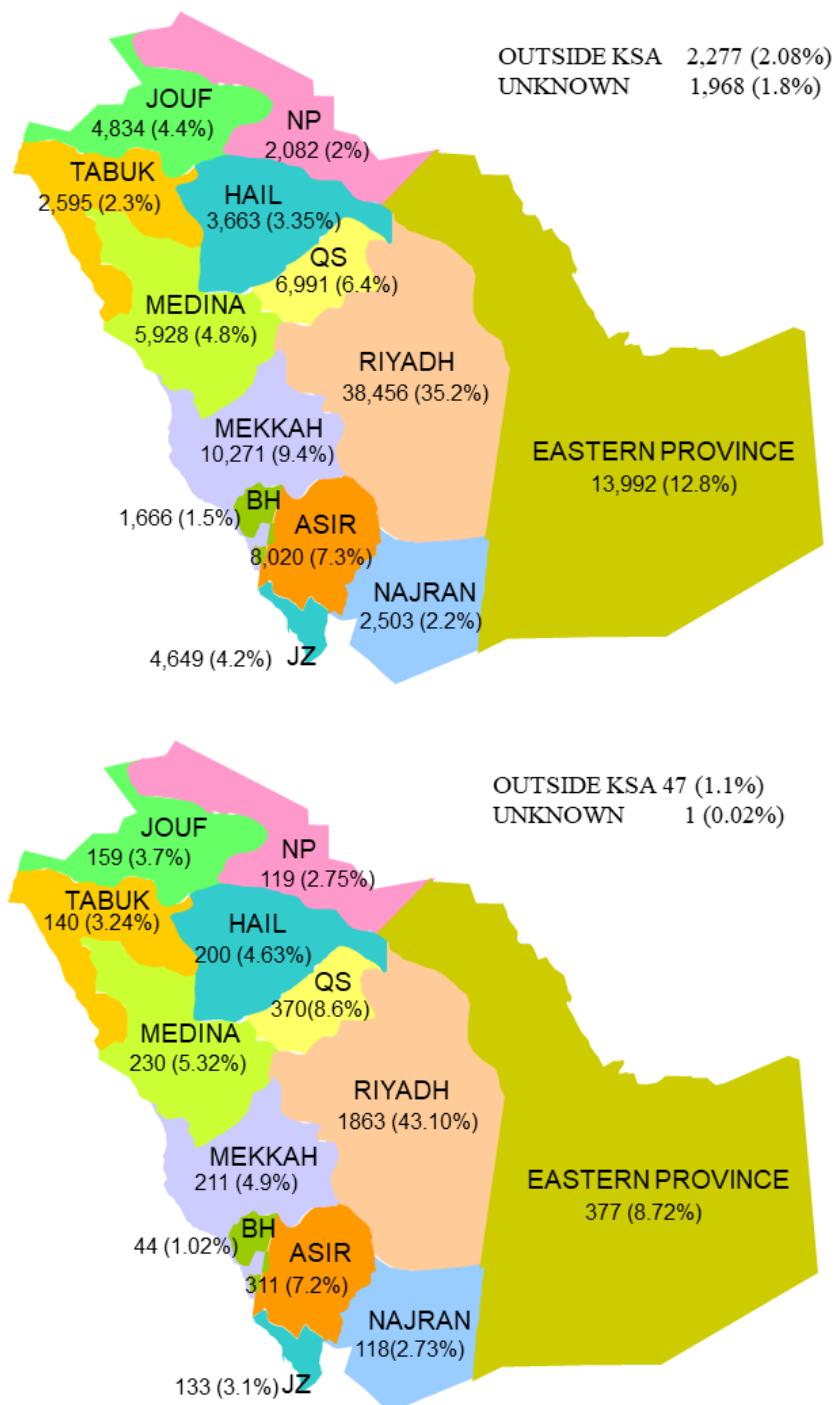
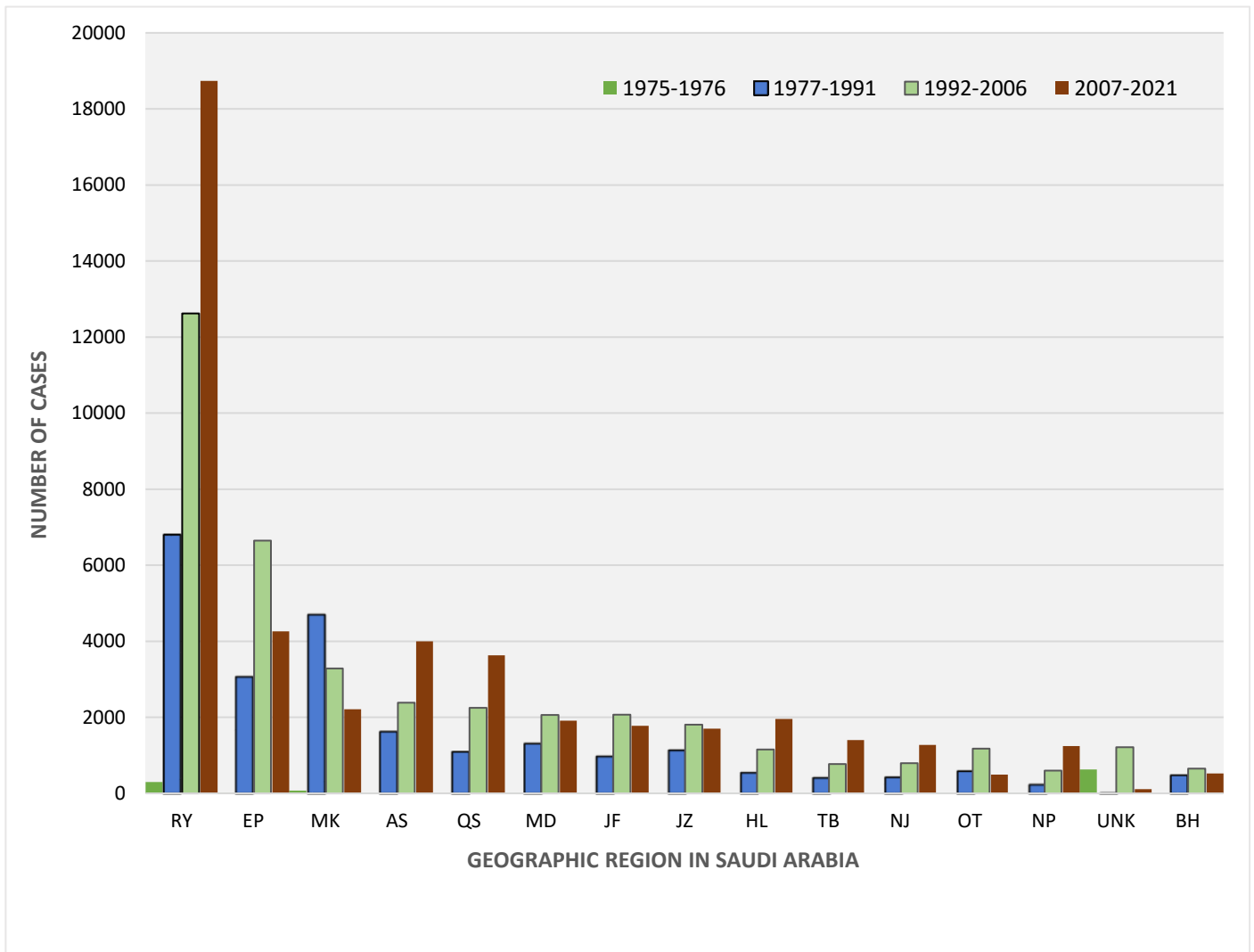


FIGURE 5
DISTRIBUTION OF CASES BY REGION (1975–2021)
15-YEAR PERIOD



RY: Riyadh, EP: Eastern province, MK: Makkah, AS: Assir, QS: Qassim, MD: Madinah, JF: Jouf, JZ: Jazan, HL: Hail, TB: Tabouk, NJ: Najran, OT: Other, NP: Northern Province, UNK: Unknown, BA: Baha

IV. TRENDS IN RELATIVE FREQUENCY OF CANCER AT KFSH&RC

Acceptance of cases to KFSH&RC is based on eligibility criteria, considering the nature of disease and availability of services.

Breast cancer led the list of total cancer cases seen from 1975 to 2021 with (11.8%), followed by Leukemia (8.8%), Thyroid (7.1%), Non-Hodgkin Lymphoma (6.8%) and Brain (6.3%).

FIGURE 6
DISTRIBUTION OF 20 MOST COMMON MALIGNANCIES
(1975-2021)
(TOTAL CASES = 109,265)

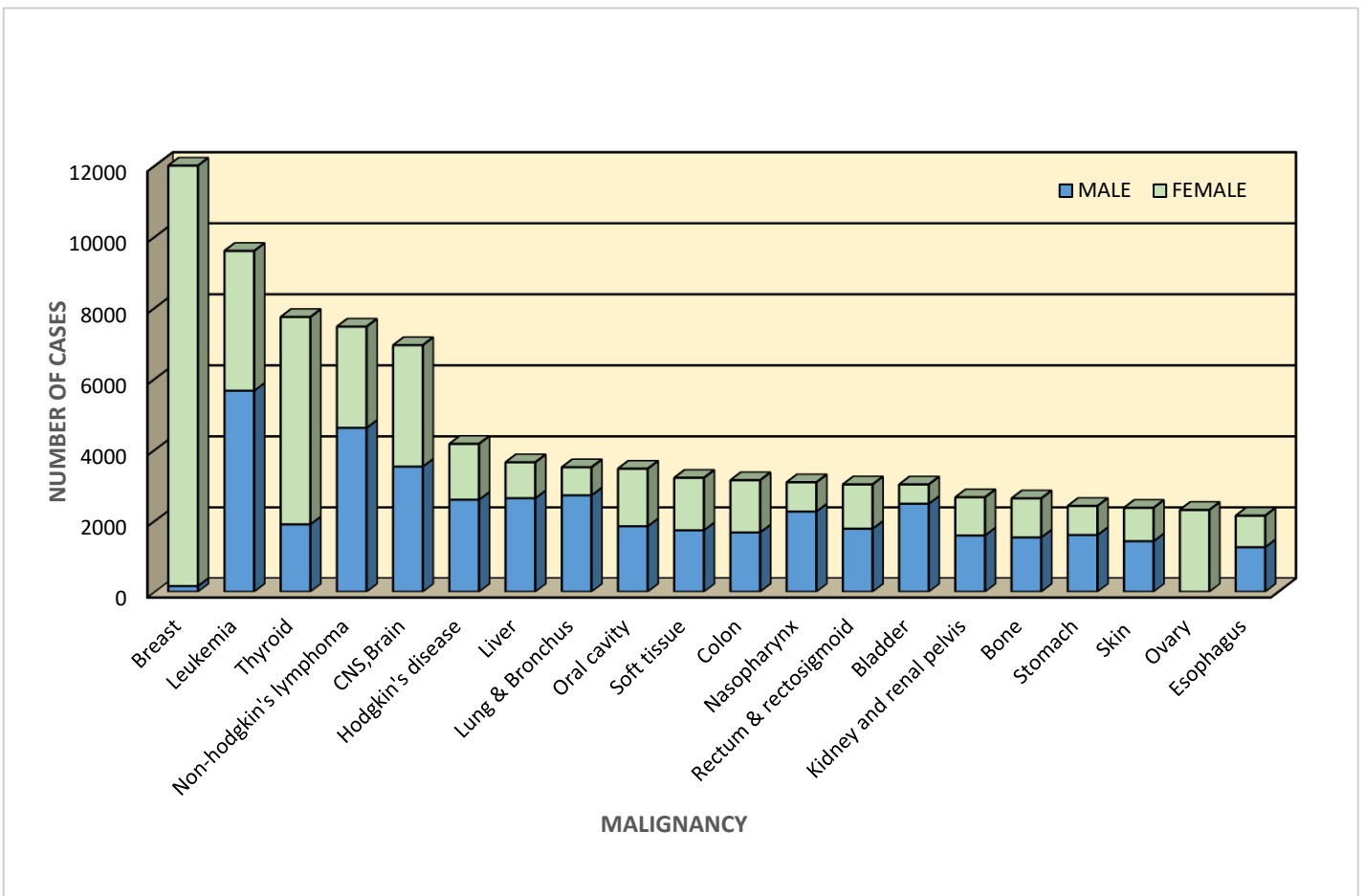
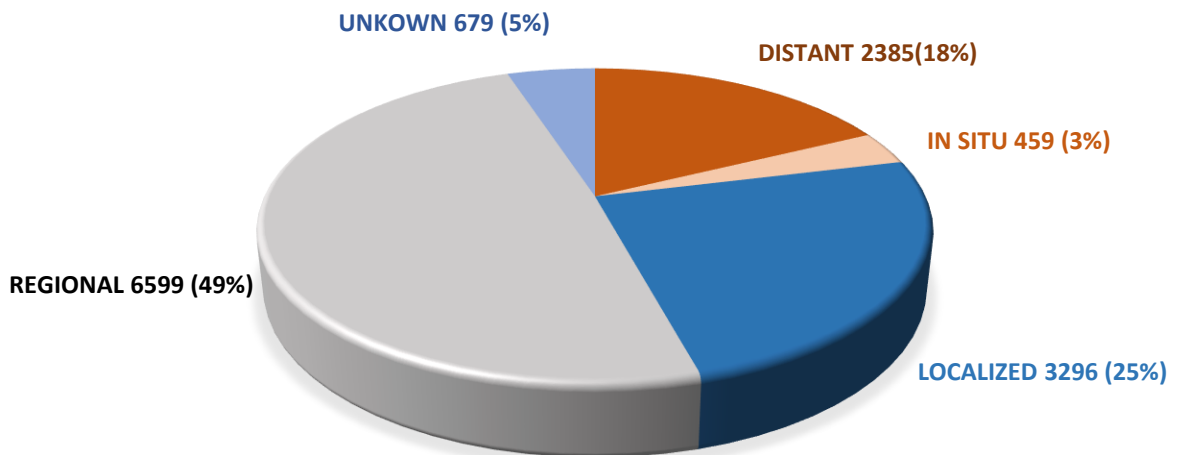
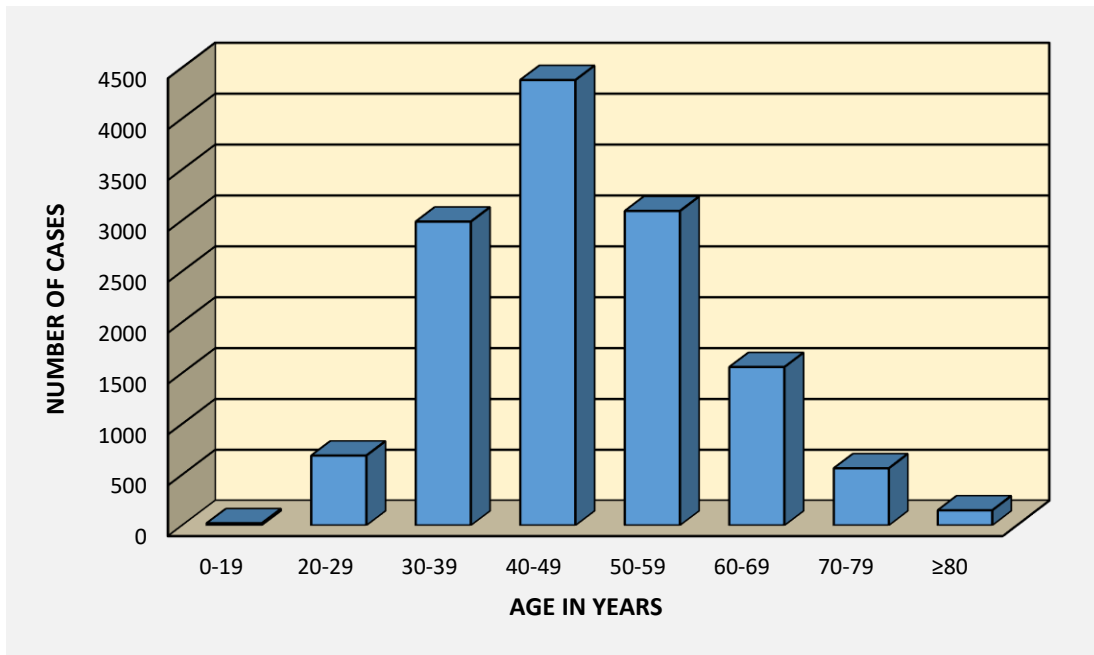
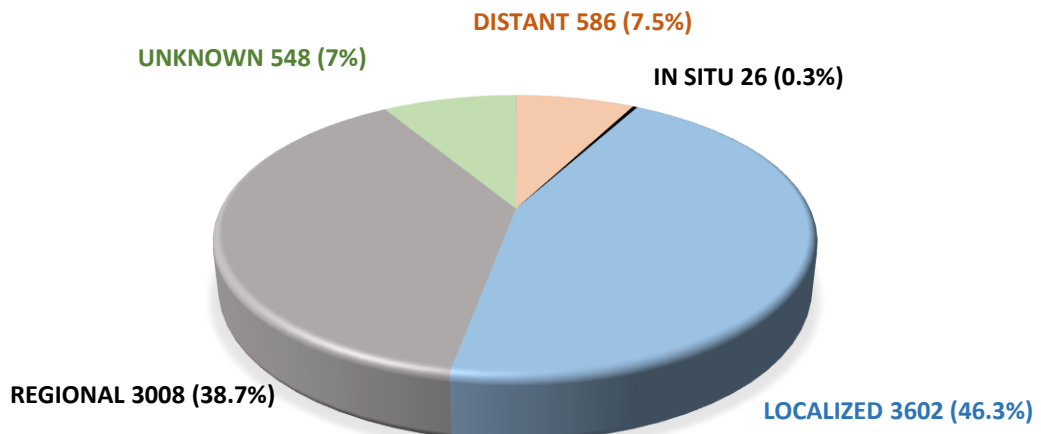
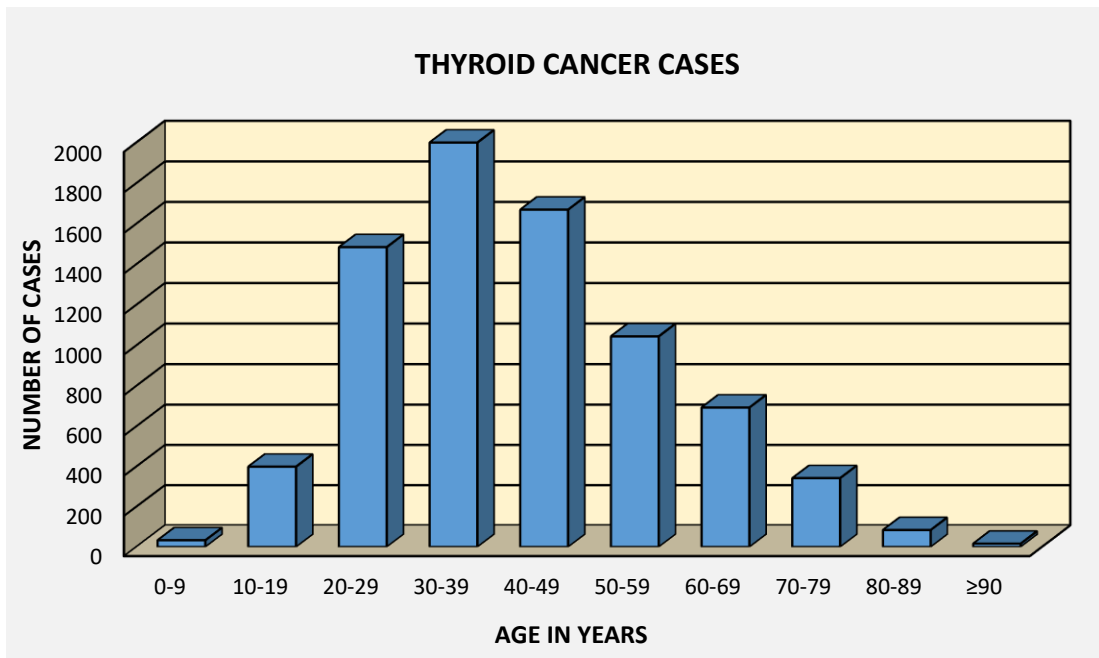
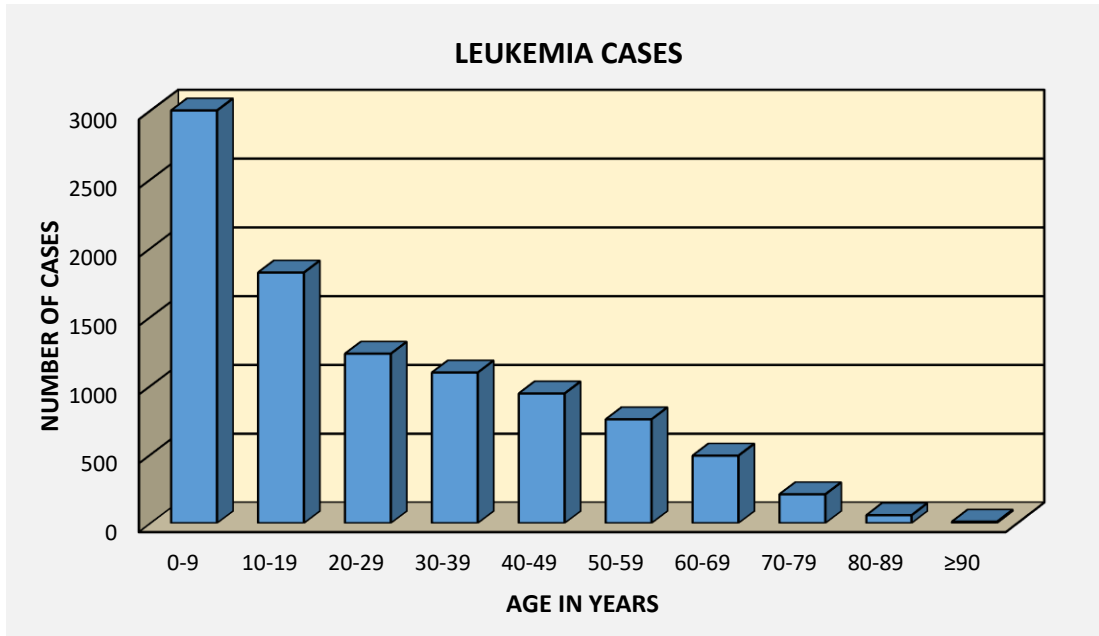


