

Every preventable cancer averted. Every screenable cancer detected. Every cancer patient counted.

Some of you may be wondering why the CARE PH summary data seen in our careph.org website does not have outcome data. Epidemiologic outcomes like incidence. Prevalence and mortality rates are the purview of population-based cancer registries. While clinical outcomes like remission rates. Relapse rates. 2 or 5 year survival rates. While these can be captured by the CARE PH app in individual local area networks. Are usually not encoded by hospital tumor registrars. As they are not trained to do this.

YOUR HOSPITAL CLINICAL RESEARCHERS CAN STILL USE THE CARE PH APP TO GATHER DATA FOR SPECIFIC CANCER SITES. INCLUDING ICD-O CLASSIFICATION. STAGE UPON DIAGNOSIS. TREATMENTS GIVEN AND TREATMENT OUTCOMES. FOLLOWING AN IRB- APPROVED PROTOCOL. AT PRESENT. SPECIALTY SOCIETIES LIKE THE PHILIPPINE COLLEGE OF HEMATOLOGY AND BLOOD TRANSFUSION. THE PHILIPPINE SOCIETY OF UROLOGIC ONCOLOGY AND THE PHILIPPINE COLLEGE OF CHEST PHYSICIANS. WITH THE HELP OF CARE PH RESEARCH GROUP. HAVE INITIATED SITE SPECIFIC CANCER REGISTRIES THAT COLLECT MORE GRANULAR DATA. THESE REGISTRIES STILL HAVE A HIGH PERCENTAGE OF MISSING DATA. BUT THE GOOD NEWS IS. MORE AND MORE CLINICAL RESEARCHERS ARE REALIZING THE VALUE OF REGISTRIES AND OF DATA ANALYTICS.

FOR HOSPITAL-BASED CANCER REGISTRIES. THE OUTCOME OF INTEREST OR RESEARCH QUESTIONS WHOSE ANSWERS CAN BE FOUND BY ANALYSIS OF DATA CONTAINED WITHIN COULD BE "WHAT CANCERS ARE MOST COMMONLY DIAGNOSED OR TREATED IN THIS HOSPITAL?". OR "WHAT PERCENTAGE OF CANCER PATIENTS ARE DIAGNOSED AND TREATED IN THIS HOSPITAL. DIAGNOSED ELSEWHERE BUT TREATED HERE. OR DIAGNOSED HERE BUT TREATED ELSEWHERE?" SUCH OUTCOMES HELP YOUR CANCER CENTER ADMINISTRATION IDENTIFY AREAS THAT COULD BE IMPROVED OR SUPPORTED. OR HELP YOU DECIDE WHAT NEW TECHNOLOGY YOUR HOSPITAL SHOULD INVEST IN. FOR BETTER CANCER CARE FOR YOUR PATIENTS AND YOUR SURROUNDING COMMUNITY.

CARE PH's vision is to move towards better healthcare for Filipino cancer patients by providing an internet application that is capable of sharing de-identified data to a central hospital-based cancer registry system. A natural area of growth for CARE PH to move into is clinical and epidemiologic research.

REGISTRY AND RESEARCH ARE LIKE SOULMATES THAT HAVE RECENTLY FOUND EACH OTHER. AT LEAST IN THE HEALTHCARE ECOSYSTEM. EACH EXISTED ON ITS OWN. BUT TOGETHER. THEY NOW HAVE SO MUCH MORE RELEVANCE AND MEANING.

OR. TO FURTHER THE HEALTHCARE ECOSYSTEM METAPHOR. DISEASE REGISTRIES ARE LIKE THE ROOTS OF THE HEALTHCARE TREE THAT ARE GROUNDED AND FOUNDED ON DATA. ORGANIZED IN ITS TRUNK CALLED REGISTRY. AND ITS BRANCHES AND LEAVES ARE RESEARCHES THAT FEED ON THIS DATABASE AND EXPAND OUR KNOWLEDGE. WITH FRUITS THAT NOURISH OUR SEARCH FOR TRUTH.

THERE ARE RECENT CHANGES IN HEALTH RESEARCH THAT HAVE IMPACTED ON THE EMERGENCE OF REGISTRIES. ON THE METHODS OF DATA COLLECTION AND ON DATA ANALYSIS. Advancements in health information technology. Digital transformation in healthcare, and the use of artificial intelligence in the analysis of de-identified big data now allow us to find answers to our research ouestions. And validate these answers, with a speed never before imagined.

CARE PH was contracted in 2022 by the World Health Organization and the DOH to create a Development Plan for the Philippine Cancer Center-Scientific Research Data Center. We also collaborated with specialty societies and initiated several site-specific cancer registries. We are also excited, together with the University of the Philippines and the Massachusetts Institute of Technology. To be part of the organizing committee of the 2023 Philippine Datathon.

THIS 2023 WILL SURELY BE A YEAR OF FURTHER GROWTH FOR US. ON BEHALF OF THE REGISTRY GROUP AND THE RESEARCH GROUP OF CARE PH. I THANK YOU FOR YOUR CONTINUED SUPPORT FOR OUR ORGANIZATION. AND WE HOPE YOU WILL CONTINUE TO GROW ALONG WITH US UNTIL "EVERY PREVENTABLE CANCER IS AVERTED. EVERY SCREENABLE CANCER IS DETECTED. AND EVERY CANCER PATIENT (IS) COUNTED".



