



THE CENTRE FOR ONCOLOGY
EDUCATION AND RESEARCH
TRANSLATION (CONCERT) BIOBANK

YEARLY REPORT

AUGUST 2019







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SUMMARY

EXECUTIVE SUMMARY

Since its operation in 2012, the CONCERT Biobank has been providing samples to researchers investigating the genetic, lifestyle and environmental factors linked to cancer. These findings are being translated into new ways to prevent, detect, diagnose and treat different types of cancer. The CONCERT Biobank is also a NSW Health Pathology certified Biobank – BRC-00010.

OUR CHALLENGE	OUR APPROACH	OUR IMPACT	HOW YOU CAN HELP
 <p>Help researchers end cancer</p>	 <p>30,000+ specimens collected</p>	 <p>30+ cancer projects supported</p>	 <p>2,000+ donors</p>



DEFINITIONS

Case – A case is an individual who has donated cancer biospecimens.

Biospecimen – A specimen of biological material from a case, which includes tumour/normal adjacent tissue, blood and blood products. For example, 1 case may have 20 associated biospecimens.

COLLECTIONS

The CONCERT Biobank is actively operating at 3 hubs; Central Hub (Liverpool, Bankstown, South West Sydney Private and Strathfield Private Hospitals), Wollongong Hub (Wollongong and Wollongong Private Hospitals) and Canberra Hub (Canberra Hospital).

CENTRAL HUB

Total since Operation (November 2012 to June 1st, 2019):

- One thousand six hundred (1,600) cases donated tissue and blood to the CONCERT Biobank.
- Of these, 908 cases were Head and Neck Cancers (HNCa), 365 were Colorectal Cancers (CRC), 172 were Neurological (NRO) and 155 were Breast (BRT) cancers.
- One participant (HNCa) chose to withdraw their consent and their specimens were subsequently destroyed.
- The number of cases collected each year by cancer type is illustrated in Table 1.

Table 1 | Total Number of Cases Collected At Central Hub Each Year by Cancer Type

Collections	2012	2013	2014	2015	2016	2017	2018	2019 (YTD)	Subtotals
Head & Neck	12	96	104	127	163	130	206	70	908
Colorectal	2	19	70	65	75	52	65	17	365
Neuro	0	17	19	27	24	37	41	7	172
Breast	0	0	0	55	36	43	15	6	155
Subtotals	14	132	193	274	298	262	327	100	1600

WOLLONGONG HUB

Total since Operation (Aug 2014 to June 1st 2019):

- Five hundred and twenty-seven (527) cases donated tissue and blood to the CONCERT Biobank.
- Of these, 261 cases were Head and Neck Cancers (HNCA), 133 were Colorectal Cancers (CRC), 54 were Neurological (NRO), 60 were Gastrointestinal (GCa) cancers and 19 were Pancreatic cancers.
- The number of cases collected each year by cancer type is illustrated in Table 2.

Table 2 | Total Number of Cases Collected At Wollongong Hub Each Year by Cancer Type

Collections	2012	2013	2014	2015	2016	2017	2018	2019 (YTD)	Subtotals
Head & Neck	-	-	8	8	27	76	100	42	261
Colorectal	-	-	-	-	-	47	55	31	133
Neuro	-	-	-	4	16	12	18	4	54
GCa	-	-	-	8	9	14	17	12	60
Pancreatic	-	-	-	-	-	5	11	3	19
Subtotals	0	0	8	20	52	154	201	92	527

CANBERRA HUB

Total since Operation (2018 – June 2019):

- Forty-four (44) cases have been donated to the CONCERT Biobank.
- All 44 of these collections were Colorectal Cancers (CRC). Further details regarding site of tumour and histopathological subtype are imminent.

DEMOGRAPHICS

CENTRAL HUB

- There is a 1.27:1 ratio of males to females across all cancers (Figure 1).
- The majority of cancer cases (12%) fall within the age bracket of 65-69 years (Figure 2).