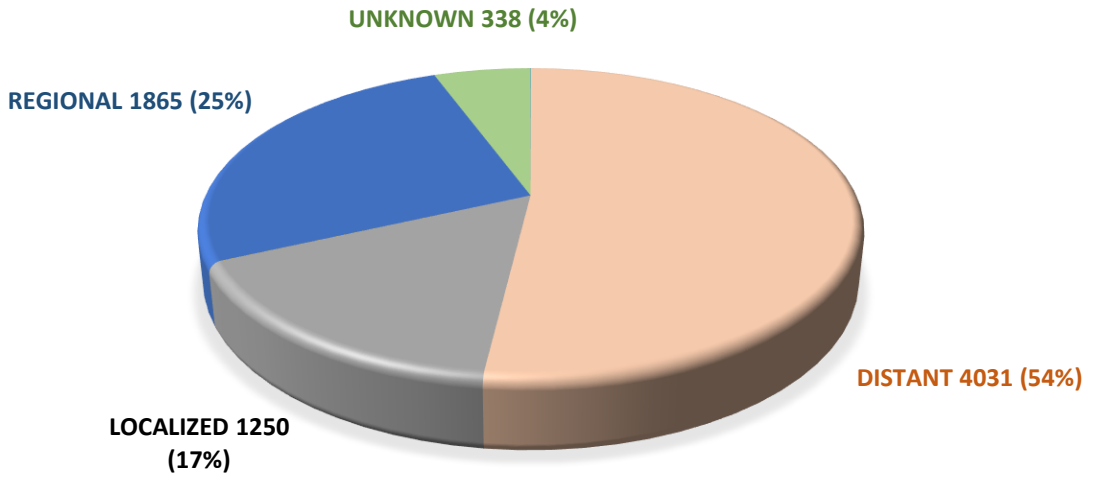
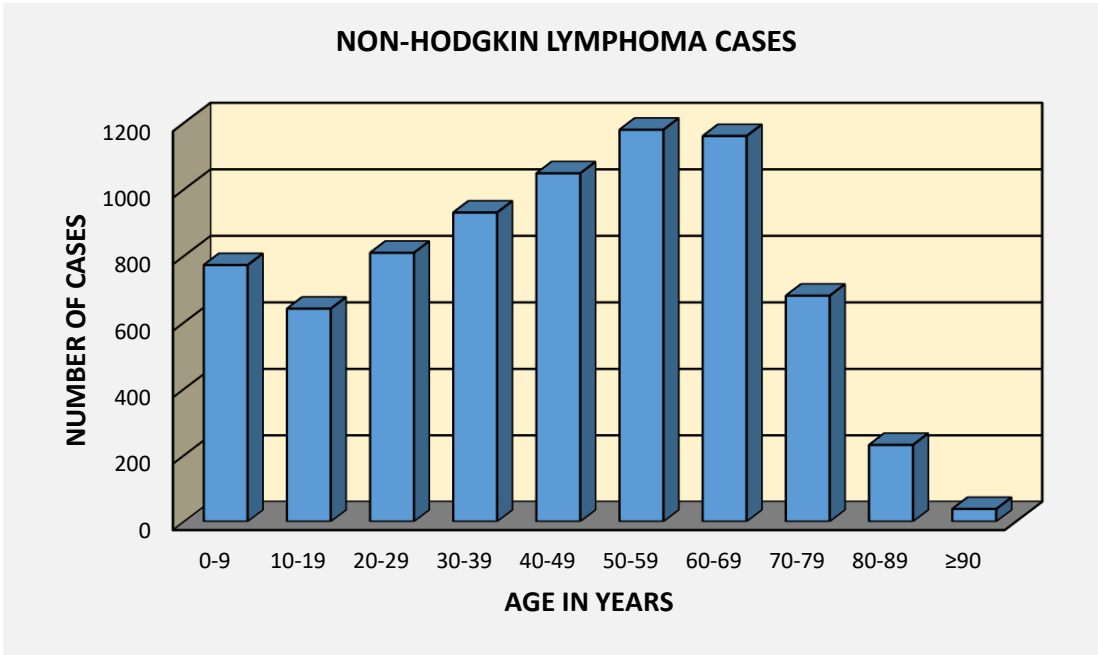
FIGURE 7

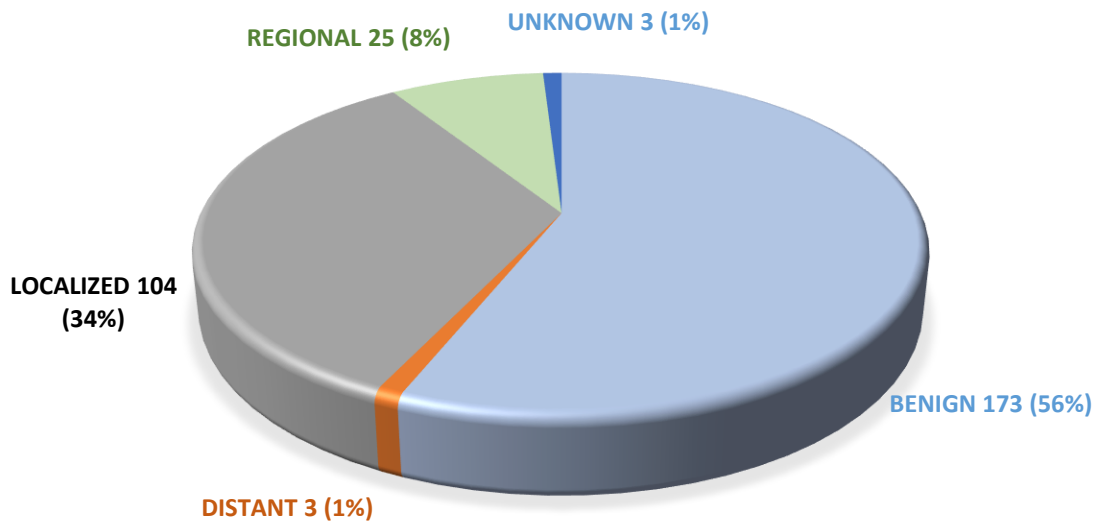
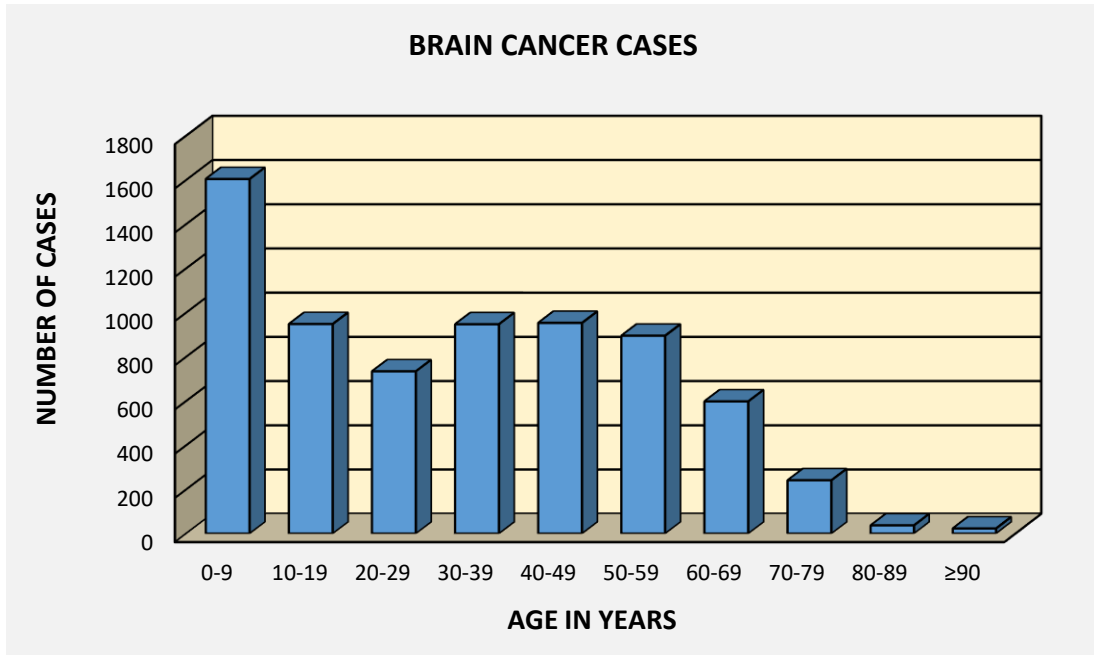
**DISTRIBUTION OF 5 MOST COMMON MALIGNANCIES
BY AGE AT DIAGNOSIS AND SEER SUMMARY STAGE (1975 – 2021)**

BREAST CANCER CASES







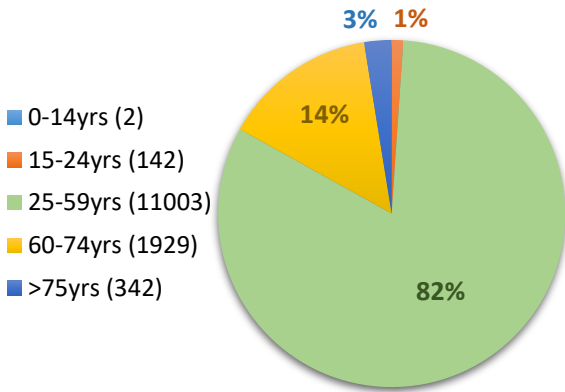


Reference; SEER Summary stage 2018

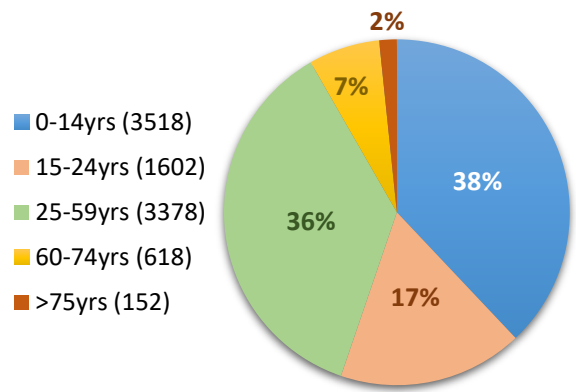
FIGURE 8

TEN MOST COMMON MALIGNANCIES BY AGE GROUP AT DIAGNOSIS (1975-2021)

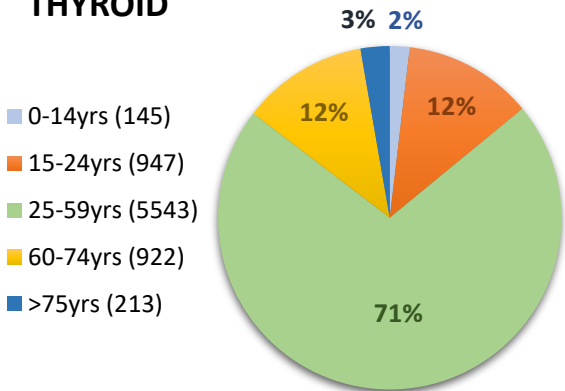
BREAST



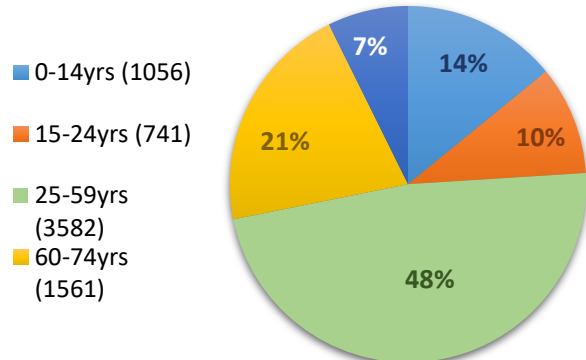
LEUKEMIA



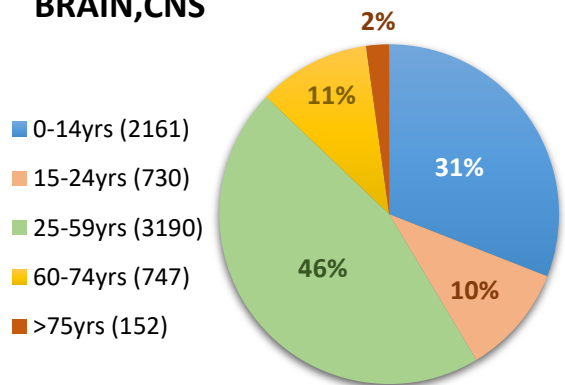
THYROID



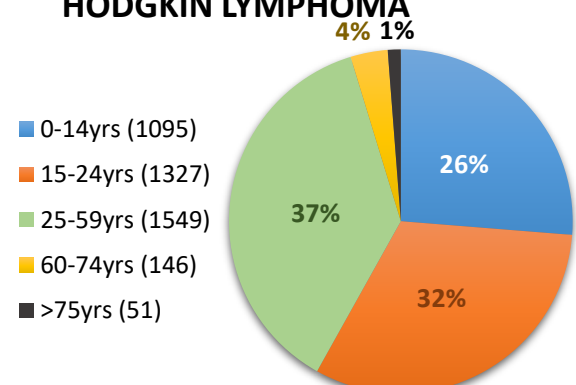
NON-HODGKIN LYMPHOMA



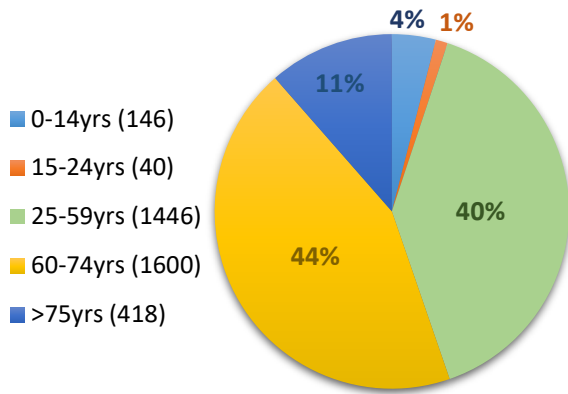
BRAIN,CNS



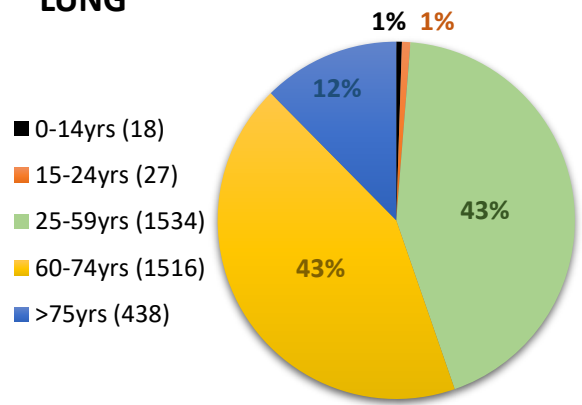
HODGKIN LYMPHOMA



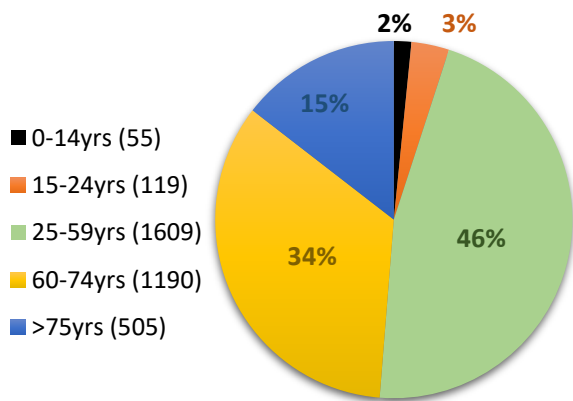
LIVER



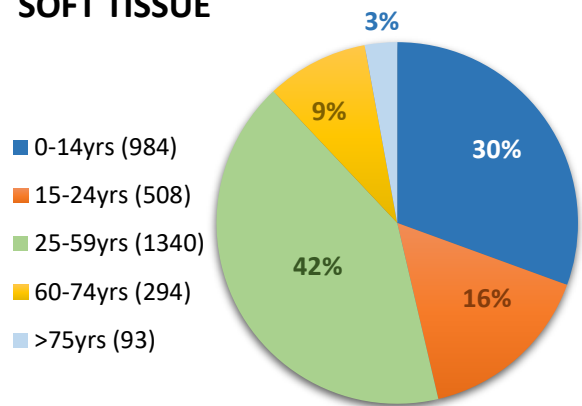
LUNG



ORAL CAVITY



SOFT TISSUE



Cancer among pediatrics (under the age of 15) accounted for 12.02% of all cases from 1975 to 2021. The five most common pediatric malignancies were Leukemia (29.4%), Brain (16.4%), Hodgkin disease (8.3%), Non-Hodgkin Lymphoma (8.03%), Soft tissue (7.5%).