3 FEB 2023

CEO'S CORNER & EXECUTIVE SUMMARY

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List of Abbreviations

PGH	Philippine General Hospital
ТМС	The Medical City
CGH	Chinese General Hospital
DDVMH	Dagupan Doctors Villaflor Memorial Hospital
MMC	Makati Medical Center
NKTI	National Kidney and Transplant Institute
CSMC	Cardinal Santos Medical Center
BiMC	Bicol Medical Center
BatMC	Batangas Medical Center
RMC	Rizal Medical Center
вон	Beginning on Hand
EOH	Ending on Hand

CANCER IN THE PHILIPPINES: Burden of Disease

GLOBOCAN 2020

In December 2020, CANCER TODAY website was updated with GLOBOCAN 2020 database version 2.0. In it we find data sourced from the Cebu Cancer Registry, Manila Cancer Registry and Rizal Cancer Registry weighted/sample average of the most recent local rates, applied to the 2020 population of 109,581,085 Filipinos^[1]. In that same update, the estimated number of new cases of cancer for 2020 was 153,751, or a nine percent increase from 2018 new cases of 141,021; while the number of cancer deaths for the same period showed a seven percent increase to 92,6060 from 86,337 in 2018.

The top ten **incident** cancers in the Philippines, based on the 2020 GLOBOCAN data presented in Figure 1 are: Breast Cancer, Lung Cancer, Colon Cancer, Liver Cancer, Prostate Cancer, Cervical Cancer, Thyroid Cancer, Rectal Cancer, Leukemia, and Ovarian Cancer.

The top ten most common cause of cancer **death** in the Philippines, based on the 2020 GLOBOCAN data presented in Figure 1 are: Lung Cancer, Liver Cancer, Breast Cancer, Colon Cancer, Leukemia, Cervical Cancer, Ovarian Cancer, Pancreatic Cancer, Prostate Cancer, and Rectal Cancer.

Philippines Source: Globocan 2020







Number of new cases in 2020, males, all ages



Number of new cases in 2020, females, all ages



Summary statistic 2020

	Males	Females	Both sexes
Population	55 028 825	54 552 260	109 581 085
Number of new cancer cases	67 267	86 484	153 751
Age-standardized incidence rate (World)	164.6	167.3	162.0
Risk of developing cancer before the age of 75 years (%)	16.7	16.7	16.5
Number of cancer deaths	47 046	45 560	92 606
Age-standardized mortality rate (World)	119.5	88.2	100.0
Risk of dying from cancer before the age of 75 years (%)	11.7	9.0	10.2
5-year prevalent cases	134 739	219 659	354 398
Top 5 most frequent cancers excluding non-melanoma skin cancer	Lung	Breast	Breast
(ranked by cases)	Colorectum	Cervix uteri	Lung
	Prostate	Colorectum	Colorectum
	Liver	Lung	Liver
	Leukaemia	Ovary	Prostate

Total population

109 581 085

Number of new cases

153751

Number of deaths

92606

Number of prevalent cases (5-year)

354 398

Data source and methods

Incidence

Country-specific data source: Cebu Cancer Registry, Manilla Cancer Registry, Rizal Cancer Registry Method: Weighted/simple average of the most recent local rates applied to 2020 population

Mortality

Country-specific data source: National (WHO) Method: Estimated from national incidence estimates by modelling, using incidence:mortality ratios derived from cancer registry data in neighbouring countries

Prevalence

Computed using sex-; site- and age-specific incidence to 1-;3- and 5-year prevalence ratios from Nordic countries for the period (2006-2015), and scaled using Human Development Index (HDI) ratios.

Philippines Source: Globocan



	New cases				Deaths				5-year prevalence (all ages)		
Cancer	Number	Rank	(%)	Cum.risk	Number	Rank	(%)	Cum.risk	Number	Prop. (per 100 000)	
Breast	27 163	1	17.7	5.66	9 926	3	10.7	2.02	85 206	156.19	
Lung	19 180	2	12.5	2.56	17 063	1	18.4	2.30	20 625	18.82	
Colon	11 315	3	7.4	1.39	6 109	4	6.6	0.65	25 916	23.65	
Liver	10 594	4	6.9	1.30	9 953	2	10.7	1.23	10 964	10.01	
Prostate	8 242	5	5.4	2.30	3 164	9	3.4	0.41	26 942	48.96	
Cervix uteri	7 897	6	5.1	1.61	4 052	6	4.4	0.88	19 933	36.54	
Thyroid	6 345	7	4.1	0.65	743	21	0.80	0.08	19 260	17.58	
Rectum	5 846	8	3.8	0.75	2 982	10	3.2	0.36	14 577	13.30	
Leukaemia	5 795	9	3.8	0.47	4 370	5	4.7	0.38	16 835	15.36	
Ovary	5 3 9 5	10	3.5	1.13	3 379	7	3.6	0.77	13 667	25.05	
Corpus uteri	4 374	11	2.8	1.01	1 306	15	1.4	0.31	12 417	22.76	
Non-Hodgkin lymphoma	4 1 4 0	12	2.7	0.46	2 415	12	2.6	0.27	11 065	10.10	
Stomach	3 381	13	2.2	0.40	2 860	11	3.1	0.32	4 531	4.13	
Pancreas	3 349	14	2.2	0.40	3 283	8	3.5	0.40	2 804	2.56	
Nasopharynx	3 006	15	2.0	0.33	1 947	13	2.1	0.24	8 370	7.64	
Kidney	2 384	16	1.6	0.29	1 229	16	1.3	0.14	5 785	5.28	
Brain, central nervous system	2 037	17	1.3	0.19	1 752	14	1.9	0.18	5 311	4.85	
Bladder	1 714	18	1.1	0.21	996	19	1.1	0.09	4 391	4.01	
Lip, oral cavity	1 561	19	1.0	0.19	870	20	0.94	0.10	3 902	3.56	
Larynx	1 550	20	1.0	0.21	1 020	18	1.1	0.13	4 124	3.76	
Oesophagus	1 1 4 4	21	0.74	0.14	1 122	17	1.2	0.14	1 228	1.12	
Multiple myeloma	766	22	0.50	0.10	649	22	0.70	0.09	1 754	1.60	
Salivary glands	578	23	0.38	0.07	244	25	0.26	0.03	1 641	1.50	
Hodgkin lymphoma	514	24	0.33	0.04	152	27	0.16	0.02	1 632	1.49	
Oropharynx	465	25	0.30	0.06	272	23	0.29	0.03	1 106	1.01	
Melanoma of skin	418	26	0.27	0.05	251	24	0.27	0.03	1 131	1.03	
Testis	358	27	0.23	0.06	74	30	0.08	0.01	1 157	2.10	
Gallbladder	286	28	0.19	0.03	215	26	0.23	0.03	355	0.32	
Anus	203	29	0.13	0.03	92	29	0.10	0.01	495	0.45	
Hypopharynx	184	30	0.12	0.03	107	28	0.12	0.02	284	0.26	
Vulva	158	31	0.10	0.04	61	31	0.07	0.01	423	0.78	
Penis	126	32	0.08	0.03	45	34	0.05	0.01	345	0.63	
Vagina	97	33	0.06	0.02	49	33	0.05	0.01	249	0.46	
Mesothelioma	63	34	0.04	0.01	57	32	0.06	0.01	69	0.06	
Kaposi sarcoma	11	35	0.01	0.00	5	35	0.01	0.00	31	0.03	
All cancer sites	153 751		-	16.50	92 606			10.22	354 398	323.4	