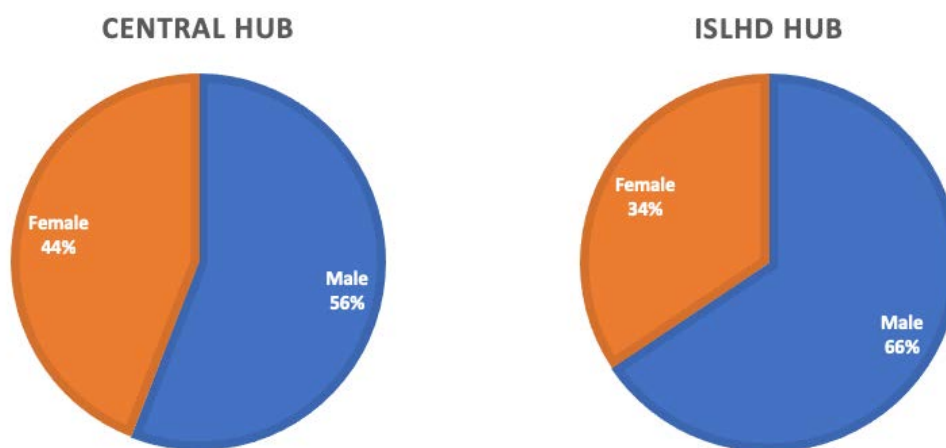


Figure 1 | Gender Distribution Across All Cancers at Central (left) and Wollongong Hubs (right)

WOLLONGONG HUB

- There is a 1.9:1 ratio of males to females across all cancers (Figure 1).
- Similar to the Central Hub, majority of cancer cases (17%) fall within the age bracket of 65-69 years (Figure 2).

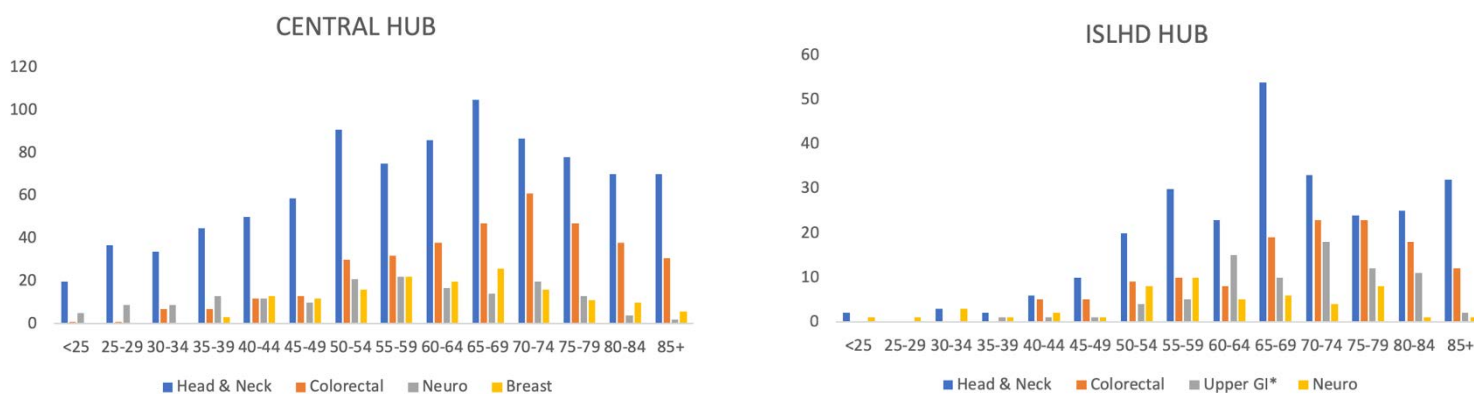


Figure 2 | Age Distribution Across All Cancers at Central (left) and Wollongong (right) Hubs.

THE FOLLOWING INFORMATION IS FOR CENTRAL & WOLLONGONG COLLECTION SITES

BIOSPECIMENS

- The CONCERT Biobank inventory holds 33,650 biospecimens across all cancers (Table 3 and 4).
- Of these 3,441 are fresh frozen tumour and normal adjacent tissue (Table 3), 26,519 are blood and blood products, 29 are Cavitron Ultrasonic Surgical Aspirator (CUSA), 10 are cerebrospinal fluid (CSF), 683 are paraffin embedded tissue (FFPE), with 1,964 haematoxylin and eosin (H&E) slides (Table 3).
- Blood specimen types can further be divided into whole blood, plasma, serum and buffy coat (Table 4).

Table 3 | Total Number of Specimens Across All Cancers

SPECIMEN TYPE	TOTAL (n)
Tumour Tissue	3441
Normal Tissue	1004
Blood Products	26519
CUSA	29
CSF	10
FFPE	683
H&E	1964
TOTALS	33650

Table 4 | Total Number of Blood Products Across All Cancers

BLOOD PRODUCTS	TOTAL (n)
Whole Blood	4252
Plasma	8522
Serum	8393
Buffy Coat	4240
ctDNA*	1112
TOTAL	26519

Head and Neck Cancer

- Classification of HNCa by site reveals the largest proportion were thyroid followed by oral cancers (Figure 3).
- Classification of HNCa by histological type reveals the largest proportion were squamous cell carcinoma followed by papillary carcinoma (Figure 4).
- From 1,176 cases, there are 1,367 aliquots of tumour and normal adjacent tissue, 14,390 aliquots of bloods and blood products, 226 FFPE sections and 1,022 H&E slides (Table 5).
- Of these 1,176 cases, 330 (28%) have fresh tumour and normal adjacent tissue.