FIGURE 9

DISTRIBUTION OF 10 MOST COMMON PEDIATRIC MALIGNANCIES (1975-2021)
(TOTAL CASES = 13,139)

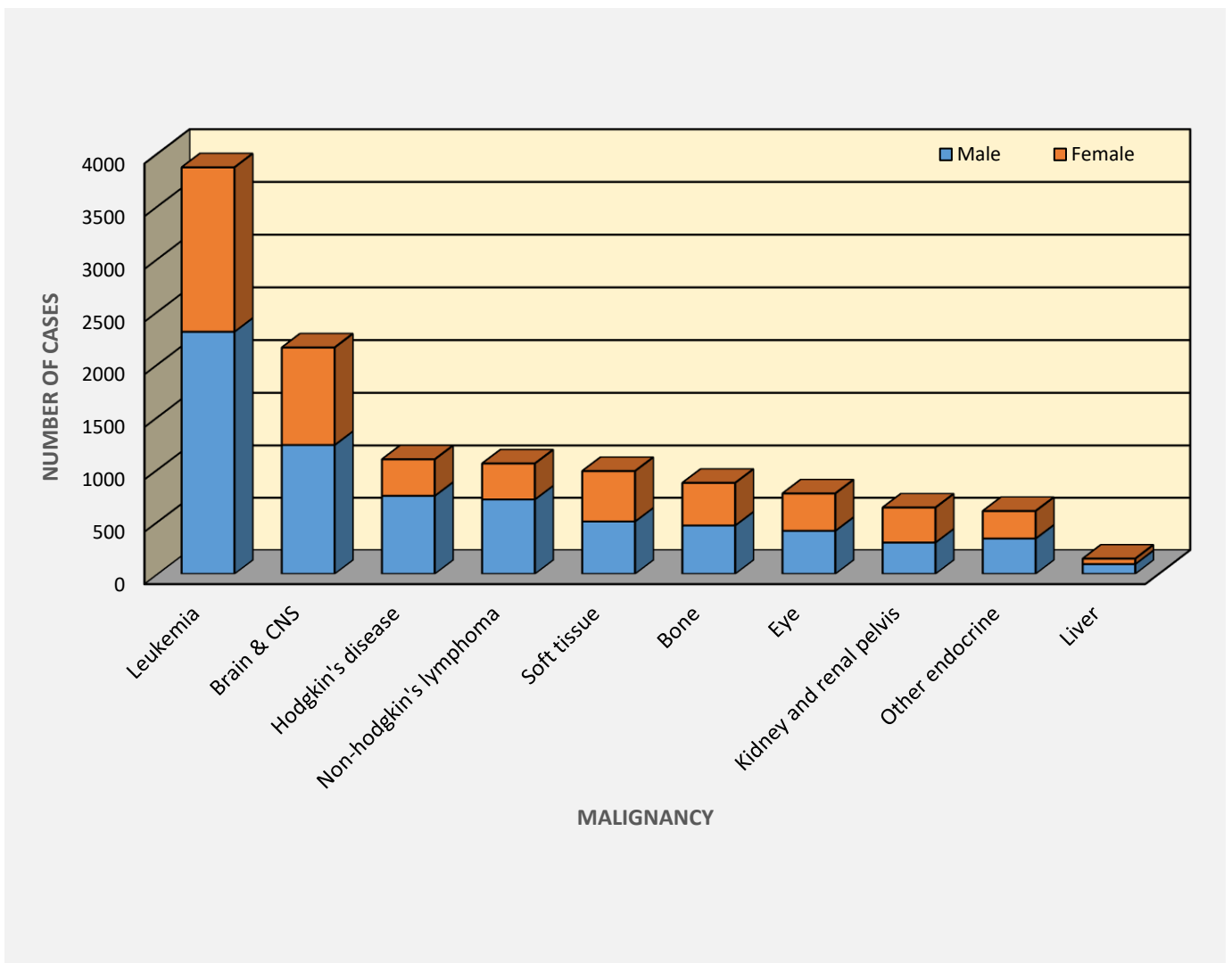
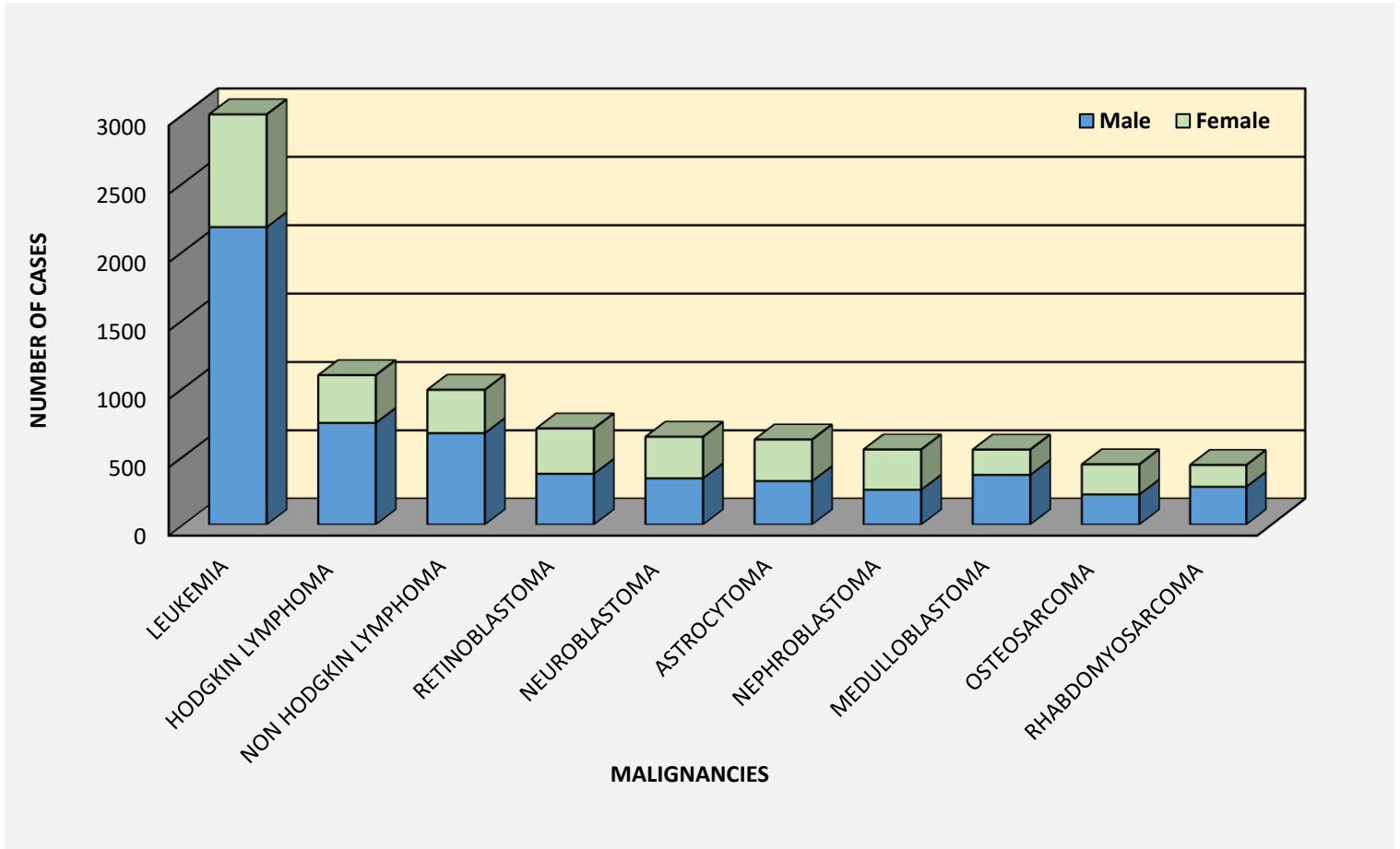


FIGURE 10

DISTRIBUTION OF 10 MOST COMMON PEDIATRIC MALIGNANCIES BY HISTOLOGY (1975-2021)
(TOTAL CASES = 13,139)



**TABLE 2
CASES SEEN AT KFSH&RC BY SITE AND YEAR (1975-2021)**

Site Group	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Oral Cavity	1	8	21	59	44	53	43	59	74	52	80	56	76	95	83	75	86
Nasopharynx	3	17	51	55	63	54	64	69	93	72	69	74	104	101	87	93	80
Esophagus	1	15	51	62	67	67	57	62	77	78	56	69	76	66	68	72	66
Stomach	2	15	32	35	50	37	49	51	64	60	49	64	61	48	52	53	36
Small intestine	0	0	4	0	2	2	2	1	1	5	3	5	2	1	6	4	1
Colon	1	10	10	12	12	16	21	20	16	25	13	25	41	36	32	25	41
Rectum & rectosigmoid	0	3	11	8	16	21	24	17	20	27	26	20	31	43	26	33	35
Anus,anal canal,anorectum	0	0	1	4	3	1	7	4	7	9	7	7	4	4	5	8	6
Liver	7	15	33	44	49	33	41	54	53	64	57	84	78	71	68	56	69
Gallbladder	0	2	3	4	2	2	4	6	4	4	6	7	14	9	5	9	9
Bile ducts	1	1	0	2	2	4	1	2	3	4	4	6	6	6	2	4	2
Pancreas	1	5	7	11	15	14	20	22	14	20	16	28	20	17	29	13	14
Peritoneum,Retroperitoneum	0	0	2	1	2	1	0	0	2	1	0	1	1	1	1	1	0
Other digestive	0	0	0	2	2	5	4	1	1	0	3	1	4	3	6	2	1
Nasal cavity,sinus,ear	1	3	9	7	5	7	9	10	10	5	7	5	16	14	8	13	12
Larynx	1	5	12	12	12	14	20	13	23	22	25	16	23	33	21	26	35
Lung/bronchus	3	11	23	34	45	40	56	63	74	74	87	84	85	106	90	74	85
Pleura	0	0	1	0	0	0	0	0	1	1	0	1	0	1	2	2	0
Other respir & thoracic	0	0	0	1	1	1	3	1	1	0	4	0	6	2	2	3	9
Leukemia	8	32	48	94	98	94	136	133	132	144	140	197	224	191	187	168	196
Myeloma	1	5	6	11	9	11	8	13	13	12	19	13	29	22	33	15	28
Bone	1	7	15	27	25	21	28	45	36	47	25	39	48	52	49	46	47
Soft tissue	4	19	29	38	39	37	43	46	55	65	65	76	100	90	117	112	104
Skin	2	17	31	40	50	42	55	58	62	64	69	69	54	55	59	47	58
Kaposi sarcoma	0	1	1	0	6	4	2	2	5	4	5	9	5	9	5	4	5
Breast	3	24	53	46	57	65	101	111	111	153	131	127	174	194	137	168	169
Uterus	1	11	20	23	31	22	34	33	44	47	51	65	68	71	54	62	48
Ovary	2	7	10	10	17	21	21	36	31	28	24	36	43	50	54	51	41
Vagina	0	0	5	2	0	1	2	0	2	2	3	1	2	1	2	3	3
Vulva	0	0	0	1	1	0	2	1	3	2	5	5	1	2	1	4	5
Other female genital	0	1	5	4	9	8	7	8	24	8	7	17	24	17	15	9	16
Prostate	0	7	5	4	5	10	11	18	28	19	19	17	22	27	27	24	16
Testis	0	3	9	8	10	11	15	11	7	12	14	14	17	17	9	14	14
Penis	0	1	1	0	1	0	2	2	3	4	0	0	0	2	2	5	2
Other male genital	0	0	0	0	2	0	1	0	1	0	3	0	3	0	2	0	0
Bladder	4	7	12	24	29	40	37	23	41	35	46	51	79	74	73	60	45
Kidney and renal pelvis	0	9	18	18	18	15	18	30	23	20	24	41	31	58	32	36	33
Ureter	0	0	0	0	0	0	0	0	0	1	1	0	3	1	1	0	1
Other urinary	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1
Eye	0	6	11	19	12	24	29	34	25	17	30	25	35	45	26	30	9
Brain,CNS	4	29	35	57	38	41	56	107	71	72	68	102	134	135	136	116	118
Thyroid	2	8	17	29	37	47	59	54	68	71	64	88	121	117	113	95	114
Other endocrine	2	11	14	11	20	27	30	31	38	47	35	37	41	53	32	40	46
Hodgkin's disease	13	19	40	41	36	42	47	42	54	50	49	45	65	57	76	56	57
Non-hodgkin's lymphoma	4	23	73	75	103	112	128	116	172	139	124	142	157	153	165	154	123
Unknown or ill-defined	3	11	23	24	20	27	34	30	33	26	25	25	38	33	43	39	40
TOTAL	76	368	752	959	1065	1094	1331	1439	1620	1613	1558	1795	2166	2183	2044	1924	1926

Site Group	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Oral Cavity	97	72	74	94	81	87	69	91	100	69	68	99	78	101	82	103
Nasopharynx	84	88	82	89	113	114	126	120	100	147	92	119	117	102	92	89
Esophagus	69	47	50	50	52	52	62	34	52	37	42	43	37	41	36	30
Stomach	49	42	68	61	59	47	42	56	54	40	50	60	68	57	59	48
Small intestine	5	4	4	6	6	4	7	7	9	5	3	5	9	6	4	5
Colon	35	25	34	38	36	34	59	49	77	77	98	107	77	82	98	89
Rectum & rectosigmoid	48	47	54	50	55	62	61	96	76	77	107	99	114	115	93	93
Anus,anal canal,anorectum	7	12	10	5	6	6	7	4	7	7	8	14	5	5	3	5
Liver	83	82	105	102	105	96	84	90	85	92	73	70	60	37	69	50
Gallbladder	13	19	21	9	11	11	12	15	13	11	12	15	14	8	8	11
Bile ducts	7	2	7	3	9	7	10	9	8	9	10	7	4	8	6	11
Pancreas	27	21	23	26	21	24	34	18	38	26	31	30	34	27	42	26
Peritoneum,Retroperitoneum	2	1	0	2	0	0	1	2	2	1	1	1	4	4	3	3
Other digestive	2	4	0	3	0	0	0	0	0	2	0	3	4	2	1	1
Nasal cavity,sinus,ear	9	10	11	10	9	4	10	14	11	9	11	10	9	13	13	12
Larynx	27	31	35	37	36	31	30	36	32	33	26	47	41	36	26	32
Lung/bronchus	79	85	89	87	84	88	106	108	91	80	91	86	94	84	64	60
Pleura	3	4	3	1	2	1	1	2	3	8	1	4	3	3	1	3
Other respir & thoracic	7	7	8	4	4	8	8	9	2	1	5	2	4	3	4	1
Leukemia	176	202	180	225	180	242	257	289	272	252	270	267	230	214	236	213
Myeloma	26	25	40	30	21	14	23	16	28	20	19	20	23	23	22	31
Bone	65	59	68	65	63	74	79	72	80	94	83	66	74	72	72	56
Soft tissue	68	62	82	96	62	80	86	101	85	79	70	83	89	74	58	85
Skin	64	61	68	51	66	57	40	65	57	67	44	57	57	61	74	35
Kaposi sarcoma	14	2	3	6	11	6	8	8	4	7	9	9	6	8	9	7
Breast	188	251	241	232	282	294	337	343	383	362	378	410	433	379	326	351
Uterus	79	70	78	72	68	73	92	90	76	103	100	114	109	94	97	107
Ovary	46	60	57	58	58	66	66	61	68	63	55	65	63	54	60	55
Vagina	2	0	5	5	2	2	1	2	1	0	1	1	2	1	0	0
Vulva	1	4	5	5	2	1	0	1	2	3	2	2	3	2	0	2
Other female genital	15	13	20	7	11	9	7	6	5	5	10	14	13	12	16	8
Prostate	41	27	45	37	49	43	44	63	47	49	49	59	59	75	46	39
Testis	21	25	21	14	15	17	16	19	21	18	28	19	21	17	11	17
Penis	0	1	3	0	1	3	0	0	2	0	1	1	0	2	0	0
Other male genital	0	1	1	0	0	0	1	0	0	1	2	1	2	1	2	0
Bladder	66	88	72	60	56	65	85	91	80	82	71	93	102	89	67	69
Kidney and renal pelvis	52	51	65	48	47	50	59	71	57	72	65	55	70	64	67	70
Ureter	1	1	1	1	1	0	3	1	2	3	2	2	1	2	0	1
Other urinary	1	0	0	0	0	0	0	2	1	0	0	0	1	2	0	0
Eye	15	39	27	15	22	31	17	24	26	17	16	21	18	15	20	11
Brain,CNS	153	139	163	176	178	180	216	208	237	243	218	186	200	163	152	116
Thyroid	143	136	159	134	162	161	192	211	186	189	169	215	214	216	206	229
Other endocrine	45	30	24	20	31	37	27	29	33	29	29	49	42	41	31	24
Hodgkin's disease	75	73	78	88	76	76	98	116	131	121	121	132	144	130	101	118
Non-hodgkin's lymphoma	150	154	160	158	157	193	208	207	204	175	186	206	218	181	167	178
Unknown or ill-defined	52	42	62	36	42	35	50	50	46	49	53	48	49	33	29	19
TOTAL	2212	2219	2406	2316	2352	2485	2741	2906	2894	2834	2780	3016	3019	2759	2573	2513