Incidence, Mortality and Prevalence by cancer site

Figure 1. GLOBOCAN 2020 estimates of incidence and mortality in the Philippines.

CARE PH HOSPITAL-BASED CANCER REGISTRY

2022 Consolidated Cancer Census

Twenty-seven (27) member hospitals have completed sharing their data as of 20 March 2023, for a total of 16,708 new registrants in 2022. These numbers represent an 8% increase in the number of contributing hospitals (from 25 in 2021 to 27 in 2022), and a 30% increase in the number of new registrants (from N=12,839 registrants in 2021 to N=16,708 registrants in 2022).

Breakdown of primary cancer sites are shown in Figure 2.



Figure 2. Frequency of primary cancer sites in CARE PH cancer census 2022.

The top ten most frequently diagnosed cancers in the CARE PH Registry System are: Breast Cancer, Colorectal Cancer, Cervical Cancer, Head and Neck Cancer, Uterine Cancer, Prostate and other Male Urogenital Cancers, Blood Dyscrasia, Thyroid Cancer, Lung Cancer, Kidney Cancer.

No.	Institution	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1	Baguio Medical Center	1	1	2	0	0	3	4	3	5	2	1	1	23
2	Batangas Medical Center	27	56	67	92	81	79	78	92	109	81	99	61	922
3	Bicol Medical Center	67	91	108	66	61	66	56	65	54	37	20	6	697
4	Bicol Regional Training and Teaching Hospital	0	1	2	1	0	1	0	2	1	1	2	4	15
5	Bulacan Sacred Heart	19	9	0	0	1	0	0	1	0	0	1	0	31
6	Cardinal Santos Medical Center	44	55	77	86	64	70	68	59	61	53	50	58	745
7	Chinese General Hospital	83	132	122	156	192	118	166	147	87	156	144	116	1,619
8	Dagupan Doctors Villaflor Memorial Hospital	128	126	125	112	136	151	158	140	121	137	148	105	1,587
9	Davao Doctors Hospital	17	15	23	7	0	3	2	0	0	0	0	3	70
10	East Avenue Medical Center	8	16	31	17	7	59	42	19	52	38	9	46	344
11	General Santos Doctors Hospital	0	0	0	0	0	0	4	11	5	4	1	4	29
12	Global Cancer Care Institute	0	0	0	0	0	0	0	0	0	0	6	8	14
13	Iloilo Doctors Hospital	6	2	5	13	11	10	11	23	40	24	28	25	198
14	Makati Medical Center	53	85	119	107	120	128	117	121	85	101	102	80	1,218
15	Medical Center Manila	18	21	19	21	28	35	27	28	19	18	22	17	273
16	National Kidney & Transplant Institute	2	214	103	359	295	137	123	138	158	152	123	37	1,841
17	Northern Mindanao Medical Center	20	20	28	22	15	25	18	46	28	19	89	104	434
18	Palawan MMG-PPC	0	0	0	0	0	1	1	0	0	0	0	0	2
19	Philippine General Hospital	194	214	291	397	424	414	450	405	371	418	402	403	4,383
20	Rizal Medical Center	34	20	43	41	43	42	44	50	44	46	34	31	472
21	St. Paul Hospital of Tuguegarao	4	5	13	6	8	2	0	3	6	2	0	0	49
22	The Medical City	73	136	171	133	169	138	129	110	142	122	125	103	1,551
23	The Medical City Clark	4	6	8	12	0	1	2	9	0	9	11	2	64
24	The Medical City Pangasinan	1	6	1	0	0	0	7	0	3	9	0	0	27
25	The Medical City South Luzon	12	13	0	0	0	0	0	0	0	0	0	0	25
26	TMC Iloilo	8	3	5	3	5	9	8	5	9	3	4	1	63
27	Zamboanga Del Sur Medical Center	12	0	0	0	0	0	0	0	0	0	0	0	12
		835	1,247	1,363	1,651	1,660	1,492	1,515	1,477	1,400	1,432	1,421	1,215	16,708

Table 1. CARE PH monthly summary per institution in 2022.

2022 CARE PH Member Hospitals

CARE PH has a total of 44 hospital members, but only 27 (61%) were able to share and 17 (39%) were unable to share any 2022 data. The reasons given for non-sharing were: 1) Continued focus on recovery from the pandemic, or change in hospital management during the pandemic, 2) Preference to give hospital cancer data directly to DOH, 3) Lack of human resource to encode data, 4) Lack of computer server or hospital local area network.