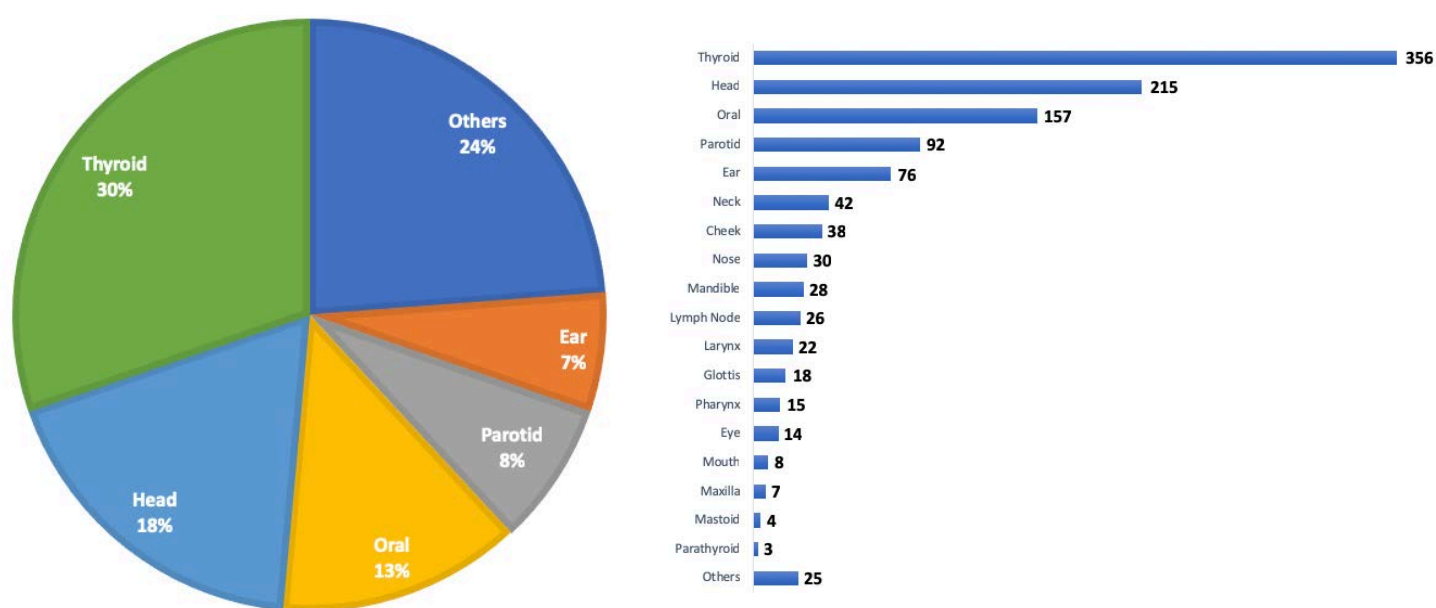


Figure 3 | Five Major Sites Banked (left) and Numbers of All Sites for HNCa Cases (right).

Table 5 | Total Number of Specimens for HNCa

SPECIMEN TYPE	TOTAL (n)
Tumour Tissue	978
Normal Tissue	389
Blood	14390
FFPE	226
H&E	1022