Site Group	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTAL
Oral Cavity	90	91	62	87	74	81	87	90	96	77	86	77	85	65	3478
Nasopharynx	93	68	85	90	71	84	71	70	78	87	76	76	66	105	3943
Esophagus	31	31	29	31	30	21	30	25	26	30	33	32	29	26	2148
Stomach	52	64	65	59	61	67	76	57	42	38	40	62	42	78	2421
Small intestine	6	7	6	9	10	11	21	7	9	13	6	8	14	14	269
Colon	83	96	86	104	103	120	132	155	135	141	123	154	131	242	3176
Rectum & rectosigmoid	83	92	83	93	99	92	102	111	113	151	86	104	89	125	3031
Anus,anal canal,anorectum	5	1	4	2	3	5	7	4	10	6	2	3	5	9	254
Liver	73	89	97	112	105	104	94	103	110	105	119	107	116	157	3650
Gallbladder	10	6	9	11	5	11	23	17	12	21	22	28	28	25	521
Bile ducts	7	12	13	8	10	9	12	17	16	7	9	18	28	34	367
Pancreas	33	40	38	31	46	61	62	50	50	64	53	80	67	91	1480
Peritoneum,Retroperitoneum	3	2	3	2	6	9	5	5	16	13	11	18	15	9	158
Other digestive	4	1	2	0	0	1	0	3	2	9	6	7	1	6	99
Nasal cavity,sinus,ear	9	8	5	4	7	4	4	11	10	12	14	5	12	13	424
Larynx	31	26	10	17	19	21	18	24	20	18	24	18	19	33	1147
Lung/bronchus	63	61	63	73	72	82	92	65	79	82	76	108	71	118	3515
Pleura	2	4	1	0	3	3	0	4	1	2	1	2	2	2	79
Other respir & thoracic	6	7	9	7	5	5	2	3	6	2	0	6	3	5	177
Leukemia	253	241	267	231	292	267	259	253	288	306	275	260	239	270	9628
Myeloma	18	39	36	28	16	31	26	25	30	23	30	27	34	45	1037
Bone	85	66	72	65	58	51	72	39	54	73	66	73	69	97	2640
Soft tissue	63	62	73	68	74	73	64	66	53	47	61	67	60	89	3219
Skin	49	47	46	48	43	53	49	56	56	58	35	57	29	36	2418
Kaposi sarcoma	7	7	10	5	3	5	12	10	4	8	2	6	5	11	279
Breast	358	339	376	414	377	434	488	398	420	506	491	594	495	714	13418
Uterus	108	120	89	107	115	98	143	125	118	139	147	170	192	199	3977
Ovary	75	64	79	61	65	66	70	55	57	47	63	69	55	89	2352
Vagina	0	2	0	2	1	0	1	5	3	1	2	2	0	0	73
Vulva	4	4	2	5	4	2	2	1	2	7	1	1	3	7	113
Other female genital	6	10	4	4	2	6	4	5	2	0	2	2	4	3	404
Prostate	60	45	47	38	37	48	68	66	58	68	84	85	72	123	1930
Testis	28	28	30	23	14	28	33	38	25	25	28	42	40	44	911
Penis	0	1	0	0	2	0	0	0	1	0	3	1	1	1	49
Other male genital	0	0	0	1	1	0	0	2	3	0	1	0	1	0	33
Bladder	71	70	87	67	62	80	75	76	93	81	84	104	65	102	3033
Kidney and renal pelvis	86	86	85	87	84	78	97	92	100	102	84	128	71	125	2692
Ureter	0	2	2	2	0	0	0	1	1	0	0	3	0	0	41
Other urinary	0	0	0	0	3	1	1	2	1	1	1	1	3	2	27
Eye	19	17	24	32	27	22	23	21	21	27	21	19	24	25	1033
Brain,CNS	139	129	172	170	185	155	161	192	177	193	154	322	277	307	6980
Thyroid	254	225	213	245	248	246	287	292	297	317	282	298	218	322	7770
Other endocrine	47	37	38	28	40	36	35	45	24	50	47	75	49	60	1647
Hodgkin's disease	118	122	104	96	117	107	146	114	120	141	129	143	111	133	4168
Non-hodgkin's lymphoma	172	149	163	141	155	161	156	189	172	206	181	257	194	327	7488
Unknown or ill-defined	25	31	33	25	25	40	30	24	40	40	10	10	31	35	1568
TOTAL	2729	2649	2722	2733	2779	2879	3140	3013	3051	3344	3071	3729	3165	4323	109265

The largest number of cases in 2021 was noted in the 6th and 7th decades of life in males and in the 5th in females. The mean age was 47, the median was 50 and the mode was at 57. Pediatric malignancies were most common among children at two year of age and at fourteen year of age.

FIGURE 11
DISTRIBUTION OF ALL CASES BY AGE AT DIAGNOSIS (2021)
(TOTAL CASES = 4,323)

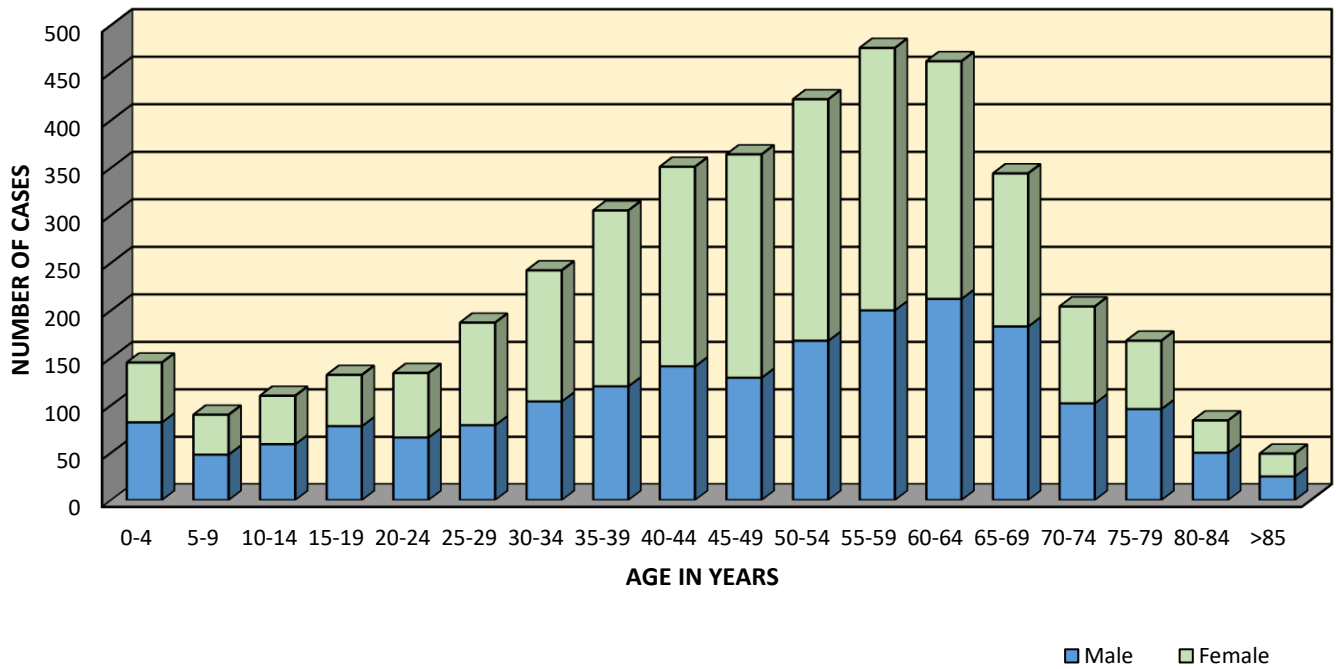
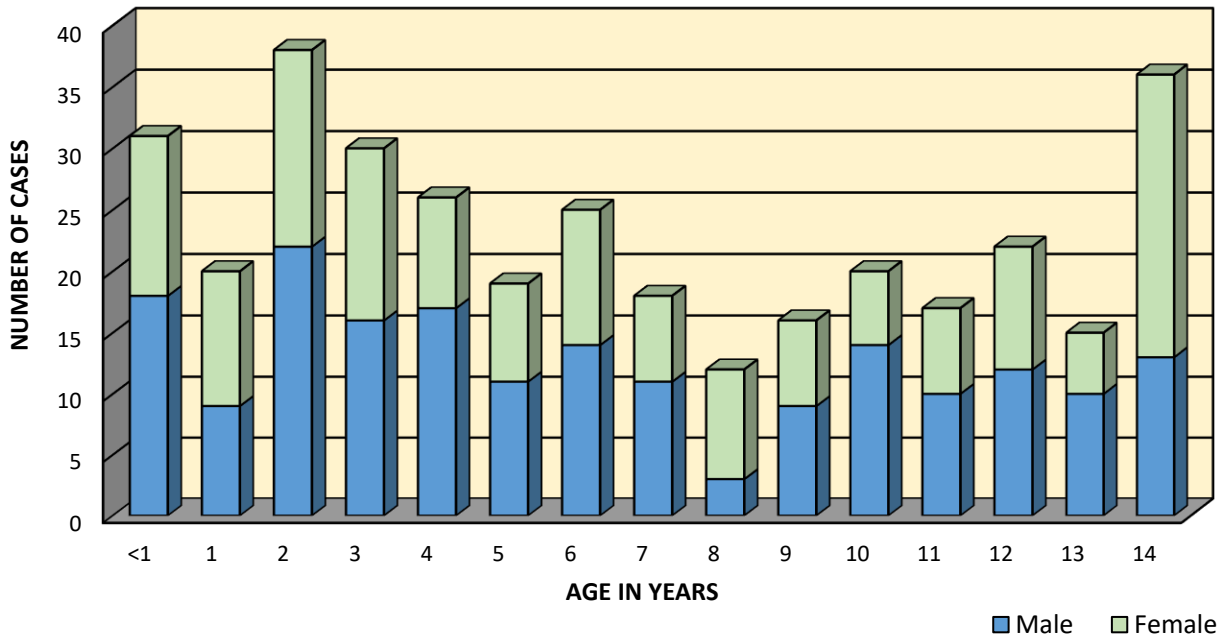


FIGURE 12
DISTRIBUTION OF PEDIATRIC CASES BY AGE AT DIAGNOSIS (2021)
(TOTAL CASES = 346)



Of the 4,323 cases in 2021, 4,049 (93.66%) were analytic (defined as cases which were first diagnosed and/or received all or part of their first course of treatment at KFSH&RC). The remaining 274 cases (6.33%) were non-analytic (defined as cases diagnosed elsewhere and received their entire first course of treatment elsewhere). Pediatric cases totaled 346, with 190 males and 156 females.

See Table 4 for the distribution of cases by site, sex, class of case, and stage at diagnosis.

**TABLE 3
CASES SEEN AT KFSH&RC BY SITE, SEX, CLASS OF CASE, AND SUMMARY STAGE (2021)**

Site Group	Total Cases	Class		Sex		STAGE				
		Analytic	NonAn	M	F	In Situ	Localized	Regional	Distant	Unstageable
ORAL CAVITY	65	62	3	38	27	0	25	33	7	0
NASOPHARYNX	105	99	6	73	32	0	4	80	21	0
ESOPHAGUS	26	26	0	18	8	0	4	14	8	0
STOMACH	78	70	8	44	34	0	22	18	38	0
SMALL INTESTINE	14	10	4	8	6	0	6	3	4	1
COLON	242	216	26	134	108	2	55	82	103	0
RECTUM & RECTOSIGMOID	125	119	6	72	53	0	27	55	42	1
ANUS,ANAL CANAL,ANORECTUM	9	9	0	7	2	0	5	4	0	0
LIVER	157	153	4	109	48	0	107	9	40	1
GALLBLADDER	25	24	1	6	19	0	6	1	18	0
BILE DUCTS	34	33	1	23	11	0	12	5	17	0
PANCREAS	91	88	3	60	31	0	14	23	52	2
PERITONEUM,RETROPERITONEUM	9	8	1	4	5	0	3	5	1	0
OTHER DIGESTIVE	6	4	2	3	3	0	1	1	4	0
NASAL CAVITY,SINUS,EAR	13	13	0	11	2	0	7	4	2	0
LARYNX	33	32	1	31	2	0	24	8	1	0
LUNG/BRONCHUS	118	112	6	87	31	0	16	21	80	1
PLEURA	2	2	0	1	1	0	1	1	0	0
OTHER RESPIR & THORACIC	5	5	0	5	0	0	2	1	1	1
LEUKEMIA	270	250	20	155	115	0	5	0	265	0
MYELOMA	45	44	1	28	17	0	0	0	45	0
BONE	97	93	4	53	44	0	53	8	35	1
SOFT TISSUE	89	83	6	55	34	0	50	12	24	3
SKIN	36	35	1	21	15	2	25	3	6	0
KAPOSIS SARCOMA	11	11	0	7	4	0	5	1	5	0
BREAST	714	687	27	9	705	30	234	323	126	1
UTERUS	199	192	7	0	199	16	115	30	37	1
OVARY	89	76	13	0	89	0	31	20	38	0
VULVA	7	7	0	0	7	1	0	2	4	0
OTHER FEMALE GENITAL	3	3	0	0	3	0	0	0	3	0
PROSTATE	123	113	10	123	0	1	55	14	52	1
TESTIS	44	34	10	44	0	0	31	10	3	0
PENIS	1	1	0	1	0	0	1	0	0	0
BLADDER	102	93	9	87	15	27	55	10	9	1
KIDNEY AND RENAL PELVIS	125	121	4	68	57	0	84	8	32	1
OTHER URINARY	2	2	0	2	0	1	1	0	0	0
EYE	25	25	0	17	8	1	23	1	0	0
BRAIN,CNS	307	298	9	138	169	0	104	25	3	175
THYROID	322	292	30	70	252	4	192	106	18	2
OTHER ENDOCRINE	60	55	5	33	27	0	15	1	10	34
HODGKIN'S DISEASE	133	124	9	79	54	0	27	35	71	0
NON-HODGKIN'S LYMPHOMA	327	297	30	201	126	0	48	25	251	3
UNKNOWN OR ILL-DEFINED	35	28	7	26	7	0	4	0	11	20
TOTAL	4323	4049	274	1951	2370	85	1499	1002	1487	250

**TABLE 4
ANALYTIC CASES SEEN AT KFSH&RC BY SITE AND AGE GROUP
(2021)**

Site Group	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	TOTAL
Oral Cavity	0	0	0	0	1	2	3	5	3	6	12	4	7	6	4	4	3	2	62
Nasopharynx	0	1	2	1	5	4	4	15	7	12	8	16	11	5	5	2	1	0	99
Esophagus	0	0	0	0	0	3	0	0	3	1	3	5	2	3	2	3	0	1	26
Stomach	0	0	0	1	0	3	2	3	4	10	10	8	9	8	3	4	2	3	70
Small intestine	0	0	0	0	0	0	0	0	0	1	1	1	2	3	1	1	0	0	10
Colon	0	0	1	0	3	4	8	20	16	14	29	32	30	22	13	11	10	3	216
Rectum & rectosigmoid	0	0	0	0	0	0	4	7	10	12	18	21	18	16	3	6	3	1	119
Anus,anal canal,anorectum	0	0	0	0	0	0	0	0	1	0	2	1	3	0	1	0	0	1	9
Liver	5	0	1	2	2	2	2	3	1	5	11	29	31	24	12	11	9	3	153
Gallbladder	0	0	0	0	0	0	0	0	0	0	3	6	6	5	2	0	2	0	24
Bile ducts	0	0	0	0	0	0	0	2	4	2	3	4	6	7	3	0	1	1	33
Pancreas	0	0	0	0	0	1	1	5	3	10	14	8	19	7	8	6	2	4	88
Peritoneum,Retroperitoneum	1	0	0	0	0	0	0	1	1	0	3	1	1	0	0	0	0	0	8
Other digestive	0	0	0	0	0	0	2	0	0	0	1	0	1	0	0	0	0	0	4
Nasal cavity,sinus,ear	0	0	0	1	0	1	0	0	2	0	1	1	1	2	0	2	0	2	13
Larynx	0	0	0	0	0	0	0	1	0	2	3	6	4	9	3	4	0	0	32
Lung/Bronchus	1	1	0	0	2	1	4	0	8	5	13	8	20	15	19	13	1	1	112
Pleura	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
Other respir & thoracic	0	0	0	1	0	1	2	0	0	0	0	0	0	0	1	0	0	0	5
Leukemia	29	20	15	19	15	12	16	14	16	16	17	16	18	13	4	6	3	1	250
Myeloma	0	0	0	0	0	0	0	0	4	6	5	6	13	5	3	2	0	0	44
Bone	2	5	19	18	11	8	9	5	4	3	3	1	1	1	0	1	1	1	93
Soft tissue	8	4	5	6	7	1	8	5	5	11	5	6	1	3	4	3	1	0	83
Skin	0	1	0	0	0	2	3	1	2	2	3	4	4	2	5	2	3	1	35
Kaposi sarcoma	0	0	0	0	0	0	0	2	0	2	1	2	1	1	2	0	0	0	11
Breast	0	0	0	1	2	18	34	69	86	109	91	104	74	46	27	15	8	3	687
Uterus	0	0	1	0	1	1	5	5	14	16	20	30	34	27	19	10	5	4	192
Ovary	2	0	1	3	3	4	5	5	11	2	6	10	10	1	4	7	2	0	76
Vulva	0	0	0	0	0	0	0	1	0	0	0	3	1	0	0	1	0	1	7
Other female genital	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	3
Prostate	0	0	0	0	0	1	0	0	0	2	5	15	14	29	15	17	11	4	113
Testis	1	0	0	2	7	9	8	2	3	2	0	0	0	0	0	0	0	0	34
Penis	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Bladder	1	0	0	0	0	1	0	3	3	4	9	10	20	9	11	13	4	5	93
Kidney and renal pelvis	12	3	0	0	1	2	6	14	12	9	13	16	14	8	3	7	1	0	121
Other urinary	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2
Eye	20	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	1	25
Brain,CNS	15	17	12	12	8	15	21	30	31	28	35	21	19	16	10	5	3	0	298
Thyroid	0	0	3	9	19	27	36	36	40	32	27	27	20	6	7	2	1	0	292
Other endocrine	5	3	3	3	4	5	6	6	4	2	4	3	2	3	1	1	0	0	55
Hodgkin's disease	2	9	16	18	17	22	11	8	9	2	3	3	3	1	0	0	0	0	124
Non-hodgkin's lymphoma	29	18	26	21	15	21	19	16	21	16	19	21	21	19	5	6	4	0	297
Unknown or ill-defined	1	1	2	1	0	1	2	2	1	1	2	4	4	2	2	1	0	1	28
TOTAL	134	83	107	119	123	172	222	287	330	345	403	455	448	325	203	166	82	45	4049