Hospital Name	Level	Туре	Bed Capacity
NCR (n=9)			
1. Cardinal Santos Medical Center	Tertiary	Private	245
2. Chinese General Hospital	Tertiary	Private	600
3. Dr. Jose N. Rodriguez Memorial Hospital and Sanitarium	Tertiary	Government	2,000
4. East Avenue Medical Center	Tertiary	Government	600
5. Makati Medical Center	Tertiary	Private	600
6. Medical Center Manila	Tertiary	Private	200
7. National Kidney and Transplant Institute	Tertiary	Specialty Government	500
8. Philippine General Hospital	Tertiary	Government	1,500
9 The Medical City – Pasig	Tertiary	Private	800
Luzon (n=19)			
1. Baguio Medical Center	1	Government	500
2. Batangas Medical Center	Tertiary	Government	500
3. Bicol Medical Center	Tertiary	Government	500
4. Bicol Regional Training and Teaching Hospital	Tertiary	Government	600
5. Calamba Medical Center	Tertiary	Private	122
6. Dagupan Doctors Villaflor Memorial Hospital	Tertiary	Private	125
7. De La Salle University Medical Center	Tertiary	Private	300
8. Divine Grace Medical Center	Tertiary	Private	75
9. Global Care Cancer Institute	n/a	Standalone	n/a
10. Mary Mediatirx Medical Center	Tertiary	Private	174
11. Naga Imaging Center Cooperative Doctors Hospital	Tertiary	Private	99
12. Palawan MMG Cooperative Hospital	Tertiary	Private	80
13. Rizal Medical Center	Tertiary	Government	500
14. Sacred Heart Hospital of Malolos	2	Private	99
15. St. Paul Hospital – Tuguegarao	Tertiary	Private	250
16. The Medical City – Clark	Tertiary	Private	100
17. The Medical City – Pangasinan	Tertiary	Tertiary Private	
18. The Medical City – South Luzon	Tertiary	Private	150
19. Universidad de Sta. Isabel Health Services Department	Tertiary	Private	150
Visayas (n=8)			
1. AMOSUP-Seamen's Hospital – Iloilo	2	Private	43
2. Antique Medical Center	2	Private	152
3. Iloilo Doctors' Hospital	Tertiary	Private	300
4. Metro Iloilo Hospital and Medical Center	2	Private	110
5. St. Paul's Hospital of Iloilo	Tertiary	Private	220
6. The Medical City – Iloilo	Tertiary	Private	108
7. Western Visayas Medical Center	Tertiary	Government	400
8. Vicente Sotto Medical Center	Tertiary	Government	1,200
Mindanao (n=8)			
1. Ciudad Medical de Zamboanga	Tertiary	Private	160
2. Cotabato Regional Medical Center	Tertiary	Government	600
3. Davao Doctors Hospital	Tertiary	Private	250
4. General Santos Doctors Hospital	Tertiary	Private	202
5. Metro Davao Medical Research Center	Tertiary	Private	129
6. Northern Mindanao Medical Center	Tertiary	Government	400
7. Zamboanga City Medical Center	Tertiary	Government	250
8. Zamboanga Del Sur Medical Center	2	Government	250
TOTAL (N=44)			
*Orange rows = New in 2022			
# Red or white feat-No data shared in 2022		1	

Table 2. 2022 CARE PH Hospital Name, Level, Type, and Bed Capacity.

The following hospitals have the highest contribution to the total number of new registrants for CARE PH 2022:



Figure 3. Frequency of primary cancer sites in PGH cancer census 2022.



Figure 4. Frequency of primary cancer sites in TMC-Pasig cancer census 2022.



Figure 5. Frequency of primary cancer sites in CGH cancer census 2022.



Figure 6. Frequency of primary cancer sites in DDVMH cancer census 2022.



Figure 7. Frequency of primary cancer sites in MMC cancer census 2022.



Figure 8. Frequency of primary cancer sites in NKTI cancer census 2022.



Figure 9. Frequency of primary cancer sites in CSMC cancer census 2022.



Figure 10. Frequency of primary cancer sites in BiMC cancer census 2022.



Figure 11. Frequency of primary cancer sites in BatMC cancer census 2022.



Figure 12. Frequency of primary cancer sites in RMC cancer census 2022.



Figure 13. Top 10 primary sites by age group in 2022.

Primary Site	0-19	20-29	30-39	40-49	50-59	60-69	70-79	Over 80	Total
Breast Cancer	28	55	417	1,299	1,528	1,037	496	133	4,993
Colorectal Cancer	19	39	87	197	422	569	357	94	1,784
Cervical Cancer	8	32	221	330	284	184	48	14	1,121
Head and Neck Cancer	21	44	100	174	238	259	120	43	999
Uterine Cancer	2	11	99	157	310	280	94	10	963
Prostate and other Male Genital Cancer	3	17	10	20	99	338	313	79	879
Blood Dyscrasia	110	94	99	95	140	156	102	24	820
Thyroid Cancer	12	87	129	139	190	181	58	19	815
Lung Cancer	1	8	13	47	116	189	166	48	588
Kidney Cancer	13	7	11	60	116	153	63	12	435
TOP TEN OVERALL	217	394	1,186	2,518	3,443	3,346	1,817	476	13,397
TOTAL OVERALL	355	591	1,447	2,957	4,145	4,226	2,346	641	16,708
% Top Ten of Overall	61%	67%	82%	85%	83%	79%	77%	74%	80%

Table 3. Age distribution of top 10 CARE PH primary sites.

Table 3 above shows the age distribution of the top ten CARE PH cancer sites. Red highlighted cells show the highest number of new registrants per primary site. Yellow highlighted cells show the next highest number of new registrants per primary site. Note that the table lists the age at which the cancer patients are entered into the CARE PH Cancer Registry system. Since the registry enlists only those newly diagnosed or treated in the CARE PH site, the underlying assumption is that the patient is diagnosed in a CARE PH hospital and/or treated in a CARE PH hospital within one year of each other.

As was observed in 2021, 80% of all the cancers seen in CARE PH hospitals in 2022 is attributed to the top ten cancers seen in Table 3. Breast and uterine cancers, found in women, and thyroid cancer found in both men and women, have peak incidence between ages 50-59 years, another female malignancy, cervical cancer peaks at 40-49 years, while all other cancers found in men or men and women peak between 50 to 69 years old.