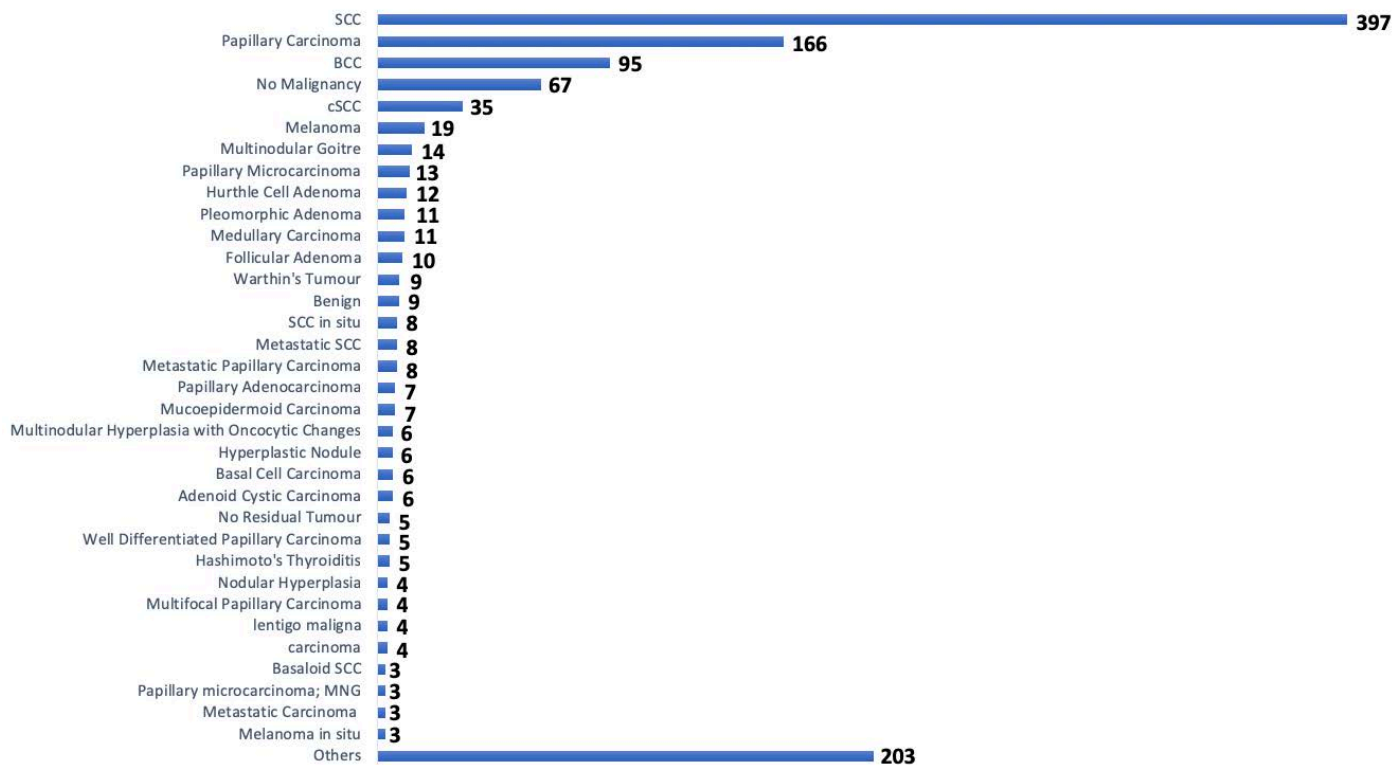


Figure 4 | Number of HNCa Cases by Histological Type

Colorectal Cancer

- Classification of CRC by site reveals the largest proportion were located in the rectum followed by the ascending colon and sigmoid colon (Figure 5).
- Classification of CRC by histological type reveals the largest proportion were adenocarcinoma (Figure 6).
- From 501 cases, there are 1,627 aliquots of tumour and normal adjacent tissue, 6,289 aliquots of bloods and blood products, 370 FFPE sections and 674 H&E slides (Table 6).
- Of these 501 cases, 297 (59%) have fresh tumour and normal adjacent tissue.