**TABLE 5
ANALYTIC MALE CASES SEEN AT KFSH&RC BY SITE AND AGE (2021)**

Site Group	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	TOTAL
Oral Cavity	0	0	0	0	0	1	3	2	3	5	8	3	6	2	0	1	2	0	36
Nasopharynx	0	1	2	0	3	3	4	10	4	7	5	11	9	5	4	2	0	0	70
Esophagus	0	0	0	0	0	2	0	0	2	1	3	3	2	2	1	2	0	0	18
Stomach	0	0	0	0	0	2	0	2	3	7	4	3	4	7	3	3	2	1	41
Small intestine	0	0	0	0	0	0	0	0	0	0	1	0	0	2	1	1	0	0	5
Colon	0	0	1	0	2	2	4	13	12	11	12	15	17	12	4	7	4	2	118
Rectum & rectosigmoid	0	0	0	0	0	0	2	4	6	6	9	11	11	11	3	2	2	0	67
Anus,anal canal,anorectum	0	0	0	0	0	0	0	0	1	0	1	1	3	0	1	0	0	0	7
Liver	3	0	0	2	0	0	1	2	0	4	8	24	18	17	6	10	8	3	106
Gallbladder	0	0	0	0	0	0	0	0	0	0	0	4	0	0	1	0	1	0	6
Bile ducts	0	0	0	0	0	0	0	2	2	1	3	4	4	3	2	0	1	0	22
Pancreas	0	0	0	0	0	0	1	4	2	5	11	4	15	4	4	2	2	4	58
Peritoneum,Retroperitoneum	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	4
Other digestive	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2
Nasal cavity,sinus,ear	0	0	0	1	0	1	0	0	1	0	0	1	1	2	0	2	0	2	11
Larynx	0	0	0	0	0	0	0	1	0	2	3	5	4	9	2	4	0	0	30
Lung/Bronchus	0	0	0	0	1	1	1	0	4	5	11	6	13	13	16	10	1	1	83
Pleura	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Other respir & thoracic	0	0	0	1	0	1	2	0	0	0	0	0	0	0	1	0	0	0	5
Leukemia	16	10	9	12	7	6	9	7	9	7	9	11	14	6	2	2	2	1	139
Myeloma	0	0	0	0	0	0	0	0	2	3	4	3	8	3	2	2	0	0	27
Bone	1	3	9	11	5	5	4	4	2	2	2	0	1	1	0	0	1	0	51
Soft tissue	5	2	1	4	4	0	7	2	4	7	3	5	0	1	2	3	1	0	51
Skin	0	0	0	0	0	0	2	1	1	1	2	2	3	2	4	0	3	0	21
Kaposi sarcoma	0	0	0	0	0	0	0	1	0	2	1	1	0	1	1	0	0	0	7
Breast	0	0	0	0	0	1	0	0	3	1	1	1	1	0	1	0	0	0	9
Prostate	0	0	0	0	0	1	0	0	0	2	5	15	14	29	15	17	11	4	113
Testis	1	0	0	2	7	9	8	2	3	2	0	0	0	0	0	0	0	0	34
Penis	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Bladder	0	0	0	0	0	0	0	2	3	4	7	8	20	8	7	13	3	4	79
Kidney and renal pelvis	4	1	0	0	0	1	2	8	9	8	6	9	5	6	1	4	1	0	65
Other urinary	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2
Eye	13	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	17
Brain,CNS	9	7	7	5	7	5	11	10	15	10	14	9	6	6	7	2	2	0	132
Thyroid	0	0	0	0	7	5	7	7	13	4	7	4	4	1	5	1	0	0	65
Other endocrine	4	2	2	2	1	1	3	5	2	2	2	0	1	1	1	0	0	0	29
Hodgkin's disease	2	6	6	11	8	12	7	6	6	2	3	2	2	1	0	0	0	0	74
Non-hodgkin's lymphoma	16	10	20	16	7	11	14	9	17	8	10	14	9	13	2	4	3	0	183
Unknown or ill-defined	1	1	2	1	0	1	1	1	1	1	1	2	3	2	2	1	0	0	21
TOTAL	75	43	59	68	59	71	95	106	131	120	159	183	201	170	102	95	50	23	1810

**TABLE 6
ANALYTIC FEMALE CASES SEEN AT KFSH&RC BY SITE AND AGE (2021)**

Site Group	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	TOTAL
Oral Cavity	0	0	0	0	1	1	0	3	0	1	4	1	1	4	4	3	1	2	26
Nasopharynx	0	0	0	1	2	1	0	5	3	5	3	5	2	0	1	0	1	0	29
Esophagus	0	0	0	0	0	1	0	0	1	0	0	2	0	1	1	1	0	1	8
Stomach	0	0	0	1	0	1	2	1	1	3	6	5	5	1	0	1	0	2	29
Small intestine	0	0	0	0	0	0	0	0	0	1	0	1	2	1	0	0	0	0	5
Colon	0	0	0	0	1	2	4	7	4	3	17	17	13	10	9	4	6	1	98
Rectum & rectosigmoid	0	0	0	0	0	0	2	3	4	6	9	10	7	5	0	4	1	1	52
Anus,anal canal,anorectum	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	2
Liver	2	0	1	0	2	2	1	1	1	1	3	5	13	7	6	1	1	0	47
Gallbladder	0	0	0	0	0	0	0	0	0	0	3	2	6	5	1	0	1	0	18
Bile ducts	0	0	0	0	0	0	0	0	2	1	0	0	2	4	1	0	0	1	11
Pancreas	0	0	0	0	0	1	0	1	1	5	3	4	4	3	4	4	0	0	30
Peritoneum,Retroperitoneum	1	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	4
Other Digestive system	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
Nasal cavity,sinus,ear	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
Larynx	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
Lung/Bronchus	1	1	0	0	1	0	3	0	4	0	2	2	7	2	3	3	0	0	29
Pleura	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Leukemia	13	10	6	7	8	6	7	7	7	9	8	5	4	7	2	4	1	0	111
Myeloma	0	0	0	0	0	0	0	0	2	3	1	3	5	2	1	0	0	0	17
Bone	1	2	10	7	6	3	5	1	2	1	1	1	0	0	0	1	0	1	42
Soft tissue	3	2	4	2	3	1	1	1	1	4	2	1	1	2	2	0	0	0	32
Skin	0	1	0	0	0	2	1	0	1	1	1	2	1	0	1	2	0	1	14
Kaposi sarcoma	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	4
Breast	0	0	0	1	2	17	34	69	83	108	90	103	73	46	26	15	8	3	678
Uterus	0	0	1	0	1	1	5	5	14	16	20	30	34	27	19	10	5	4	192
Ovary	2	0	1	3	3	4	5	5	11	2	6	10	10	1	4	7	2	4	76
Vulva	0	0	0	0	0	0	0	1	0	0	0	3	1	0	0	1	0	1	7
Other female genital	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	3
Bladder	1	0	0	0	0	1	0	1	0	0	2	2	0	1	4	0	1	1	14
Kidney & Renal pelvis	8	2	0	0	1	1	4	6	3	1	7	7	9	2	2	3	0	0	56
Eye	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	8
Brain,CNS	6	10	5	7	1	10	10	20	16	18	21	12	13	10	3	3	1	0	166
Thyroid	0	0	3	9	12	22	29	29	27	28	20	23	16	5	2	1	1	0	227
Other endocrine	1	1	1	1	3	4	3	1	2	0	2	3	1	2	0	1	0	0	26
Hodgkin's disease	0	3	10	7	9	10	4	2	3	0	0	1	1	0	0	0	0	0	50
Non-hodgkin's lymphoma	13	8	6	5	8	10	5	7	4	8	9	7	12	6	3	2	1	0	114
Unknown or ill-defined	0	0	0	0	0	0	1	1	0	0	1	2	1	0	0	0	0	1	7
TOTAL	59	40	48	51	64	101	128	179	199	225	245	271	247	155	100	71	32	22	2239

TRENDS IN RELATIVE FREQUENCY OF CANCER AT KFSH&RC (CONT'D)

The crude relative frequencies of primary cancers seen at KFSH&RC are slightly different from cases of Saudi Cancer Registry. Most common tumors of SCR are (Breast, colorectal, and Thyroid), while Breast, NHL and Thyroid cancers are more common at KFSH&RC. The following 2021 cases exhibit significant differences in trends from those of 2019 of SCR data (SCR 2020 data excluded due to COVID-19 Pandemic):

TABLE 7
COMPARATIVE DATA - KFSH&RC VS SCR
(% to TOTAL CANCER CASES)

SITE	KFSH&RC 2021	SCR 2021	USA 2021
BREAST	16.5%	18.4%	14.83%
COLORECTAL	8.4%	12.1%	7.87%
NHL	7.5%	5.4%	4.29%
THYROID	7.4%	7.6%	2.33%
CNS, BRAIN	7.1%	3.1%	1.29%
LEUKEMIA	6.2%	5.3%	3.21%
UTERUS	4.6%	2.9%	4.26%
LIVER	4.6%	2.5%	2.22%
HODGKIN LYMPHOMA	3.1%	2.4%	0.46%
KIDNEY	2.9%	2.4%	4%

Breast - The most common malignancy seen at KFSH&RC is breast cancer, comprising 16.5% of all cases, as compared to 14.83% of all neoplasms diagnosed in the U.S.A. It affects mostly women under the age of 50, while in the U.S.A., those more than 50 years of age are most frequently affected. KFSH&RC as in the Western countries, it is the number one cancer among women.

Colon, Rectum – In Western countries it accounts for 7.87% of all cancers, whereas at KFSH&RC represents 8.4% of the cases.

Non-Hodgkin Lymphoma - Cases of non-Hodgkin’s lymphoma account for 4.29% of all cases in the U.S.A., NHL accounts for only 7.5% of all cancers.

Thyroid – 7.4% of all malignancies in KFSH&RC are thyroid cancer, much higher than in the West, it accounts for only 2.33% of all cases in the U.S.A.

Brain, CNS – The incidence of Brain & CNS is comparatively more frequent at KFSH&RC than in Western countries. In the U.S.A., it constitutes 1.29% of all cancers, compared to 7.1% at KFSH&RC.

Leukemia - The most striking feature is the high crude relative frequency of leukemia cases, 6.2% of all cases seen at KFSH&RC, as compared to 3.21% of all neoplasms diagnosed in the U.S.A. It is the second most common malignancy at KFSH&RC. It is also the most common malignancy among pediatric cases.

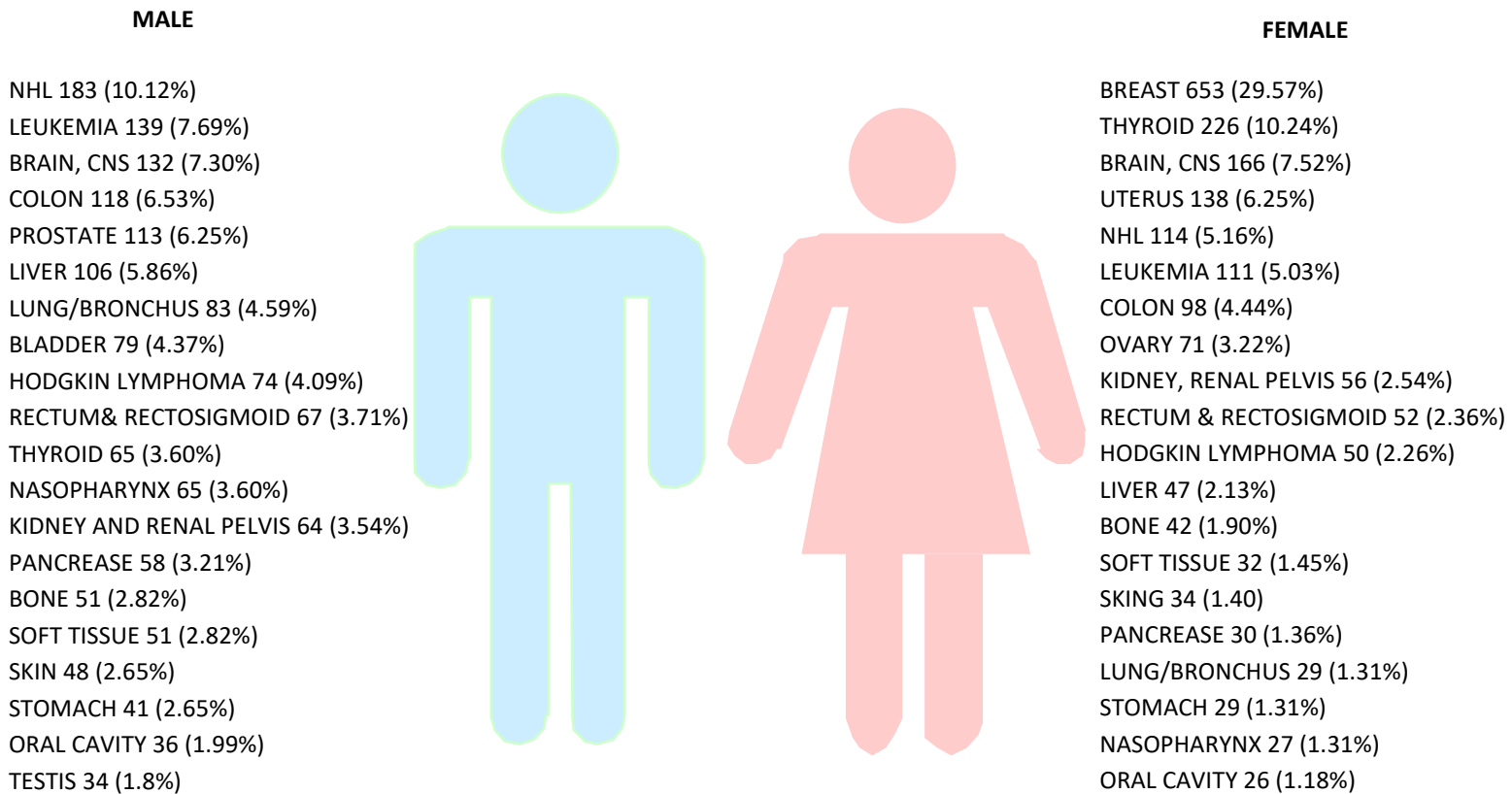
Uterus - Primary malignant neoplasms of the Uterus at KFSH&RC account for 4.6% of all malignancies. This is higher than in the U.S.A., with only 4.26% of all cases.

Liver – Frequency of Liver cancer in Western Countries is 2.22%, while in KFSH&RC it accounts for 4.6% of all cancers.

Hodgkin Disease – The relative frequency of Hodgkin Disease cases at KFSH&RC is 3.1% as compared to the West recorded as 0.46%.

Kidney & renal pelvis – Frequency of Kidney & Renal Pelvis malignancies in Western Countries is 4%, while in KFSH&RC it accounts for 2.9% of all cancers.