Of note, more than half of the top ten cancers in the age group 0-19 are blood dyscrasias (childhood leukemias)

A patient with the same initials, birthday, and primary site is considered to be the same person by the central CARE PH database. A close look at the 2022 CARE PH data reveals that a total of 154 patients (<1% of total number of CARE PH HBCR registry patients) were registered in 2 (152/154) or 3 (2/154) CARE PH hospitals (Table 4).

Primary Site	Seen in 2 Hospitals	Seen in 3 Hospitals
Anal Cancer	1	-
Blood Dyscrasia	4	-
Breast Cancer	56	1
Central Nervous System Cancer	1	-
Cervical Cancer	21	-
Colorectal Cancer	23	1
Gastric Cancer	4	-
Head and Neck Cancer	10	-
Hepatobiliary Cancer	3	-
Kidney Cancer	1	-
Lung Cancer	4	-
Neuroendocrine Tumors	1	-
Ovarian Cancer	1	-
Prostate and other Male Genital Cancer	8	-
Soft Tissue Cancer	4	-
Urinary Bladder Cancer	1	-
Uterine Cancer	9	-
TOTAL	152	2

Table 4. Patients per primary site in more than 1 hospital cancer registry.

CARE PH RESEARCH

Year 2022 was, by far, the busiest year for the research arm of CARE PH. Three studies were completed, 3 new studies started, 3 workshops conducted, and opportunities for CARE PH staff were created. CANDLE P1, the biggest project of CARE PH, proposed completion in 4 years from its originally approved 5 years as the study team was confident that the study would be completed at the end of the study year. BLOOM PH was completed, and a summary of its results can be seen below. CALMER Study fulfilled its commitment to finish its recruitment by the last quarter of the year and have started analyzing the data and preparing the manuscript for possible publication. Meanwhile, 3 new studies were initiated in 2022. CANDLE P3 is a glycoproteomic study on liver cancer from samples of participants from CANDLE P1. CHERISH2 is a validation study of the previously completed CHERISH1 study on COVID-19 Pneumonia. PUMA Study is a research-based registry for urologic malignancies.

Formulation of a Registry and Research Workshop was also initiated on the 3rd quarter of 2022. The workshop was CARE PH's answer to the call of specialty societies and institutions on the need to create their own registry. Modules were formed specifically for starting a registry, a research-based registry, and a discussion that benchmarks on artificial intelligence. With the anticipation of more specialty societies and institutions reaching out to CARE PH, some staff were sent to an online short course for Healthcare Leadership to further their training and experience as the organization continues to expand and help not just cancer patients, but all Filipinos, in attaining better healthcare.

2022 Completed Studies

CANDLE Project 1

Project 1 of the CANDLE Program that dealt with participant recruitment was concluded last January 2023. It was able to enroll a total of 785 participants from its different cohorts, 755 of which the team were able do baseline blood extraction. The sites involved in the study were Philippine General Hospital as UP-Manila served as the main implementing agency, National Kidney and Transplant Institute, The Medical City Pasig, Sacred Heart Hospital Malolos, and Palawan Medical Mission Group – Multipurpose Cooperative. Below are the partial results and discussion.

For the following components, all biospecimens collected from 755 participants have been sent and are currently stored at the Philippine Genome Center, pending results at 40% complete:

- Genotyping of recruited exposed-unexposed cohorts by customized chipsets
- Genome-wide association studies to evaluate phenotypic and genotypic data
- Viral load profiling and PCR-based genotyping of HBV subtypes

There were 358 cohorts included in this partial analysis, of which, 49.44% are males and 50.56% are females. Among patients without HCC, 51.78% of them were females. Meanwhile, there were more males (70.0%) among those who were diagnosed with HCC. Patients who participated were 19 to 73 years old. The average patients' age was 38.94 years old (\pm 11.52). Those who were diagnosed with hepatocellular carcinoma were significantly older than those who were not. The average age among the 20 HCC-diagnosed cohorts was 55.40 (\pm 11.12) years old. Moreover, there was a significant difference in the proportion of patients with cirrhosis between those with and without HCC. As expected over 50% of HCC patients had liver cirrhosis as compared to the patients without HCC.

The proportion of patients with Hepatitis B and patients who were overweight was not significantly different between HCC and non-HCC groups. Likewise, the proportion of patients with nonalcoholic fatty liver disease (NAFLD) and patients with dyslipidemia were also not significantly different between the two groups. On the other hand, a significant difference was observed in the proportion of patients with high total bilirubin and patients with diabetes between the HCC and non-HCC group. The proportions were higher among those with HCC than those without HCC.

Variabla	Classific	ation	n valua
v al lable	with HCC	without HCC	p-value
Gender			1.0000
Male	14 (70%)	56 (70%)	
Female	6 (30%)	24 (30%)	
Age (yrs)	55.4 (± 11.123)	50.58 (± 9.485)	
Hepatitis B	12 (60%)	57 (71.25%)	0.3306
Cirrhosis	12 (60%)	19 (23.75%)	0.0017*
Overweight	15 (75%)	61 (76.25%)	0.9068
NAFLD	5 (25%)	8 (10%)	0.0744
AFP (ng/mL)	658.14 (± 1369.782)	67.37 (± 459.799)	< 0.0001*
AFP-L3 (%)	30.13 (± 27.224)	1.35 (± 9.221)	< 0.0001*
DCP (ng/mL)	274.92 (± 602.896)	3.37 (± 18.475)	< 0.0001*

In terms of the obtained measurements of patients' serum biomarkers, patients diagnosed with HCC had significantly higher mean levels of %AFP-L3, AFP, and DCP than those without HCC as shown in Table 5.