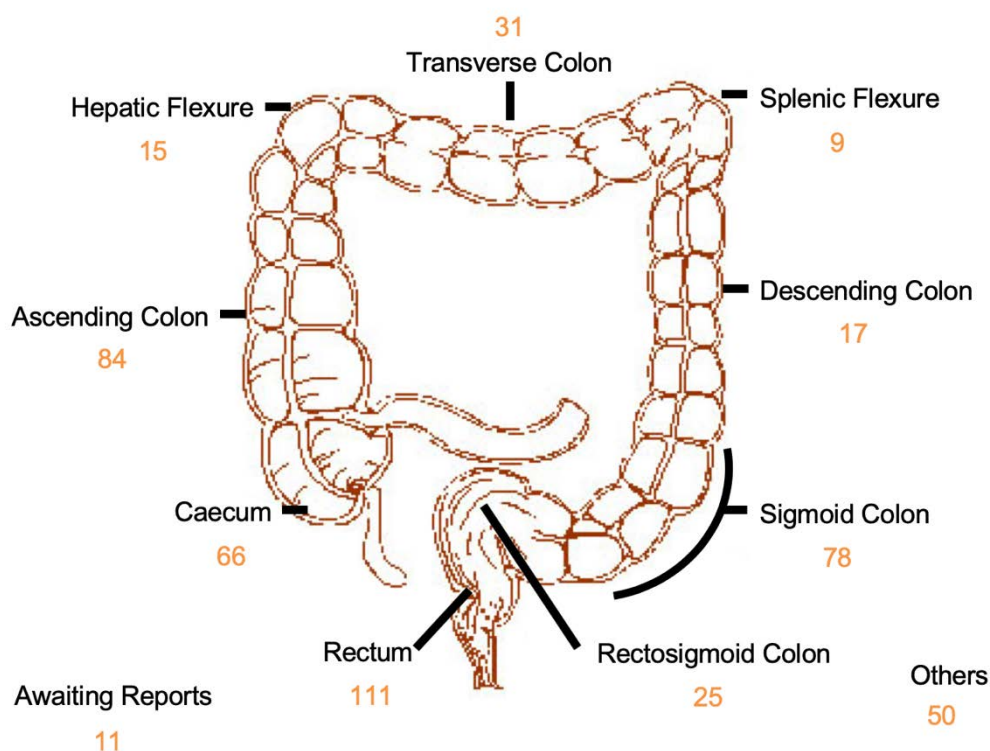


Figure 5 | Number of CRC Cases by Site

Table 6 | Total Number of Specimens for CRC

SPECIMEN TYPE	TOTAL (n)
Tumour Tissue	1100
Normal Tissue	527
Blood	6289
FFPE	370
H&E	674

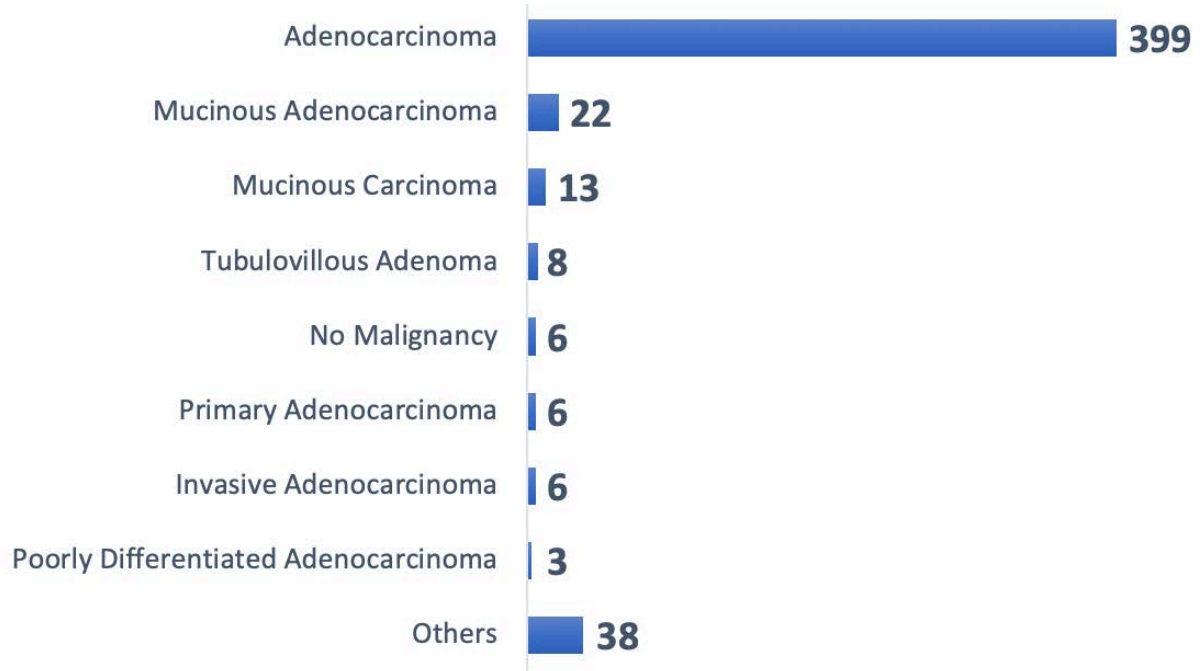


Figure 6 | Number of CRC Cases by Histological Type

Neurological Cancer

- Classification of NRO by histological type reveals the largest proportion were glioblastoma multiforme and astrocytoma (Table 7).
- From 227 cases, there are 1,175 aliquots of tumour tissue, 2,938 aliquots of bloods and blood products, 28 FFPE tissues and 26 H&E slides, 25 CUSA specimens and 10 CSF specimens (Table 8).
- Of note, of 227 cases, 197 (87%) have fresh tumour and normal adjacent tissue.