FIGURE 13
DISTRIBUTION OF 20 MOST COMMON MALIGNANCIES (2021 ANALYTIC CASES)
 TOTAL CASES = 4,049



This figure only categories analytic cases seen at KFSH&RC. Table 3 clearly differentiate analytic and non-analytic cases

FIGURE 14
DISTRIBUTION OF MOST COMMON PEDIATRIC MALIGNANCIES (2021 ANALYTIC CASES)
 (TOTAL CASES= 323)

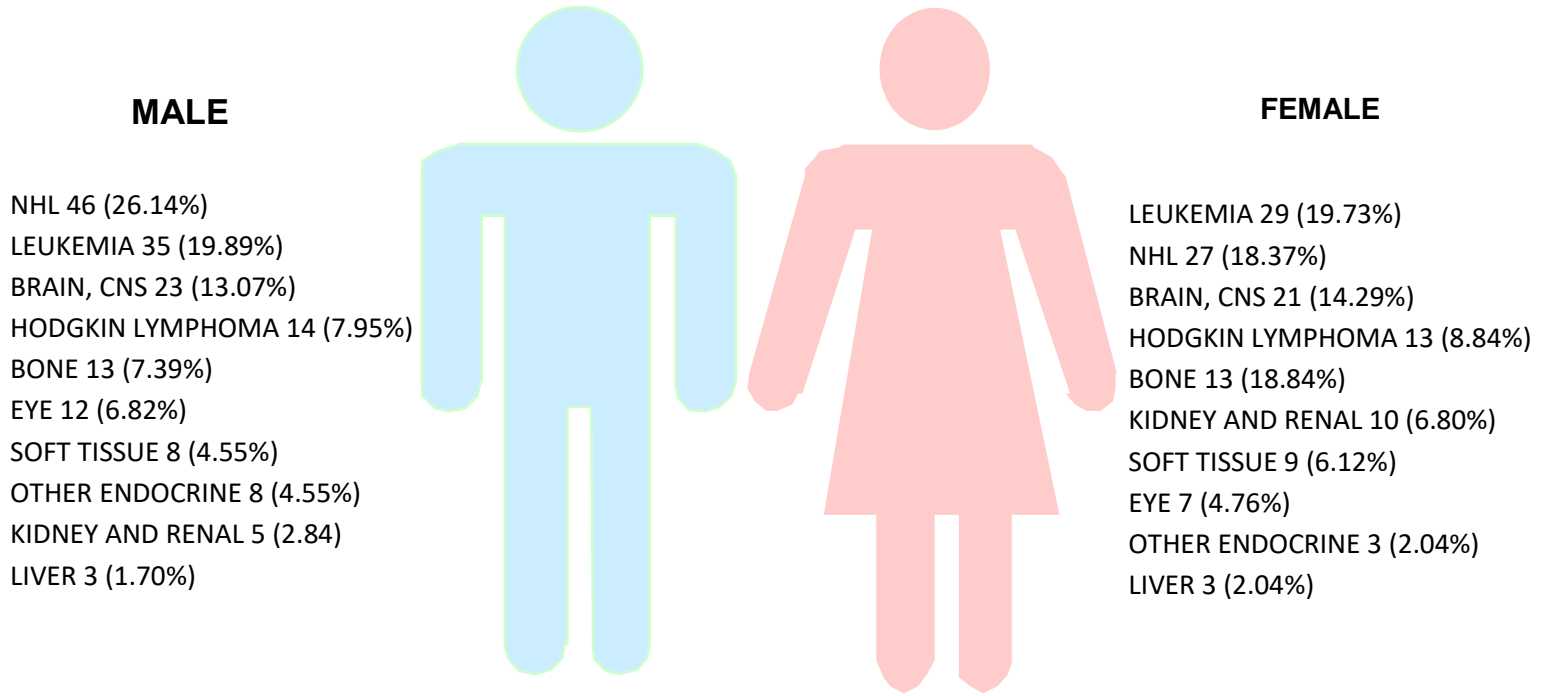
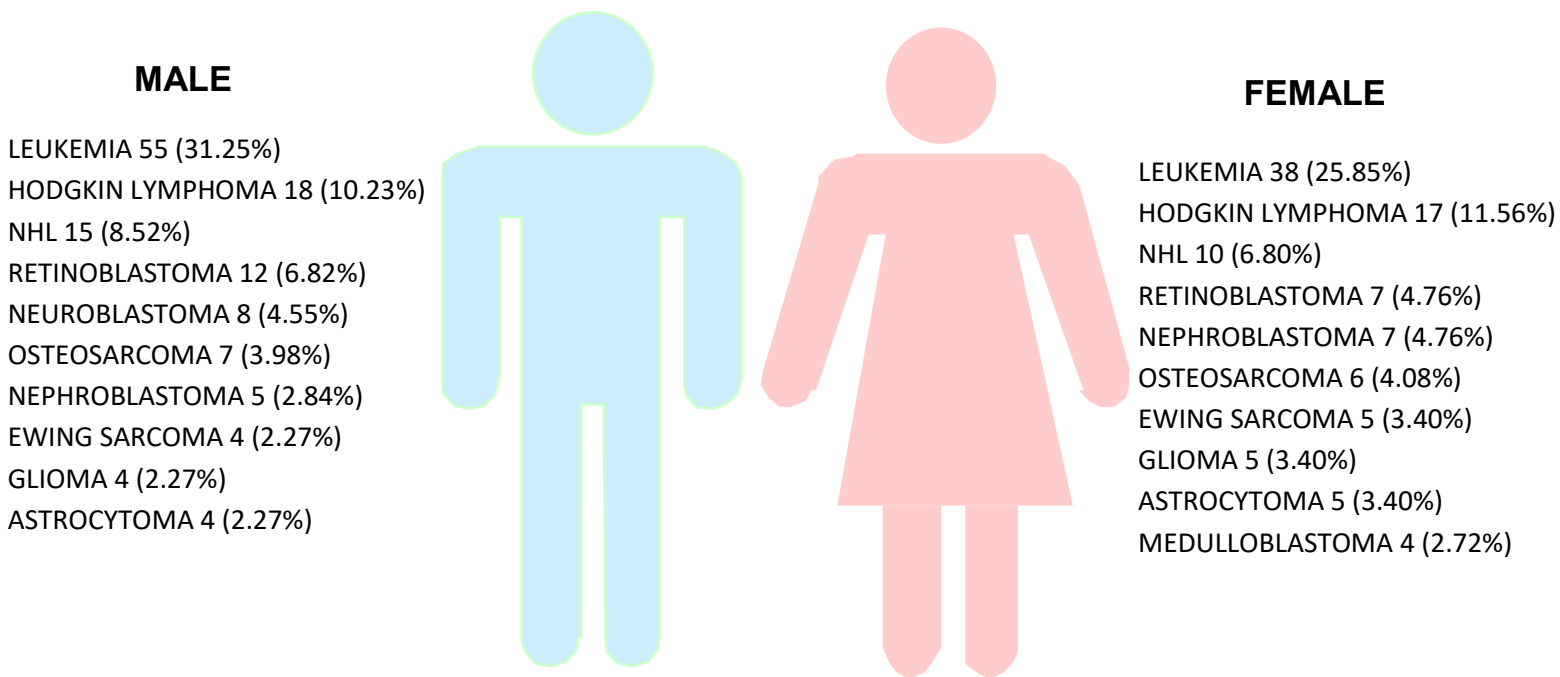


FIGURE 15
DISTRIBUTION OF MOST COMMON PEDIATRIC MALIGNANCIES BY HISTOLOGY (2021 ANALYTIC CASES)
 (TOTAL CASES= 323)



**TABLE 8
PRIMARY SITE (2021)
(INCLUDES MULTIPLE PRIMARIES)**

SITE	HISTOLOGY (NOS - NOT OTHERWISE SPECIFIED)	ALL CASES	ADULTS		PEADIATRICS	
			MALE	FEMALE	MALE	FEMALE
		4,323	1,762	2,215	190	156
LIP		3	1	2	0	0
	Adenocarcinoma NOS	1	1	0	0	0
	Squamous cell carcinoma NOS	2	0	2	0	0
TONGUE		29	18	11	0	0
	Adenosquamous carcinoma	1	1	0	0	0
	Squamous cell carcinoma keratinizing NOS	9	5	4	0	0
	Squamous cell carcinoma NOS	19	12	7	0	0
FLOOR OF MOUTH		1	1	0	0	0
	Squamous cell carcinoma NOS	1	1	0	0	0
OTHER PARTS OF MOUTH		17	9	8	0	0
	Adenocarcinoma NOS	1	1	0	0	0
	Malignant melanoma	1	0	1	0	0
	Squamous cell carcinoma keratinizing NOS	1	1	0	0	0
	Squamous cell carcinoma NOS	14	7	7	0	0
SALIVARY GLANDS, MAJOR		15	9	6	0	0
	Acinar cell carcinoma	1	0	1	0	0
	Adenocarcinoma NOS	1	1	0	0	0
	Adenoid cystic carcinoma	3	1	2	0	0
	Basal cell adenocarcinoma	1	1	0	0	0
	Carcinoma NOS	3	1	2	0	0
	Invasive carcinoma	2	2	0	0	0
	Mucoepidermoid carcinoma	2	2	0	0	0
	Squamous cell carcinoma NOS	2	1	1	0	0
TONSIL		1	1	0	0	0
	Squamous cell carcinoma	1	1	0	0	0
NASOPHARYNX		104	68	31	2	3
	Carcinoma NOS	29	21	6	1	0
	Scc large cell nonkeratinizing	66	42	22	1	0
	Squamous cell carcinoma NOS	5	3	2	0	1
	Squamous cell carcinoma HPV positive	1	0	1	0	2
HYPOPHARYNX		1	1	0	0	0
	Squamous cell carcinoma NOS	1	1	0	0	0
ESOPHAGUS		26	18	8	0	0
	Adenocarcinoma intestinal type	1	1	0	0	0
	Adenocarcinoma NOS	15	13	2	0	0
	Neuroendocrine carcinoma NOS	1	0	1	0	0
	Signet ring cell carcinoma	1	1	0	0	0
	Squamous cell carcinoma NOS	8	3	5	0	0
OTHER DIGESTIVE		6	3	3	0	0
	Adenocacarcinoma NOS	1	0	1	0	0
	Carcinoid tumor NOS	1	1	0	0	0
	Carcinoma NOS	1	0	1	0	0
	Gastrointestinal stromal sarcoma	2	2	0	0	0
	Mucinous adenocarcioma	1	0	1	0	0

SITE	HISTOLOGY (NOS - NOT OTHERWISE SPECIFIED)	ALL CASES	ADULTS		PEADIATRICS	
			MALE	FEMALE	MALE	FEMALE
STOMACH		78	44	34	0	0
	Adenocarcinoma intestinal type	8	7	1	0	0
	Adenocarcinoma NOS	46	26	20	0	0
	Adenocarcinoma with mixed subtypes	1	0	1	0	0
	Carcinoid tumor NOS	2	0	2	0	0
	Carcinoma diffuse type	1	1	0	0	0
	Carcinoma	1	0	1	0	0
	Gastrointestinal stromal sarcoma	7	4	3	0	0
	Papillary adenocarcinoma NOS	1	1	0	0	0
	Signet ring cell carcinoma	11	5	6	0	0
SMALL INTESTINE		14	8	6	0	0
	Adenocarcinoma	6	3	3	0	0
	Atypical carcinoid tumor	1	1	0	0	0
	Carcinoid tumor	2	1	1	0	0
	Gastrointestinal stromal sarcoma	6	3	2	0	0
COLON		242	133	108	1	0
	Adenocarcinoma in situ	1	1	0	0	0
	Adenocarcinoma NOS	211	115	95	1	0
	Atypical carcinoid tumor	1	1	0	0	0
	Carcinoid tumor NOS	3	2	1	0	0
	Carcinoma in situ NOS	1	0	1	0	0
	Carcinoma NOS	1	1	0	0	0
	Medullary carcinoma NOS	1	0	1	0	0
	Mucinous adenocarcinofibroma	1	0	1	0	0
	Mucinous adenocarcinoma	17	8	9	0	0
	Neoplasm malignant	1	1	0	0	0
	Neuroendocrine carcinoma NOS	1	1	0	0	0
	Pseudomyxoma peritonei	1	1	0	0	0
	Signet ring cell carcinoma	2	2	0	0	0
RECTOSIGMOID JUNCTION		125	72	53	0	0
	Adenocarcinoma NOS	122	70	52	0	0
	Mucinous adenocarcinoma	1	0	1	0	0
	Neuroendocrine carcinoma NOS	1	1	0	0	0
	Signet ring cell carcinoma	1	1	0	0	0
ANUS, ANAL CANAL, ANORECTUM		9	7	2	0	0
	Adenocarcinoma NOS	5	4	1	0	0
	Squamous cell carcinoma NOS	4	3	1	0	0
RETROPERITONEUM, PERITONEUM		9	4	4	0	1
	Gastrointestinal stromal sarcoma	1	1	0	0	0
	Liposarcoma NOS	1	1	0	0	0
	Liposarcoma well differentiated	1	0	1	0	0
	Small cell sarcoma	1	1	0	0	0
	Spindle cell sarcoma	1	0	1	0	0
	Yolk sac tumor	1	1	0	0	1
	Adenocarcinoma NOS	1	0	1	0	0
	Mesothelioma	1	0	1	0	0

SITE	HISTOLOGY (NOS - NOT OTHERWISE SPECIFIED)	ALL CASES	ADULTS		PEADIATRICS	
			MALE	FEMALE	MALE	FEMALE
LIVER, BILE DUCTS		191	129	56	3	3
	Adenocarcinoma NOS	23	15	8	0	0
	Atypical carcinoid tumor	1	1	0	0	0
	Cholangiocarcinoma	21	12	9	0	0
	Hcc & cholangiocarcinoma	1	0	1	0	0
	Gastrointestinal stromal sarcoma	1	0	1	0	0
	Hepatocellular carcinoma clear cell	1	1	0	0	0
	Hepatocellular carcinoma NOS	135	98	35	1	1
	Neuroendocrine carcinoma NOS	1	1	0	0	0
	Small cell carcinoma NOS	1	0	1	0	0
	Klatskin tumor	1	0	1	0	0
	Mucin-producing adenocarcinoma	1	1	0	0	0
	Epithelioid sarcoma	1	0	0	1	0
	Hepatoblastoma	3	0	0	1	2
GALLBLADDER		25	6	19	0	0
	Adenocarcinoma intestinal type	1	0	1	0	0
	Adenocarcinoma	22	6	16	0	0
	Carcinoma NOS	1	0	1	0	0
	Cholangiocarcinoma	1	0	1	0	0
PANCREAS		91	60	31	0	0
	Acinar cell carcinoma	1	1	0	0	0
	Adenocarcinoma NOS	75	52	23	0	0
	Atypical carcinoid tumor	2	1	1	0	0
	Carcinoid tumor	3	1	2	0	0
	Carcinoma NOS	5	2	3	0	0
	Cholangiocarcinoma	1	1	0	0	0
	Neoplasm malignant	1	0	1	0	0
	Neuroendocrine carcinoma NOS	2	1	1	0	0
	Spindle cell carcinoma NOS	1	1	0	0	0
NASAL CAVITY, MIDDLE EAR		13	11	2	0	0
	Malignant melanoma	1	1	0	0	0
	Adenocarcinoma	2	1	1	0	0
	Mucoepidermoid carcinoma	1	1	0	0	0
	Sarcoma NOS	1	0	1	0	0
	Squamous cell carcinoma keratinizing	1	1	0	0	0
	Squamous cell carcinoma large cell non keratinizing	2	2	0	0	0
	Squamous cell carcinoma NOS	5	5	0	0	0
LARYNX		33	31	2	0	0
	Carcinoma NOS	1	1	0	0	0
	Medullary carcinoma	1	1	0	0	0
	Small cell carcinoma	1	0	1	0	0
	Squamous cell carcinoma keratinizing NOS	2	2	0	0	0
	Scc keratinizing lrg cell non keratinizing	1	1	0	0	0
	Squamous cell carcinoma NOS	26	25	1	0	0
	Squamous cell carcinoma spindle cell	1	1	0	0	0

SITE	HISTOLOGY (NOS - NOT OTHERWISE SPECIFIED)	ALL CASES	ADULTS		PEADIATRICS	
			MALE	FEMALE	MALE	FEMALE
LUNG, BRONCHUS		118	87	29	0	2
	Adenocarcinoma NOS	50	34	16	0	0
	Squamous cell carcinoma	7	7	0	0	0
	Small cell carcinoma	15	12	3	0	0
	Non-samll cell carcinoma	21	18	3	0	0
	Carcinoma NOS	6	5	1	0	0
	Atypical carcinoid tumor NOS	2	1	1	0	0
	Carcinoid tumor NOS	6	3	3	0	0
	Neoplasm malignant	1	1	0	0	0
	Mucinous adenocarcinoma	1	0	1	0	0
	Mucoepidermoid carcinoma	1	1	0	0	0
	Neuroendocrine carcinoma NOS	2	1	1	0	0
	Myofibroblastic sarcoma	1	1	0	0	0
	Large cell neuroendocrine carcinoma	1	1	0	0	0
	Nut carcinoma	1	1	0	0	0
	Pseudosarcomatous carcinoma	1	1	0	0	0
	Rhabdomyosarcoma NOS	2	0	0	0	2
PLEURA		2	1	1	0	0
	Mesothelioma malignant	2	1	1	0	0
OTHER RESPIR & THORACIC		5	5	0	0	0
	Germinoma	1	1	0	0	0
	Neoplasm malignant	1	1	0	0	0
	Yolc sac tumor	3	3	0	0	0
BONE, JOINTS, CARTILAGE		97	41	31	12	13
	Osteosarcoma NOS	27	11	4	6	6
	Ewing sarcoma	21	10	4	4	3
	Chondrosarcoma	6	1	5	0	0
	Telangiectatic osteosarcoma	1	1	0	0	0
	Epithelioid carcinoma	2	0	2	0	0
	Chondroblastic osteosarcoma	3	1	1	1	0
	Spindle cell sarcoma	2	2	0	0	0
	Chordoma	1	1	0	0	0
	Giant cell sarcoma	2	1	1	0	0
	Clear cell sarcoma	1	0	1	0	0
	Rhabdomyosarcoma NOS	1	1	0	0	0
	Chondroblastoma	1	1	0	0	0
	Giant cell tumor of bone malignant	5	2	3	0	0
	Hemagiosarcoma	1	1	0	0	0
	Leiomyosarcoma	2	1	1	0	0
	Malignant tyrosynovial giant cell tumor	1	1	0	0	0
	Malignant tumor giant cell type	1	1	0	0	0
	Myxoid liposarcoma	1	0	1	0	0
	Neuroectodermal tumor	3	1	0	1	1
	Osteosarcoma in paget disease of bone	1	0	1	0	0
	Sarcoma NOS	3	1	2	0	1
	Small cell sarcoma	4	2	0	0	2
	Synovial sarcoma	2	0	2	0	0
	Synovial sarcoma spindle cell	1	0	1	0	0
	Admantinoma of long bones	1	0	1	0	0

SITE	HISTOLOGY (NOS - NOT OTHERWISE SPECIFIED)	ALL CASES	ADULTS		PEADIATRICS	
			MALE	FEMALE	MALE	FEMALE
KAPOSIS SARCOMA		11	7	4	0	0
BREAST		714	9	705	0	0
	Adenocarcinoma NOS	3	0	3	0	0
	Carcinoma NOS	6	0	6	0	0
	Comedocarcinoma noninfiltrating	1	0	1	0	0
	Caribriform carcinoma in situ	1	0	1	0	0
	Intraductal carcinoma noninfiltrating NOS	26	0	26	0	0
	Invasive ductal carcinoma	617	9	608	0	0
	Lobular carcinoma in situ NOS	3	0	3	0	0
	Lobular carcinoma NOS	47	0	47	0	0
	Metaplastic carcinoma NOS	1	0	1	0	0
	Mucinous adenocarcinoma	1	0	1	0	0
	Neoplasm malignant	1	0	1	0	0
	Neuroendocrin carcinoma NOS	1	0	1	0	0
	Papillary carcinoma in situ	1	0	1	0	0
	Papillary carcinoma NOS	2	0	2	0	0
	Phyllodes tumor malignant	1	0	1	0	0
	Spindle cell carcinoma NOS	1	0	1	0	0
	Squamous cell carcinoma NOS	1	0	1	0	0
VULVA		7	0	7	0	0
	Paget disease extramammary in situ	1	0	1	0	0
	Squamous cell carcinoma keratinizing NOS	1	0	1	0	0
	Squamous cell carcinoma large cell nonkeratinizing NOS	2	0	2	0	0
	Squamous cell carcinoma NOS	3	0	3	0	0
OTHER FEMALE GENITAL		3	0	3	0	0
	Carcinoma NOS	1	0	1	0	0
	Choriocarcinoma NOS	1	0	1	0	0
	Serous cystadenocarcinoma NOS	1	0	1	0	0
CERVIX UTERI		38	0	37	0	1
	Adenocarcinoma endocervical type	2	0	2	0	0
	Adenosquamous carcinoma	1	0	1	0	0
	Carcinoma NOS	5	0	5	0	0
	Carcinosarcoma NOS	1	0	1	0	0
	Serous cystadenocarcinoma NOS	2	0	2	0	0
	Squamous cell carcinoma keratinizing NOS	1	0	1	0	0
	Scc large cell nonkeratinizing NOS	6	0	6	0	0
	Squamous cell carcinoma NOS	6	0	6	0	0
	Squamous cell carcinoma, hpv +ve	1	0	1	0	0
	Squamous cell carcinoma insitu	1	0	1	0	0
	Squamous intraepithelial neoplasia gr3	11	0	11	0	0
	Embryonal rhabdomyosarcoma	1	0	0	0	1