* Significant at α=0.05



BLOOM PH

A total of 409 patients newly diagnosed with hematologic malignancies (HM) in 2020 were included in this study. Leukemia was the most commonly diagnosed HM with a total of 207 patients, Non-Hodgkin Lymphoma (NHL) came in second with a total of 88 patients, coming in third was Multiple Myeloma (Plasma Cell Disorder) with 60 patients, and fourth was Hodgkin Lymphoma with 14 patients. These same 4 HMs are in the world's most common cancer list seen in the Global Cancer Observatory 2020 data¹ except worldwide ranking puts NHL as the most commonly diagnosed blood cancer, followed by leukemia, then Multiple Myeloma, then Hodgkin Lymphoma.

Out of the 409 patients 201 (49.0%) were female, and 208 (51.0%) were male. The overall median age at diagnosis is 54 years (18, 95). Table 6 shows the proportion of patients identified according to type of malignancy stratified according to sex and age.

Code	Malignancy type	No.	% of total	Age in yrs (Median, Min-Max)	Females	%Female	Males	%Male
1	Malignant Lymphoma, Not Otherwise Specified (NOS)	4	1.0%	64 (23-74)	3	75%	1	25%
2	Hodgkin Lymphoma	14	3.4%	24 (19-67)	8	57%	6	43%
3	Non-Hodgkin Lymphoma	73	17.8%	56 (22-84)	33	45%	40	55%
4	Mature T-cell and NK-cell Lymphoma	7	1.7%	40 (18-75)	2	29%	5	71%
5	Precursor cell Lymphoblastic Lymphoma	4	1.0%	25 (19-27)	0	0%	4	100%
6	Plasma cell tumor	60	14.7%	62 (29-80)	34	57%	26	43%
7	Leukemia, NOS	15	3.7%	41 (18-72)	6	40%	9	60%
8	Lymphoid Leukemia	52	12.7%	52 (18-81)	35	67.3%	17	32.7%
9	Myeloid Leukemia	140	34.2%	50.5 (18-85)	59	42.1%	81	57.9%
10	Chronic Myeloproliferative Disorder	15	3.7%	64 (22-82)	5	33%	10	67%
11	Myelodysplastic Syndrome	9	2.2%	65 (48-73)	6	67%	3	33%
12	Others (specify)*	16	3.9%	60 (20-79)	10	63%	6	38%
	TOTAL	409	100%	54 (18-85)	201	49%	208	51%

Table 6. Age and sex of patients diagnosed in 2020 according to type of malignancy.

CALMER Study

There were 100 patients included in the study, of which 24 expired, 57 were lost to follow-up, and 19 survived. The patients' age ranged from 37 to 95 years old, with a mean of 63.9798 \pm 11.78. There were also more females (*n*=55) than male (*n*=45) patients.

Of the 100 patients of this study, 95 had available information on some or all biomarkers for lung cancer (*Note: The 5 patients with no available information on any biomarkers were either not tested or have insufficient sample*). About 71% of these 95 patients (n=67) had at least 1 biomarker that tested positive in their cancer tissue, while 29% (n=28) had no biomarker that tested positive in their cancer tissue. Among the patients with present biomarker, 49% (n=33) had only 1 biomarker present, 40% (n=27) had 2 biomarkers present, and 10% (n=7) had three biomarkers present in their cancer tissue. Specifically, about 44% (n=38/86) have EGFR mutations, 37% have PDL-1 (n=30/81), about 6% have ALK (n=5/82), 43% have ROS (n=35/82).



Figure 14. Percentage of biomarkers present in CALMER patients.

	Status			
Variable	Euroine d	Censored		
	Expired	Alive	LTFU	p-value ^a
	(n = 24)	(n = 19)	(n = 57)	
Age (N = 99)	63.38 ± 9.75	68.58 ± 10.47	62.68 ± 12.74	0.7742
Sex (N = 100)				
Male	14 (31.11%)	8(17.78%)	23 (51.11%)	< 0.0001***
Female	10 (18.18%)	11 (20.00%)	34 (61.82%)	< 0.0001***
EGFR Mutation (N = 86)				
Negative	15 (31.25%)	10 (20.83%)	23 (47.92%)	< 0.0001***
Positive	5 (13.16%)	9 (23.68%)	24 (63.16%)	< 0.0001***
Type of EGFR Mutation (N =32)	. ,		. ,	
E19 DEL	4 (16.67%)	4 (16.67%)	16 (66.67%)	< 0.0001***
E19 DEL ; L8610	0 (00.00%)	0 (00.00%)	1 (100.00%)	-
E19 DEL ; T790M	0 (00.00%)	0 (00.00%)	1 (100.00%)	
G719X DEL	0 (00.00%)	1 (100.00%)	0 (00.00%)	
L858R	0 (00.00%)	1 (25.00%)	3 (75.00%)	
L861Q ; G719X	0 (00.00%)	0 (00.00%)	1 (100.00%)	
PDL-1 (N = 81)	. ,	. ,	. ,	
Negative ($\leq 1\%$)	9 (17.65%)	7 (13.73%)	35 (68.63%)	< 0.0001***
> 1% but ≤ 50%	2 (9.09%)	7 (31.82%)	13 (59.09 %)	< 0.0001***
> 50%	16 (19.75%)	15 (18.52%)	50 (61.73%)	0.0047 ***
ALK (N = 82)				
Negative	16 (20.78%)	15 (19.48%)	46 (59.74%)	< 0.0001***
Positive	1 (20.00%)	0 (00.00%)	4 (80.00%)	0.0253 **
ROS (N = 82)		. ,		
Negative	11 (23.40%)	10 (21.28%)	26 (55.32%)	< 0.0001***
Positive	6 (17.14%)	5 (14.29%)	24 (68.57%)	< 0.0001***
		a - the comparisor	n is done between ce	nsored and expired

** - Significant at 5%

*** - Significant at 1%

Table 7. Comparison among status.