Table 7 | Total Number of Specimens for NRO

SPECIMEN TYPE	TOTAL (n)
Tumour Tissue	1172
Normal Tissue	3
Blood	2938
FFPE	28
H&E	26
CUSA	25

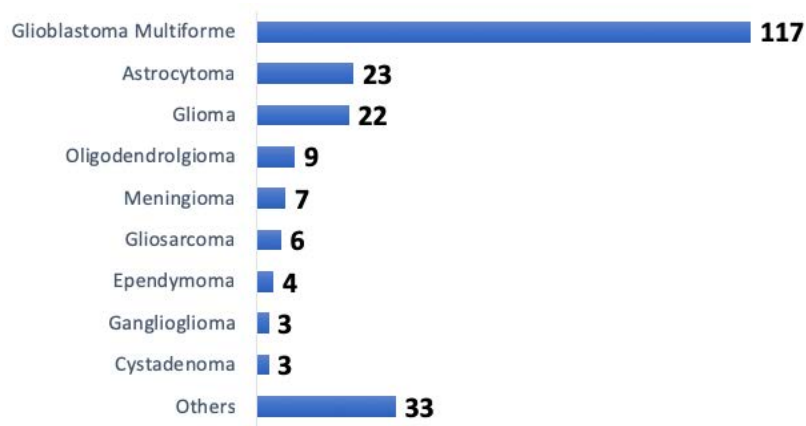


Figure 7 | Number of NRO Cases by Histological Type

Breast Cancer

- Classification of BRT by histological type reveals the largest proportion was infiltrating ductal carcinomas (Figure 7).
- The majority of BRT cancer cases (57%) occurred in the left breast.
- From 155 cases, there are 152 aliquots of tumour and normal adjacent tissue, 1,819 aliquots of bloods and blood products, 26 FFPE sections and 209 H&E slides (Table 9).
- Of these 155 cases, 31 (20%) have fresh tumour and normal adjacent tissue.

Table 8 | Total Number of Specimens for BRT

SPECIMEN TYPE	TOTAL (n)
Tumour Tissue	94
Normal Tissue	58
Blood	1819
FFPE	26
H&E	209

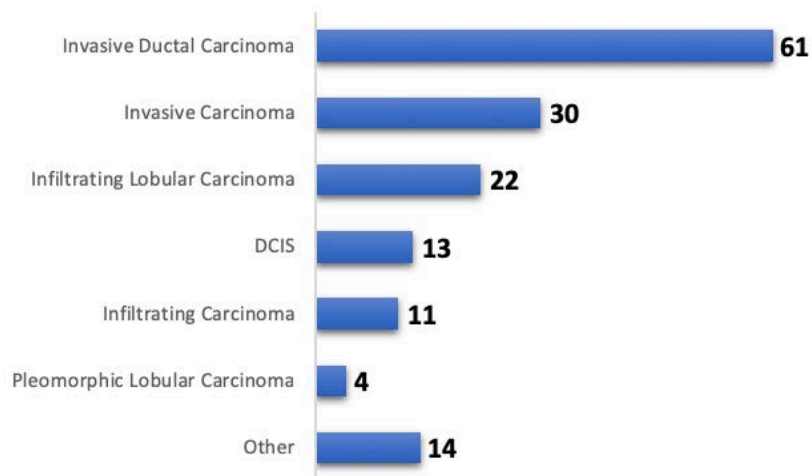


Figure 8 | Number of BRT Cases by Histological Type

Gastric Cancer

- Classification of GCa by histological type reveals the largest proportion was adenocarcinoma (Figure 8).
- The majority of GCa cases occurred in the stomach (42%) and oesophagus (36%).
- From 64 cases, there are 110 aliquots of tumour and normal adjacent tissue, 712 aliquots of bloods and blood products, 23 FFPE sections and 23 H&E slides (Table 10).
- Of these 64 cases, 20 (31%) have fresh tumour and normal adjacent tissue.