SITE	HISTOLOGY (NOS - NOT OTHERWISE SPECIFIED)	ALL CASES	ADULTS		PEADIATRICS	
			MALE	FEMALE	MALE	FEMALE
BONE MARROW		270	115	86	40	29
	Acute leukemia	41	13	9	9	10
	Acute monocytic leukemia	6	2	2	1	1
	Acute myeloid leukemia	60	22	25	7	6
	Chronic myeloid leukemia	39	20	16	2	1
	Leukemia NOS	20	2	5	9	4
	Chronic myelomonocytic leukemia	1	0	1	0	0
	Acute myeloid leukemia t(8;21)(q22;q22)	3	2	1	0	0
	Aml (megakaryoblastic) w/ t(1;22)(p13;q13)	3	2	0	1	0
	Acute megakaryoblastic leukemia	1	0	0	0	1
	Aml minimal differentiation	5	2	3	0	0
	Aml with abnormal marrow eosinophils	1	1	0	0	0
	Acute myelomonocytic leukemia	3	2	1	0	0
	Acute promyelocytic leukemia t	5	2	2	0	1
	Burkitt cell leukemia	3	1	0	1	1
	Chronic myelogenous leuk.bcr/abl +ve	2	1	1	0	0
	Essential thrombocythemia	8	5	3	0	0
	Hairy cell leukemia	5	4	1	0	0
	Hypereosinophilic syndrome	1	1	0	0	0
	Langerhans cell histiocytosis NOS	9	2	1	3	3
	Mixed phenotype acute leuk., b/myeloid, NOS	1	1	0	0	0
	Myelodysplastic syndrome NOS	11	6	4	1	0
	Mpn unclassifiable	18	10	8	0	0
	Myeloproliferative disease NOS	1	1	0	0	0
	Myelosclerosis with myeloid metaplasia	5	3	1	0	1
	Polycythemia vera	9	8	1	0	0
	Precursor cell lymphoblastic leukemia	1	1	0	0	0
	T-cl Ig gran lymph leuk/3	2	1	0	1	0
	Therapy-related acute myeloid leukemia	1	0	1	0	0
	Aml 11q23 abnormalities	1	0	0	1	0
	Juvenile myelomonocytic leukemia	3	0	0	3	0
	Myeloid sarcoma	1	0	0	1	0
MYELOMA		45	28	17	0	0
	Multiple myeloma	45	28	17	0	0
SKIN (MELANOMA)		7	5	2	0	0
	Acral lentiginous melanoma malignant	1	1	0	0	0
	Malignant melanoma NOS	5	3	2	0	0
	Melanoma in situ	1	1	0	0	0
SKIN (NON MELANOMA)		29	16	12	0	1
	Basal cell carcinoma NOS	6	3	3	0	0
	Squamous cell carcinoma NOS	4	1	3	0	0
	Basal cell carcinoma nodular	5	4	1	0	0
	Basal cell adenocarcinoma	1	0	1	0	0
	Dermatofibrosarcoma NOS	3	3	0	0	0
	Basaloid squamous cell carcinoma	1	1	0	0	0
	Basosquamous carcinoma	1	1	0	0	0
	Chondrosarcoma NOS	1	0	1	0	0
	Hemangiosarcoma	1	0	1	0	0
	Infiltrating basal cell carcinoma NOS	2	1	1	0	0
	Sebaceous adenocarcinoma	1	1	0	0	0
	Skin appendage carcinoma	1	0	1	0	0
	Squamous cell carcinoma in situ NOS	1	1	0	0	0
	Myxosarcoma	1	1	0	0	0
	Osteosarcoma NOS	1	1	0	0	0
	Pleomorphic liposarcoma	2	0	2	0	0
	Synovial sarcoma NOS	2	1	1	0	0
	Undifferentiated sarcoma	1	1	0	0	0
	Malignant rhabdoid tumor	1	0	0	0	1
	Clear cell sarcoma of kidney	1	0	0	1	0
	Synovial sarcoma	1	0	0	0	1

SITE	HISTOLOGY (NOS - NOT OTHERWISE SPECIFIED)	ALL CASES	ADULTS		PEADIATRICS	
			MALE	FEMALE	MALE	FEMALE
CORPUS UTERI		143	0	143	0	0
	Adenocarcinoma NOS	18	0	18	0	0
	Carcinoma NOS	1	0	1	0	0
	Carcinosarcoma NOS	8	0	8	0	0
	Choriocarcinoma NOS	1	0	1	0	0
	Clear cell adenocarcinoma NOS	1	0	1	0	0
	Endometrioid adenocarcinoma NOS	75	0	75	0	0
	Endometrioid adenocarcinoma secretory variant	1	0	1	0	0
	Leiomyosarcoma NOS	4	0	4	0	0
	Mixed cell adenocarcinoma	2	0	2	0	0
	Neoplasm malignant	2	0	2	0	0
	Serous cystadenocarcinoma NOS	21	0	21	0	0
	Signet ring cell carcinoma	1	0	1	0	0
	Squamous cell carcinoma keratinizing NOS	1	0	1	0	0
	Scc large cell nonkeratinizing NOS	1	0	1	0	0
	Squamous cell carcinoma NOS	2	0	2	0	0
	Squamous intraepithelial neoplasia gr3	3	0	3	0	0
	Stromal sarcoma NOS	1	0	1	0	0
UTERUS, NOS		18	0	18	0	0
	Choriocarcinoma NOS	2	0	2	0	0
	Clear cell adenocarcinoma NOS	2	0	2	0	0
	Endometrial stromal sarcoma NOS	1	0	1	0	0
	Leiomyosarcoma NOS	4	0	4	0	0
	Serous cystadenocarcinoma NOS	7	0	7	0	0
	Squamous intraepithelial neoplasia gr iii	1	0	1	0	0
	Undifferentiated sarcoma	1	0	1	0	0
OVARY		89	0	84	0	5
	Adenocarcinoma NOS	7	0	7	0	0
	Carcinoma NOS	3	0	3	0	0
	Clear cell adenocarcinoma NOS	1	0	1	0	0
	Dysgerminoma	2	0	2	0	0
	Endometrioid adenocarcinoma NOS	5	0	5	0	0
	Granulosa cell tumor juvenile malignant	2	0	1	0	1
	Granulosa cell tumor malignant	6	0	6	0	0
	Leydig cell tumor malignant	1	0	1	0	0
	Mixed germ cell tumor	1	0	1	0	0
	Mucinous adenocarcinoma	8	0	8	0	0
	Papillary serous cystadenocarcinoma	1	0	1	0	0
	Serous cystadenocarcinoma NOS	44	0	44	0	0
	Spindle cell carcinoma NOS	1	0	1	0	0
	Teratoma malignant NOS	3	0	1	0	2
	Yolk sac tumor	4	0	2	0	2
PROSTATE		123	123	0	0	0
	Acinar cell cystadenocarcinoma	1	1	0	0	0
	Adenocarcinoma NOS	119	119	0	0	0
	Giant cell sarcoma (except of bone)	1	1	0	0	0
	Neoplasm malignant	1	1	0	0	0
	Papillary transitional cell ca non-invasive	1	1	0	0	0

SITE	HISTOLOGY (NOS - NOT OTHERWISE SPECIFIED)	ALL CASES	ADULTS		PEADIATRICS	
			MALE	FEMALE	MALE	FEMALE
TESTIS		44	43	0	1	0
	Embryonal carcinoma NOS	3	3	0	0	0
	Germinoma	1	1	0	0	0
	Leydig cell tumor malignant	1	1	0	0	0
	Mixed germ cell tumor	23	23	0	0	0
	Seminoma NOS	15	15	0	0	0
	Yolk sac tumor	1	0	0	1	0
PENIS		1	1	0	0	0
	Squamous cell carcinoma NOS	1	1	0	0	0
KIDNEY		125	61	46	8	10
	Adenocarcinoma NOS	1	1	0	0	0
	Carcinoma NOS	1	0	1	0	0
	Clear cell adenocarcinoma NOS	7	5	2	0	0
	Papillary adenocarcinoma NOS	2	2	0	0	0
	Papillary transitional cell carcinoma	3	2	1	0	0
	Renal cell carcinoma chromophobe type	17	13	4	0	0
	Renal cell carcinoma NOS	75	37	38	0	0
	Transitional cell carcinoma NOS	1	1	0	0	0
	Clear cell sarcoma of kidney	1	0	0	0	1
	Neoplasm uncertain whether benign or malignant	1	0	0	1	0
	Nephroblastoma	15	0	0	7	8
	Renal cell carcinoma NOS	1	0	0	0	1
URINARY BLADDER		102	87	14	0	1
	Carcinoma in situ NOS	1	1	0	0	0
	Carcinoma NOS	1	1	0	0	0
	Papillary transitional cell carcinoma	37	30	7	0	0
	Papillary transitional cell ca non-invasive	20	18	2	0	0
	Squamous cell carcinoma NOS	3	1	2	0	0
	Squamous intraepithelial neoplasia gr iii	1	0	1	0	0
	Transitional cell carcinoma in situ	7	7	0	0	0
	Transitional cell carcinoma NOS	31	29	2	0	0
	Embryonal rhabdomyosarcoma NOS	1	0	0	0	1
OTHER URINARY		2	2	0	0	0
	Papillary transitional cell carcinoma	1	1	0	0	0
	Papillary transitional cell carcinoma non-invasive	1	1	0	0	0
EYE, ADNEXA		25	4	1	13	7
	Adenocarcinoma NOS	1	1	0	0	0
	Basal cell carcinoma nodular	1	0	1	0	0
	Squamous cell carcinoma NOS	2	2	0	0	0
	Retinoblastoma NOS	19	0	0	12	7
	Retinoblastoma undifferentiated	1	0	0	1	0
	Glioma malignant	1	1	0	0	0

SITE	HISTOLOGY (NOS - NOT OTHERWISE SPECIFIED)	ALL CASES	ADULTS		PEADIATRICS	
			MALE	FEMALE	MALE	FEMALE
BRAIN		307	114	147	24	22
	Adenoma NOS	1	1	0	0	0
	Angiocentric glioma	1	1	0	0	0
	Astrocytoma anaplastic	8	4	3	0	1
	Astrocytoma NOS	11	7	2	2	0
	Atypical meningioma	5	5	4	0	0
	Atypical teratoid/rhabdoid tumor	1	0	0	1	0
	Cavernous hemangioma	1	1	0	0	0
	Central neurocytoma	1	1	0	0	0
	Chondroma NOS	1	1	0	0	0
	Chordoma NOS	1	1	0	0	0
	Choroid plexus papilloma NOS	2	0	1	1	0
	Craniopharyngioma	2	0	1	1	0
	Craniopharyngioma adamantinomatous	1	0	1	0	0
	Dermoid cyst NOS	1	1	0	0	0
	Desmoplastic nodular medulloblastoma	1	0	0	1	0
	Dysembryoplastic neuroepithelial tumor	4	1	2	1	0
	Ependymoma anaplastic	3	0	1	1	1
	Ependymoma NOS	5	1	3	0	1
	Fibrous meningioma	2	1	1	0	0
	Ganglioglioma NOS	11	3	4	2	2
	Glioblastoma NOS	38	24	13	1	0
	Glioma benign	3	1	0	1	1
	Glioma malignant	19	8	3	4	4
	Hemangioblastoma	6	5	1	0	0
	Hemangioma NOS	3	1	2	0	0
	Lipoma NOS	1	1	0	0	0
	Macrofollicular adenoma	1	1	0	0	0
	Medulloblastoma NOS	11	1	2	4	4
	Meningioma NOS	85	17	69	0	1
	Meningothelial meningioma	4	1	6	0	0
	Myofibroma	1	0	1	0	0
	Neoplasm uncertain benign or malignant	1	0	1	0	0
	Neurilemoma NOS	20	10	10	0	0
	Neuroepithelioma NOS	3	2	1	0	0
	Neurofibroma NOS	2	1	1	0	0
	Neuroma NOS	1	1	0	0	0
	Neoplasm malignant	1	0	0	0	1
	Olfactory neuroblastoma	1	1	0	0	0
	Oligodendroglioma anaplastic	3	1	2	0	0
	Oligodendroglioma NOS	7	4	3	0	0
	Pilocytic astrocytoma	13	3	0	4	6
	Pleomorphic xanthoastrocytoma	1	0	1	0	0
	Psammomatous meningioma	3	0	4	0	0
	Subependymal giant cell astrocytoma	1	0	1	0	0
	Subependymoma benign	1	1	0	0	0

SITE	HISTOLOGY (NOS - NOT OTHERWISE SPECIFIED)	ALL CASES	ADULTS		PEADIATRICS	
			MALE	FEMALE	MALE	FEMALE
THYROID		322	70	248	0	4
	Carcinoma anaplastic NOS	1	0	1	0	0
	Carcinoma NOS	8	3	3	1	1
	Carotid body tumor malignant	1	0	1	0	0
	Follicular adenocarcinoma v	5	0	5	0	0
	Follicular carcinoma minimally invasive	3	1	2	0	0
	Follicular thyroid carcinoma	7	2	5	0	0
	Medullary carcinoma NOS	4	2	2	0	0
	Medullary carcinoma with amyloid stroma	1	1	0	0	0
	Mixed medullary-papillary carcinoma	1	0	1	0	0
	Non-invasive follicular thyroid neoplasm	2	0	2	0	0
	Nonencapsulated sclerosing carcinoma	1	0	1	0	0
	Oxyphilic adenocarcinoma	7	0	7	0	0
	Papillary & follic ca in situ	2	0	2	0	0
	Papillary adenocarcinoma NOS	252	53	195	2	2
	Papillary carcinoma columnar cell	5	1	4	0	0
	Papillary carcinoma follicular variant	8	2	6	0	0
	Papillary carcinoma oxyphilic cell	1	1	0	0	0
	Papillary microcarcinoma	16	4	10	1	1
	Squamous cell carcinoma NOS	1	0	1	0	0
OTHER ENDOCRINE GLANDS		60	24	24	9	3
	Adenoma NOS	2	0	2	0	0
	Adrenal cortical carcinoma	2	1	0	1	0
	Carcinoma NOS	3	2	1	0	0
	Carotid body tumor malignant	1	0	1	0	0
	Extra-adrenal paraganglioma malignant	4	1	2	0	1
	Ganglioglioma NOS	1	0	1	0	0
	Germinoma	1	0	0	1	0
	Neuroblastoma NOS	7	0	0	6	1
	Paraganglioma malignant	1	1	0	0	0
	Pheochromocytoma malignant	2	1	1	0	0
	Pineoblastoma	1	0	0	0	1
	Pituitary adenoma NOS	31	14	16	1	0
	Squamous cell carcinoma v	1	1	0	0	0
	Thymoma malignant NOS	1	1	0	0	0
	Thymoma type ab malignant	1	1	0	0	0
	Thymoma type b3 malignant	1	1	0	0	0
LYMPH NODES (HODGKIN'S LYMPHOMA)		133	63	40	16	14
	Hodgkin lymphoma lymphocyte depletion	1	0	0	0	1
	Hodgkin lymphoma lymphocyte-rich	1	1	0	0	0
	Hodgkin lymphoma mixed cellularity NOS	5	1	1	3	0
	HL nodular lymphocyte predominance	19	14	1	3	1
	Hodgkin lymphoma nodular sclerosis NOS	45	17	18	3	7
	Hodgkin lymphoma NOS	62	30	20	7	5

SITE	HISTOLOGY (NOS - NOT OTHERWISE SPECIFIED)	ALL CASES	ADULTS		PEADIATRICS	
			MALE	FEMALE	MALE	FEMALE
LYMPH NODES (NON HODGKIN'S LYMPHOMA)		327	155	96	46	30
	Large cell lymphoma t cell & null cell	5	0	3	0	2
	Angioimmunoblastic t-cell lymphoma	1	1	0	0	0
	B lymphoblastic leukemia/ lymph. W/ hyperdiploidy	3	2	0	0	1
	B lymphoblastic leukemia/lymphoma	56	13	10	19	14
	B-cell cll /small lymphocytic lymphoma	24	18	6	0	0
	Burkitt lymphoma NOS	16	5	0	7	4
	Cortical t all	10	0	2	8	0
	Cutaneous t-cell lymphoma NOS	1	1	0	0	0
	Follicular lymphoma grade 1	5	4	1	0	0
	Follicular lymphoma grade 2	1	1	0	0	0
	Follicular lymphoma grade 3	5	2	3	0	0
	Follicular lymphoma NOS	5	1	3	1	0
	Malignant lymphoma large b-cell diffuse	96	52	36	4	4
	Malignant lymphoma lymphoplasmacytic	1	1	0	0	0
	Malignant lymphoma non-hodgkin NOS	43	24	14	4	1
	Malignant lymphoma NOS	8	0	7	0	1
	Mantle cell lymphoma	3	3	0	0	0
	Marginal zone b-cell lymphoma NOS	1	0	1	0	0
	Mature t-cell lymphoma NOS	7	3	3	1	0
	Mycosis fungoides	31	21	7	2	1
	Nk/t-cell lymphoma nasal and nasal-type	1	1	0	0	0
	T-cell/histiocyte rich large b-cell lymphoma	2	2	0	0	0
	Precursor cell lymphoblastic lymphoma	1	0	0	0	1
	T-cell lymphoproliferative disorder	1	0	0	0	1
CONNECTIVE, SUBCUTEANEOUS, SOFT TISSUES		89	47	25	8	9
	Rhabdomyosarcoma NOS	11	6	3	1	1
	Spindle cell sarcoma	12	8	2	1	1
	Leiomyosarcoma NOS	5	4	1	0	0
	Liposarcoma NOS	4	1	3	0	0
	Liposarcoma well differentiated	3	3	0	0	0
	Myxoid liposarcoma	4	2	2	0	0
	Ewing sarcoma	11	3	6	0	2
	Sarcoma NOS	7	3	2	2	0
	Dermatofibrosarcoma NOS	3	2	1	0	0
	Alveolar rhabdomyosarcoma	1	1	0	0	0
	Chondrosarcoma NOS	2	2	0	0	0
	Dedifferentiated liposarcoma	1	0	1	0	0
	Desmoplastic small round cell tumor	1	1	0	0	0
	Embryonal rhabdomyosarcoma NOS	2	1	0	1	0
	Fibromyxosarcoma	1	1	0	0	0
	Fibrosarcoma NOS	1	1	0	0	0
	Giant cell sarcoma (except of bone)	1	1	0	0	0
	Malignant peripheral nerve sheath tumor	2	2	0	0	0
	Myxosarcoma	1	1	0	0	0
	Osteosarcoma NOS	1	1	0	0	0