Among those with known status, there was no significant difference in the average age of those who died and those who survived. Meanwhile, there were significant differences in the proportion of male and female, those who tested negative and positive in EGFR Mutation, PDL-1, ALK, and ROS, and type of EGFR mutation, between those who died and survived. Specifically, proportions were higher among those who survived.

2023 Ongoing Studies

CANDLE Project 3

This study is under the CANDLE Program that deals with the glycoproteomic profile of the participants from those recruited in Project 1. It has been approved by UPMREB for implementation and had a tentative 6-month run. Due to unavoidable circumstances, the study was unable to push through with the implementation and is currently looking for possible funding agencies and collaborators for it to be implemented. For further details on this project, you may refer to page 19 of the 2021 CARE PH Annual Report.

CHERISH2 Study

An artificial intelligence (AI) tool that can screen for COVID pneumonia by interpreting chest x-ray (CXR) image findings has been created in a Retrospective Study on the Accuracy of AI-Powered Reading of Chest X-Rays in the Diagnosis of COVID-19 Pneumonia in a Tertiary Hospital (CHERISH Study). This study (CHERISH2) will validate the CHERISH AI tool in the clinical setting in a prospective manner and has 3 tracks, namely: CXR Data, Clinical Data, and Application Development.

PUMA Study

Philippine **U**rologic **MA**lignancies (PUMA) is a research-based registry study that deals with urologic malignancies. Currently, all 4 sites involved in the study have been given approval by their local ethics board to conduct on each site, namely: Philippine General Hospital, National Kidney and Transplant Institute, East Avenue Medical Center, and Batangas Memorial Medical Center. With the recent training of PUMA researchers through the CARE PH Registry and Research Workshop, it is expected that all sites will be able to enter data into the eCRF by 2023. To learn more about this study, please visit page 21 of the 2021 CARE PH Annual Report.

2023 Research Plans

CANDLE P4

One of the plans of CARE PH is to validate scoring systems analyzed in CANDLE P1 now that it has finally concluded. This planned Project 4 of the CANDLE Program will be a model validation built to predict people at risk for liver cancer. It also aims to continue the liver cancer registry that was initially started by Project 1. Participants who will enroll in the study will be given free workup on PIVKAII, liver ultrasound, AFP, and possible inclusion of tissue specimen. Creation of protocol capsule is already in process and will be submitted to DOST-PCHRD for possible 2025 funding.

CANDLE P5

While CANDLE P4 is centered on HCC, CANDLE P5 will be a model validation built to predict people at risk for cirrhosis of the liver. The same participants will be recruited as CANDLE P4, but the workups for P5 will include bilirubin, platelet count, albumin, and ALT. The team is working on the protocol capsule and will also be submitted to DOST-PCHRD for possible 2025 funding, same as CANDLE P4.

REGISTRY & RESEARCH WORKSHOP

Registry and research have long been existing on their own in the healthcare ecosystem. Recent changes in healthcare witnessed how these two, when combined, can create more relevance and meaning, not only to data, but to patient's holistic management as well. Methods in data collection and analysis, healthcare digital transformation, even the application of artificial intelligence have enabled us to answer more relevant research questions easier and significantly faster than before. These changes now allow healthcare data to become more accessible across the globe while keeping and maintaining patient's rights and privacy.

The creation of the CARE PH Registry and Research Workshop aims to help healthcare researchers create, expand, and sustain research-based registries that can just be the answer to relevant health-related questions of our time. To date, CARE PH had organized 3 workshops for specialty societies and institutions, namely: Philippine College of Chest Physicians (PCCP), Philippine Society of Urologic Oncologists (PSUO), and Augusto P. Sarmiento Cancer Institute (APSCI) and Wellness and Aesthetics Institute (WAI) of The Medical City Pasig.







PCCP Workshop

The Philippine College of Chest Physicians has long been wanting to put up their own registry. This specialty society has 11 councils and wishes to have a disease-specific registry per council.

The original plan was to only do a registry workshop, but CARE PH suggested to have a registry and research workshop to facilitate research-based registries that could help the society achieve their goal. The workshop was a 3-half day held through teleconference via Zoom platform with topics on history of CARE PH, data lifecycle, human resources, building databases, data processing and methodologies, considerations. electronic ethical case report form creation, and even included exploratory and basic statistical analysis and artificial intelligence in health research. It was attended by 30 members of the society, representing all 11 councils. The main goal of the workshop was to let each council come up with a template or capsule that they could use to start their own registry.





PSUO Workshop

PUMA Study is a research-based registry initiated by the Philippine Society of Urologic Oncologists. This is a multi-site study across 4 different training hospitals in urologic oncology. This is PSUO's first research-based registry, and they need assistance in training their researchers on how to create and enter data into an electronic case report form.



CARE PH initiated the registry and research workshop that would focus on the case report form of the PUMA Study. The workshop was 2 half days, one face-to-face held at NKTI, and the other a teleconference via Zoom platform. Topics included the basic workshop topics on history of CARE PH, data lifecycle, human resources, building databases. data processing and methodologies, ethical considerations, and then a focused discussion on the creation and entering of data into the electronic case report form that was prepared by the CARE PH Research Team. The output was to equip the PUMA researchers the skill to create their own electronic case report form and to enter data properly into the PUMA eCRF.



APSCI/WAI Workshop

The Medical City Ortigas Augusto P Sarmiento Cancer Institute (APSCI) and Wellness and Aesthetic Institute (WAI) began the year with a joint Registry and Research Workshop conducted by CARE PH. The workshop brought together consultants, fellows, nurses, data analysts, Information Technology specialists, tumor registrars, and other allied health professionals who would be the key people in creating data-based programs for each institute. The overall feedback from the attendees was positive and CARE PH will continue to offer our Registry and Research Workshops to other hospitals interested in establishing data-based programs for their hospitals.