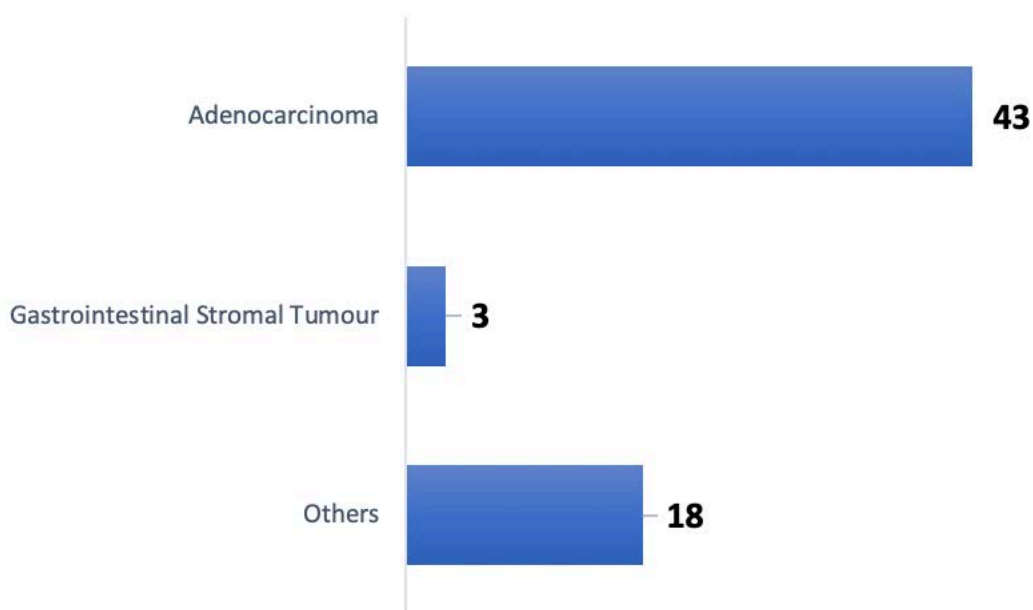


Figure 9 | Number of GCa Cases by Histological Type

Table 9 | Total Number of Specimens for GCa

SPECIMEN TYPE	TOTAL (n)
Tumour Tissue	84
Normal Tissue	26
Blood	712
FFPE	23
H&E	23

Pancreatic Cancer

- Classification of pancreatic cancer by histological type reveals the largest proportion was adenocarcinoma (Figure 9).
- From 18 cases, there are 14 aliquots of tumour and normal adjacent tissue, 237 aliquots of bloods and blood products, 10 FFPE sections and 10 H&E slides (Table 11).
- Of these 18 cases, 4 (22%) have fresh tumour and normal adjacent tissue.

Table 10 | Number of Pancreatic Cancer Cases by Histological Type

HISTOLOGICAL SUBTYPE	TOTAL (n)
Adenocarcinoma	15
Atypical Carcinoid Tumour	1
Carcinoid Tumour	2

Table 11 | Total Number of Specimens for Pancreatic Cancer

SPECIMEN TYPE	TOTAL (n)
Tumour Tissue	13
Normal Tissue	1
Blood	237
FFPE	10
H&E	10

CONCERT BIOBANK PUBLICATIONS AND PRESENTATIONS

For a comprehensive list of publications, please follow the link:

https://scholar.google.com.au/citations?user=1jBy4_IAAAJ&hl=en

CURRENT PROJECTS

- The CONCERT Biobank Scientific Advisory Committee (SAC) has received 10 applications for the use of biospecimens, with 9 applications approved and 1 refused.
- Further, the CONCERT Biobank is assisting 31 cancer research studies (Table 13), which totals over 4,309 specimens recruited to assist in these projects.
- The CONCERT Biobank has also initiated 6 biobank research studies aimed at; increasing ethical use of human specimens for research and increasing trust by patient communities to research; promoting the use of representative materials, while ensuring sample quality and maximising sample use; enabling real-time clinical data capture from electronic medical records to annotate biospecimens stored in Biobanks and identifying cultural barriers to entry for Biobank recruitment.