SITE	HISTOLOGY (NOS - NOT OTHERWISE SPECIFIED)	ALL CASES	ADULTS		PEADIATRICS	
			MALE	FEMALE	MALE	FEMALE
	Pleomorphic liposarcoma	2	0	2	0	0
	Synovial sarcoma NOS	2	1	1	0	0
	Undifferentiated sarcoma	1	1	0	0	0
	Malignant rhabdoid tumor	1	0	0	0	1
	Clear cell sarcoma of kidney	1	0	0	1	0
	Synovial sarcoma	1	0	0	0	1
	Neuroectodermal tumor	1	0	0	0	1
	Carinoma	1	1	0	0	0
	Squamous cell carcinoma	1	0	1	0	0
	Ganglioneuroblastoma	1	0	0	1	0
	Neuroblastoma NOS	1	0	0	0	1
PRIMARY UNKNOWN		35	22	7	6	0
	Adenocarcinoma NOS	8	8	0	0	0
	Carcinoid tumor NOS	2	2	0	0	0
	Carcinoma NOS	2	1	1	0	0
	Carcinoma undifferentiated NOS	1	1	0	0	0
	Carotid body tumor malignant	1	0	1	0	0
	Chordoma NOS	1	1	0	0	0
	Dedifferentiated chordoma	1	1	0	0	0
	Ewing sarcoma	1	1	0	0	0
	Gastrointestinal stromal sarcoma	2	2	0	0	0
	Mucinous adenocarcinoma	2	0	2	0	0
	Neuroendocrine carcinoma NOS	1	1	0	0	0
	Paraganglioma malignant	1	0	1	0	0
	Serous cystadenocarcinoma NOS	1	0	1	0	0
	Signet ring cell carcinoma	1	0	1	0	0
	Small cell carcinoma NOS	1	1	0	0	0
	Squamous cell carcinoma NOS	2	1	1	0	0
	Squamous cell carcinoma keratinizing NOS	1	1	0	0	0
	Neuroblastoma NOS	5	0	0	5	0
	Yolk sac tumor	1	0	0	1	0

**TABLE 9
MULTIPLE PRIMARY SITE TABLE 2021**

PRIMARY SITE 2021	HISTOLOGY (NOS - Not Otherwise Specified)	OTHER PRIMARIES (PREVIOUS OR CONCURRENT)	ALL CASES	MALE	FEMALE
			58	10	48
THYROID			3	1	2
Papillary adenocarcinoma		Lung - Small cell carcinoma	1	1	0
Papillary adenocarcinoma		Salivary Gland - Acinar cell carcinoma	1	0	1
Papillary adenocarcinoma		Thyroid - Medullary thyroid cancer	1	0	1
STOMACH			1	0	1
Gastrointestinal stromal sarcoma		Thyroid - Papillary adenocarcinoma	1	0	1
TONGUE			1	1	0
Squamous cell carcinoma		Thyroid - Papillary carcinoma follicular variant	1	1	0
BREAST			29	0	29
Invasive ductal carcinoma		Lt Breast - Invasive ductal carcinoma	10	0	10
Invasive ductal carcinoma		Rt Breast - Invasive ductal carcinoma	5	0	5
Invasive ductal carcinoma		Lt Breast - Ductal carcinoma in situ	3	0	3
Invasive ductal carcinoma		Rt Breast - Ductal carcinoma in situ	1	0	1
Invasive ductal carcinoma		Lt Breast - Lobular carcinoma	2	0	2
Lobular carcinoma		Lt Breast - Lobular carcinoma	2	0	2
Invasive ductal carcinoma		Rt & Lt Ovary - Serous cystadenocarcinoma	1	0	1
Adenocarcinoma		Lt Breast - Adenocarcinoma	1	0	1
Ductal carcinoma in situ		Lt Breast - Cribriform carcinoma in situ	1	0	1
Ductal carcinoma in situ		Lt Breast - Ductal carcinoma in situ	1	0	1
Lobular carcinoma		Lt Breast - Lobular carcinoma in situ	2	0	2
OVARY			4	0	4
Serous cystadenocarcinoma		Rt Ovary - Serous cystadenocarcinoma	2	0	2
Serous cystadenocarcinoma		Lt Ovary - Adenocarcinoma	1	0	1
Mucinous adenocarcinoma		Rt Ovary - Mucinous adenocarcinoma	1	0	1
ESOPHAGUS			1	1	0
Adenocarcinoma		Colon - Carcinoma	1	1	0

PRIMARY SITE 2021	HISTOLOGY (NOS - Not Otherwise Specified)	OTHER PRIMARIES (PREVIOUS OR CONCURRENT)	ALL CASES		
			MALE	FEMALE	TOTAL
			58	10	48
COLON			4	2	2
Adenocarcinoma		Lt Breast - Invasive ductal carcinoma	1	0	1
Adenocarcinoma		Lt Lung - Carcinoid tumor	1	0	1
Adenocarcinoma		Rt Lung - Carcinoid tumor	1	1	0
Adenocarcinoma		Liver - Hepatocellular carcinoma	1	1	0
PROSTATE			2	2	0
Adenocarcinoma		Bladder - Papillary transitional cell carcinoma	1	1	0
Adenocarcinoma		Thyroid - Papillary adenocarcinoma	1	1	0
BONE MARROW			1	1	0
Myelodysplastic/myeloproliferative neoplasm		Skin - Basal cell carcinoma nodular	1	1	0
LYMPH NODES			1	0	1
Non-Hodgkin lymphoma		Skin - Kaposi sarcoma	1	0	1
KIDNEY			2	1	1
Renal cell carcinoma		Lt Kidney - Renal cell carcinoma	1	1	0
Renal cell carcinoma		Corpus uteri - Adenocarcinoma	1	0	1
LIVER			1	0	1
Hepatocellular carcinoma		Thyroid - Papillary microcarcinoma	1	0	1
CORPUS UTERI			6	0	6
Endometrioid adenocarcinoma		Rt Breast - Invasive ductal carcinoma	1	0	1
Serous cystadenocarcinoma		Thyroid - Papillary adenocarcinoma	1	0	1
Mixed cell adenocarcinoma		Non-Hodgkin lymphoma	1	0	1
Serous cystadenocarcinoma		Stomach - Carcinoid tumor	1	0	1
Endometrioid adenocarcinoma		Ovary - Endometrioid adenocarcinoma	2	0	2
BLADDER			1	1	0
Papillary transitional cell carcinoma		Rt Lung - Adenocarcinoma	1	1	0
LUNG			1	0	1
Adenocarcinoma		Thyroid - Papillary adenocarcinoma	1	0	1

V. STAGE OF DISEASE AT DIAGNOSIS

Stage in any malignant process may be defined as the particular step, phase, or extent in a tumor's development, which is one of the predictors for outcome and treatment selection assigned at the time of initial diagnosis. The microscopic appearance, extent, and biological behavior of a tumor, as well as host factors, play a part in prognosis and are therefore important in staging.

The SEER (Surveillance, Epidemiology and End Results) Summary Staging Guide was utilized for all stageable cases. This system summarizes the disease categories into four general staging groups (i.e., in situ, localized, regional and distant). Stage categories are based on a combination of clinical observations and operative-pathological evaluation.

Summary Staging Definitions:

IN SITU: Intraepithelial, noninvasive, noninfiltrating

LOCALIZED: Within organ

- a. Invasive cancer confined to the organ of origin
- b. Intraluminal extension where specified

REGIONAL: Beyond the organ of origin

- a. By direct extension to adjacent organs/tissues
- b. To regional lymph nodes
- c. Both (a) and (b)

DISTANT: Direct extension or metastasis

- a. Direct continuity to organs other than above
- b. Discontinuous metastasis
- c. To distant lymph nodes

Systemic diseases, i.e., leukemia and multiple myeloma and cases of unstageable unknown primary were disregarded in graphically illustrating the stages for all analytic cases seen at KFSH&RC in 2020 (Figure 13).

In addition to the SEER Summary Staging, the cases were also staged according to the American Joint Committee on Cancer (AJCC) TNM system. This scheme is based on the premise that cancers of similar histology or site of origin share similar patterns of growth and extension. This system is based on the assessment of three components:

T: Extent of the primary tumor

N: Absence or presence and extent of regional lymph node involvement

M: Absence or presence of distant metastasis

Cases of Major sites of 2021, i.e., Breast, Non-Hodgkin Lymphoma, Thyroid, CNS, Brain, Leukemia, Colon and Uterus are presented in Table 10 with their clinical group stages and yearly comparative figures from 2017 to 2021.

FIGURE 16

DISTRIBUTION OF CASES BY (SEER) STAGE AT DIAGNOSIS 2021
(TOTAL CASES=4,323)

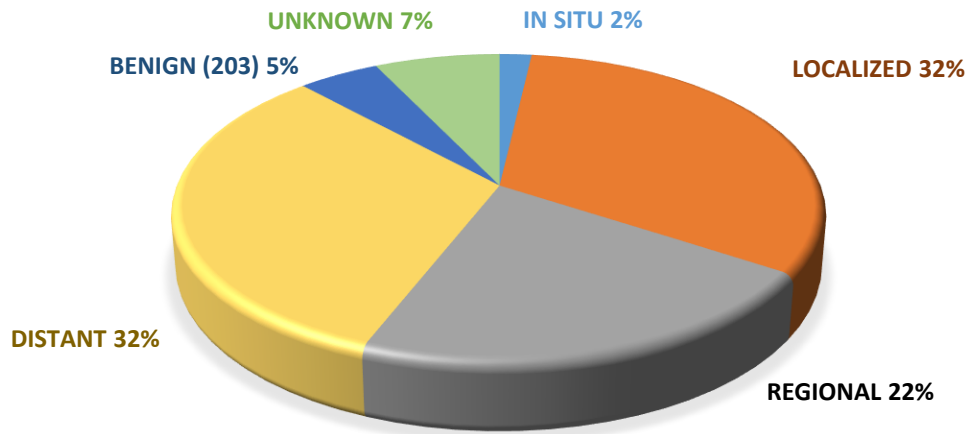


TABLE 10**AJCC TNM GROUP STAGE OF ANALYTIC CASES OF MAJOR SITES *BY YEAR (2017-2021)**

BREAST						
STAGE	2017	2018	2019	2020	2021	TOTAL
0	4	22	32	32	27	117
1	11	79	110	122	195	517
2	22	146	165	119	159	611
3	34	133	163	124	200	654
4	26	81	115	84	125	431
UNK	22	5	0	2	1	30
TOTAL	119	466	585	483	707	2360

THYROID						
STAGE	2017	2018	2019	2020	2021	TOTAL
0	0	2	1	8	4	15
1	14	170	244	186	255	869
2	1	20	30	11	31	93
3	3	5	4	0	4	16
4	3	13	15	10	17	58
UNK	12	34	0	1	2	49
Total	33	244	294	216	313	1100

COLON						
STAGE	2017	2018	2019	2020	2021	TOTAL
0	0	2	0	2	2	6
1	2	10	14	9	16	51
2	3	9	32	24	49	117
3	1	38	33	29	68	169
4	2	51	72	66	100	291
UNK	8	7	1	1	0	17
TOTAL	16	117	152	131	235	651

UTERUS						
STAGE	2017	2018	2019	2020	2021	TOTAL
0	0	1	8	11	10	30
1	4	60	74	93	91	322
2	1	16	23	19	21	80
3	0	17	35	19	31	102
4	4	27	25	45	40	141
UNK	2	15	2	2	1	22
TOTAL	11	136	167	189	194	697

LIVER						
STAGE	2017	2018	2019	2020	2021	TOTAL
1	2	29	35	36	52	154
2	1	21	23	22	33	100
3	0	16	20	21	27	84
4	2	17	22	30	40	111
UNK	5	15	3	0	5	28
TOTAL	10	98	103	109	157	477

- NHL, 2nd top cancer site at KFSH&RC, but not staged according to TNM staging.
- CNS, BRAIN, 4th top cancer site at KFSH&RC, but not staged according to TNM staging.
- LEUKEMIA, 5th top cancer site at KFSH&RC, but not staged according to TNM staging.

VI. CANCER SURVIVAL AT KFSH&RC

Five year observed* survival for some cancer sites at KFSH & RC, Riyadh 2021

The observed survival rates represent the percentage of people alive 5 years after diagnosis, regardless of the cause of death according to the stage at presentation.

TABLE 11

TRENDS IN 5-YEAR OBSERVED SURVIVAL RATES (%)
BY STAGE AT DIAGNOSIS, KFSH&RC, 2021**

Site	Stage		
	Localized	Regional	Distant
Breast Cancer	93.40%	81.70%	36.80%
Colon & rectum***	75.5%	68.0%	16.9%
Non-Hodgkin lymphoma	82.10%	69.70%	59.50%
Hodgkin lymphoma	100%	100%	83.20%
Cervical Cancer	91.70%	75.00%	50.00%
Lung Cancer	71.40%	45.00%	20.50%
Liver Cancer	56.60%	20.00%	13.30%
Prostate Cancer	94.70%	66.70%	39.10%
Uterine Cancer	88.10%	65.20%	12.50%

*Observed survival does not take into account death from other causes, the likelihood for which varies by cancer type due to differences in age distribution, and should be interpreted with caution.

**Observed survival shown are for cases diagnosed in 2016 and followed through 2021.

***Site includes cancer of the Appendix (6 cases out of 248)

VII. APPENDIX

REQUESTS FOR TUMOR REGISTRY DATA 2021

January

All breast cancer cases CRF variables from 2017-2020	Dr. Kausar Suleman
Update the pregnancy variable for specific medical record numbers	Dr. Kausar Suleman
Update on pregnancy & breast cancer database.	Dr. Kausar Suleman
All breast cancer cases CRF variables from Sept 2011 – 2016.	Dr. Kausar Suleman
Breast cancer cases with Hepatitis B or C positive with a control group. 2:1 from each Hepatitis patient, 2 patients with no hepatitis	Dr. Adher Al Sayed

February

Fanconi Anemia – BMT Available Date	Dr. Syed O. Ahmad
Multiple myeloma patients who underwent Auto transplants and received VCD as induction chemotherapy	Dr. Ahmed Abdrabou
Outcomes of FLAV-RIC patients AML	Dr. Syed O. Ahmad
Small bowel cancer from May 2018 to May 2020. Only MRN	Dr. Ali Aljubran

March

Breast Cancer cases 2017 with Diabetes Mellitus (DM), Hypertension (HTN), cholesterol	Dr. Maha Aleid
Breast cancer, Triple negative 2016-2020.	Nada Chaballout
All breast cancer cases CRF variables from 2004-2017	Dr. Maha Aleid

May

Clinical Trial Destiny 06. List of patients who are ER (+) HER2 (-). Metastatic for the last 3 years.	Dr. Taher Twegieri
RAC# 2201250. MRN of all enrolled cases at KFSHRC 2020-2021 within the period of 2 years. About 1,200 cases	Dr. S. Bazarbashi

July

RAC# 2211094 List of CLL patients from the last 15 years

Dr. Naeem Chaudhri

September

Study of FAC in Luminal A, Breast Cancer patients. (2015-2016)

Dr. Taher Twegieri

Follow-up updates for survival status of patients in Luminal A
Breast cancer study

Dr. Taher Twegieri

November

Lung cancer 2015-2018. MRN, age at diagnosis, gender smoking,
Stage, survival, histopathology

Dr. Hamed Alhussaini

Gestational trophoblastic Neoplasm (invasive mole, choriocarcinoma,
Placental Site Trophoblastic Tumor (PSTT) and
epithelioid trophoblastic Tumor) from 2010 to Sep 2021

Dr. Mohamed Asefan

VIII. REFERENCES

- American Joint Committee on Cancer (AJCC) TNM 8TH EDITION (www.cancerstaging.org)
- ICD O3.1 VERSION (www.naaccr.org)
- Summary stage 2018 SEER (www.seer.cancer.gov)
- Class Of Case (www.seer.cancer.gov/seertools/glossary)
- American Cancer Society (<https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/cancer-facts-figures-2021.html>)

IX. GLOSSARY OF TERMS

Accessioned: Cases are entered into the Tumor Registry by the year in which they were first seen at KFSH&RC for each primary cancer.

Age of Patient: Recorded in completed years at the time of diagnosis, and age group used as per international standard.

Analytic Cases: Cases that were first diagnosed and/or received all or part of their first course of treatment at KFSH&RC.

Non-Analytic Cases: Cases diagnosed elsewhere and received their entire first course of treatment elsewhere.

Case: A diagnosis or finished abstract. A patient who has more than one primary is reported as multiple cases.

Crude Relative Frequency: The proportion of a given cancer in relation to all cases in a clinical or pathological series.

First Course of Treatment: The initial tumor-directed treatment or series of treatments, usually initiated within four months after diagnosis.

Stage of Disease: The extent of the disease process is determined at the first course of treatment.

SEER (Surveillance, Epidemiology and End Results) Summary Staging:

In Situ: Tumor meets all microscopic criteria for malignancy except invasion.

Local: Tumor is confined to organ of origin.

Regional: Tumor has spread by direct extension to immediately adjacent organs and/or lymph nodes and appears to have spread no further.

Distant: Tumor has spread beyond immediately adjacent organs or tissues by direct extension and/or has either developed secondary or metastatic tumors, metastasized to distant lymph nodes or has been determined to be systemic in origin.

AJCC (American Joint Committee on Cancer) TNM Staging: A classification scheme based on the premise that cancers of similar histology or site or origin share similar patterns of growth and extension.

T+N+M = Stage

T: Extent of primary tumor

N: Extent of regional lymph node involvement

M: Distant Metastasis

Clinical Stage: Classification based on the evidence acquired before treatment. Such evidence arises from physical examination, imaging, endoscopy, biopsy, surgical exploration and other relevant findings.

Pathologic Stage: Classification based on the evidence acquired before treatment, supplemented or modified by the additional evidence acquired from surgery and from pathologic examination of the resected specimen.