PARTNERING WITH THE WORLD HEALTH ORGANIZATION IN CREATING THE PCC-SRDC DEVELOPMENT PLAN

A key achievement of CARE PH was when, in June 2022, we were tasked to do contractual service for the development of the roadmap of the Philippine Cancer Center's Scientific Research Data Center (PCC-SRDC). This was a collaborative project of the DOH and WHO Philippine Office. The goal of the PCC-SRDC is to act as the entity for centralized collection, management, and analysis of all cancer and cancer-relevant data, and to be made accessible to everyone in the cancer data lifecycle or cancer spectrum: from patients and survivors, to clinicians, to researchers, to IT health specialists (including data scientists), to publishers, to public health educators and healthcare workers.

The purposes for creating the development plan of the PCC-SRDC were clear: outline a framework for its leadership & governance; its data & network architecture, including the equipment and specs required; its management plan in all the elements (i.e., timeline, sustainability, quality assurance, risk management, communications management, safety, etc.).

As far as the bigger picture is concerned, and with respect to enabling laws for this activity, Rule III (Quality Healthcare Systems) Section 10 and Section 10a, respectively, the IRR of NICCA states that PCC *"shall be established as the center of excellence in cancer care, research and development and capacity development"*, and that PCC is *"to ensure strategic alignment with national control plans and programs."*

This was our first time working with WHO and PCC and we are happy to report that we were able to deliver on time without delays all deliverables, and we were gratified when current PCC Interim Executive Director, Dr. Alfonso Nuñez III, included in his presentation during the February 2023 National Cancer Summit organized by the PCS Cancer Commission the PCC-SRDC Development Plan.

RECOGNITIONS AND AWARDS

BCYF Innovation Award Finalist

Last December 2022, PCP Foundation Executive Director Dr Sandra Tankeh-Torres called up CARE PH to ask if we would accept the nomination of PCP Foundation to the Benita and Catalino Yap Foundation (BCYF) Innovation Award for 2023. CARE PH gladly accepted and submitted all requirements for nomination.

CARE PH was awarded a plaque of recognition as one of four finalists for the award. The judges were quite impressed with the Mission and Vision of CARE PH and its web-based application. We were advised to put on our entrepreneurial hat and think of ways to make our product more sustainable. We are open to suggestions on how to do this while remaining true to our commitment to give the app for free to all member hospitals. We are automatically considered as finalists for the 2024 BCYF Innovation Awards, and maybe with your ideas, we can win the award next year.

In the meantime, let us continue to find ways to serve our patients with a better and more useful hospital cancer registry system.

Outstanding Researcher

During their 36th Annual Convention last November 11, 2022, the Philippine Society of Medical Oncology (PSMO) awarded members of the society that excel in different fields, including research. CARE PH Co-Founder and CEO Dr. Beatrice Tiangco was chosen as the Most Outstanding Researcher for her invaluable contribution to cancer research pioneering in cancer genomics, glycoproteomics, and artificial intelligence.



Global Women Who Rule 2023



The Global Women Who Rule (GWWR) 2023 invited 22 Filipina women leaders from different industries to talk about education, mental health, human rights (violence against women), and health. CARE PH President and Chairman Dr. Necy Juat was among those selected to talk about health and inspire others to become leaders. GWWR *"aims to empower communities and promote a responsible way of using social media to do #DigitalForGood"*.

OPPORTUNITIES

CARE PH is an organization composed of volunteer staff, and one way to pay them forward is by sending them to trainings and courses that would help them in their professional development.

The National University of Singapore Yong Loo Lin School of Medicine offers a Healthcare Leadership Course that aims to equip healthcare leaders with the required knowledge to lead healthcare teams effectively, identify leadership traits, enhance team building skills, and guide them to navigate organizational barriers successfully. Ramonito B. Nuique, CARE PH Research Administrator, and Shanaia Esthelle Joy P. Daguit, CARE PH Research Data Specialist, were both sent by the organization to the healthcare leadership course with the hopes that they would be able to apply what they learned for the betterment of CARE PH. The programme was an 8-week course that ran from December 12, 2022, to February 27, 2023. Both staff finished with an exemplary rating of 100% at the end of the course and was given a certificate of completion. CARE PH aims to continue providing opportunities to all volunteer staff in the future.



Shanaia is a licensed medical doctor who graduated Cum Laude from the UP College of Medicine INTARMED Program. She is currently the CARE PH Data Specialist and works as a Science Research Specialist and Site Investigator in various projects under the organization.

Ram is a cancer genetic counselor and a registered nurse. At present, he is the Vice President of the Philippine Society of Genetic Counselors. He is the CARE PH Research Administrator and works as a Project Manager in all of CARE PH's research studies. He also heads the registry and research workshop of the organization.



CARE PH ORGANIZATIONAL CHART







FINANCIAL SUMMARY (per 2022 AFS)

BOH 2022	199,565	
• BPI	195,748	
RCBC	3,817	
CONTRIBUTIONS AND GRANTS	5,766,031	
 WHO (PCC-SRDC) 	1,500,000	
 THPI 	1,500,000	
UP-Manila	1,032,250	
 PFI 	858,200	
 PSUO (PUMA Study) 	500,000	
AGFI	250,000	
 TMC (CALMER Study) 	100,000	
 Anonymous Donors 	22,581	
EXPENSES	5,793,131	
 Programs and Projects Registry, Research 	5,489,679	
Administrative	303,452*	
EOH 2022	19,128	
• BPI	7,569	
RCBC	11,559	

*Compliant to Tax Code SEC 34-H.2.c.3

"The level of administrative expense of which shall, on an annual basis, conform with the rules and regulations to be prescribed by the Secretary of Finance, upon recommendation of the Commissioner, but in no case to exceed thirty percent (30%) of the total expenses"

[*5.24% | Best practice is ≤ 15%]

REFERENCES

- 1. Global Cancer Observatory (2021, March). *Philippine Population Fact Sheets.* https://gco.iarc.fr/today/data/factsheets/populations/608-philippines fact-sheets.pdf.
- 2. 2021 CARE PH Annual Report.