Table 13 | List of projects supported by the CONCERT Biobank to date

Project Title - Biobank Aided	Primary Investigator	Department	Year	Cancer Type	Recruitment Numbers	Status	Ethics	Collection	Specimen Dissemination	Research Services
Protein expression analysis in a "breast oncogenesis progression series" using tissue microarrays and high throughput immunohistochemistry	Prof CS Lee	Pathology	2013	Breast	1300	Ongoing	✓			
Biomarkers for brain cancer	Prof Paul de Souza	Multi-institutional	2013	Neurological	64	Ongoing	✓	✓		
CRC feasibility pilot study (Flagship)	Prof Afaf Girgis	Psycho-Oncology	2013	CRC	32	Ongoing		✓		✓
Circulating tumour cells in cancer management	Prof Paul de Souza	Multi-institutional	2013	Various	83	Ongoing	✓			✓
Investigation of biomarkers for prostate cancer	Prof CS Lee	Pathology	2014	Prostate	300	Ongoing	✓			
Magnetic resonance aided biomarker discovery in rectal cancer	Dr Trang Pham	Radiation Oncology	2014	Rectal	31	Complete	✓	✓	✓	✓
Assessment of biomarkers for head and neck cancers	Mr Ken Lai	Pathology	2014	Head and Neck	210	Complete	✓			
Biomarkers of disease progression, treatment response and survival outcomes in colorectal cancer	Prof CS Lee	Pathology	2015	CRC	1250	Ongoing	✓			
Analysis of tumour suppressors, SMG1 and ATM, and their role in lymphoma and leukemia	Dr Tara Roberts	Medical Oncology	2015	Lymphoma and Leukemia	42	Ongoing	✓			
Pilot study of NAB-Paclitaxel in combination with Capecitabine as second line treatment of advanced biliary cancer	A/Prof Morteza Aghmesheh	Medical Oncology	2015	Biliary	Pending	Ongoing		✓		
Understanding the molecular and genetic changes that lead to metastasis in cutaneous SCC	Dr Bruce Ashford	Multi-institutional	2015	Head and Neck	Pending	Ongoing		✓		✓
Personalisation of systemic therapy in gastric cancer	Dr Daniel Brungs	Wollongong Hospital	2015	Gastric	Pending	Ongoing	✓	✓		✓
CHANCES - Head and Neck Cancer Information Needs	A/Prof Jonathan Clark	RPAH	2015	Head and Neck	150	Complete		✓		
Biobanking - patient and healthcare professional attitudes and experiences	Dr Sonia Yip	Sydney Catalyst	2016	All	10	Complete	✓	✓		✓
The Dermatology Biobank	Prof Cains	Dermatology	2016	Skin Conditions	14	Ongoing	✓	✓		
PET LABRADOR Study	TROG	Clinical Trials	2016	Breast	N/A	Ongoing		✓		✓
Fatty Acids, Eicosanoids and Sphingosine-1-Phosphate in Glioblastoma Patient Plasma, A Pilot Study	Dr Anthony Don	Metabolic Signaling (UNSW)	2016	Neurological	N/A	Complete			✓	
Transcriptome and proteomic profiling to stratify radioresistant subtypes of brain cancer	Dr. Tara Roberts	Medical Oncology	2016	Neurological	N/A	Ongoing			✓	
Biomarkers of brain cancer	David Lynch	Medical Oncology	2017	Neurological	N/A	Complete	✓		✓	
Biomarkers of lung cancer for diagnostic and prognostic purposes	Prof CS Lee	Pathology	2017	Lung	N/A	Commencing	✓			
Immune network analysis in patients with head and neck cancer in the Illawarra region	Dr Thomas Guy	Wollongong Hospital	2018	Head and Neck	N/A	Ongoing		✓		✓
Biomarkers in brain cancer	Prof Helen Rizos	Macquarie University	2018	Neurological	3	Ongoing		✓	✓	
Discovery of biomarkers of pancreatic cancer for diagnostic and prognostic purposes	Prof CS Lee	Pathology	2019	Pancreatic	N/A	Commencing	✓	✓		
Biomarkers of gastric and oesophageal cancer for diagnostic and prognostic purposes	Prof CS Lee	Pathology	2019	Gastric Oesophé	N/A	Commencing	✓	✓		
Liquid Biopsies in Brain Cancer	A/Prof Therese Becker	Medical Oncology	2019	Neurological	6	Ongoing	✓	✓	✓	

Project Title - Biobank Initiated	Primary Investigator	Department	Year	Cancer Type	Recruitment Numbers	Status	Ethics	Collection	Specimen Dissemination	Research Services
Health professionals opinions towards supporting a cancer biobank	Dr Nicole Caixeiro	CONCERT Biobank	2014	All	95	Complete	✓	✓		✓
Health professionals opinions towards supporting a cancer biobank - inter-regional	Dr Nicole Caixeiro	Multi-institutional	2016	All	350	Ongoing	✓	✓		✓
Quality assessment and preservation of biobank tissue specimens	Dr Nicole Caixeiro	CONCERT Biobank	2016	All	31	Commencing	✓	✓		✓
Enabling near real-time clinical data capture for biobanks using electronic medical record: Phase 1	Prof John Pimanda	BSN	2017	All	N/A	Complete				✓
Enabling near real-time clinical data capture for biobanks using electronic medical record: Phase 2	A/Prof Kevin Spring	BSN	2018	All	N/A	Ongoing	✓			✓
Biobank recruitment in head and neck patient cohorts: Culturally and linguistically diverse (CALD) considerations	Joseph Po	CONCERT Biobank	2019	Head and Neck	338	Ongoing				✓

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Please visit our website: biobank.inghaminstitute.org.au