



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

YEARLY REPORT

JUNE 2018





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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><b>20,000</b> specimens collected</p>	 <p><b>31</b> cancer projects supported</p>	 <p><b>1,500</b> 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 May 2018):

- **One thousand two hundred and fifty-four (1,254)** cases donated tissue and blood to the CONCERT Biobank.
- Of these, **683** cases were Head and Neck Cancers (HNCa), **301** were Colorectal Cancers (CRC), **138** were Neurological (NRO) and **132** 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 (Nov-Dec)	2013	2014	2015	2016	2017	2018 (YTD)	TOTAL
HNCa	12	96	104	127	163	130	51	683
CRC	2	19	70	65	75	52	18	301
Neuro	0	17	19	27	24	37	14	138
BRT	0	0	0	55	36	38	3	132
<b>TOTALS</b>	<b>14</b>	<b>132</b>	<b>193</b>	<b>274</b>	<b>298</b>	<b>257</b>	<b>86</b>	<b>1254</b>

### WOLLONGONG HUB

Total since Operation (Aug 2014 to May 2018):

- **Three hundred and eighteen (318)** cases donated tissue and blood to the CONCERT Biobank.
- Of these, **157** cases were Head and Neck Cancers (HNCa), **66** were Colorectal Cancers (CRC), **41** were Neurological (NRO), **42** were Gastrointestinal (GCa) cancers and **12** 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	2014	2015	2016	2017	2018 (YTD)	TOTAL
HNCa	8	8	27	75	39	157
CRC	0	0	0	48	18	66
Neuro	0	4	16	12	9	41
GCa	0	8	9	14	11	42
Pancreatic	0	0	0	5	7	12
<b>TOTALS</b>	<b>8</b>	<b>20</b>	<b>52</b>	<b>154</b>	<b>84</b>	<b>318</b>

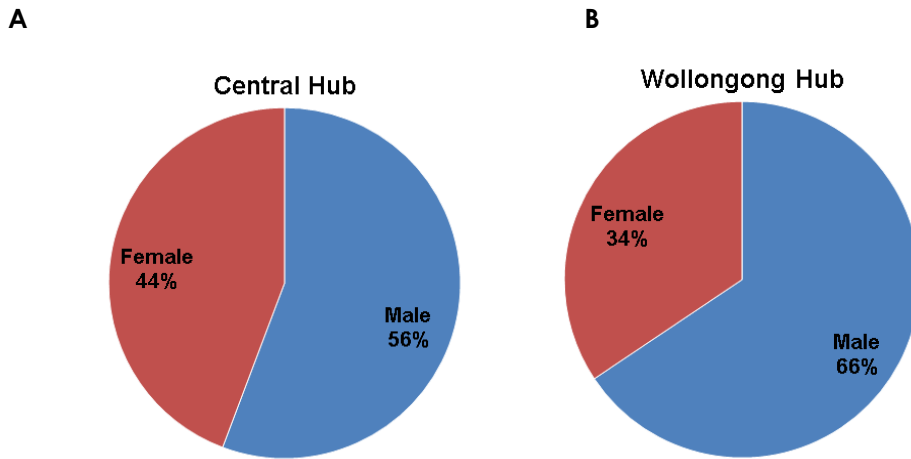
### CANBERRA HUB

- Collections are imminent.

## DEMOGRAPHICS

### CENTRAL HUB

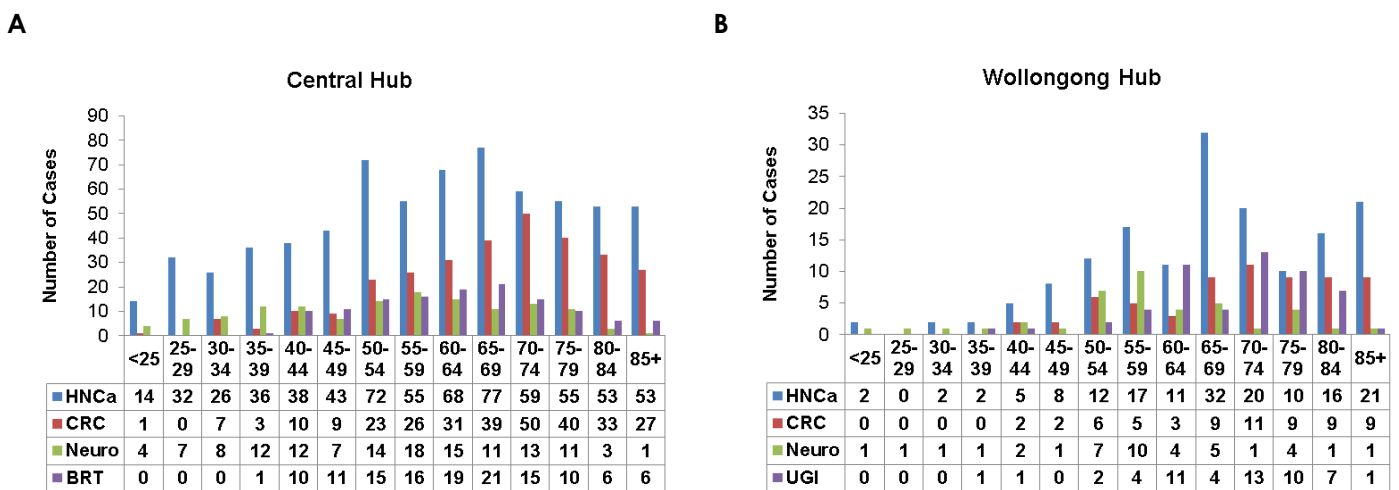
- Excluding the BRT cancer cases, there is a fairly even distribution of males to females across all cancers with a ratio of **1:0.77** (Figure 1).
- The majority of cancer cases (**12%**) fall within the age bracket of **65-69 years** (Figure 2).



**Figure 1** | Gender Distribution Across All Cancers at Central (A) and Wollongong Hubs (B)

WOLLONGONG HUB

- There is a 2:1 ratio of males to females across all cancers (Figure 1). Similar to the Central Hub, majority of cancer cases (**16%**) fall within the age bracket of **65-69 years** (Figure 2).



**Figure 2** | Age Distribution Across All Cancers at Central (A) and Wollongong (B) Hubs

~THE FOLLOWING INFORMATION IS FOR **ALL** COLLECTION SITES~

**BIOSPECIMENS**

- The CONCERT Biobank inventory exceeds **24,881** biospecimens across all cancers (Table 3 and 4).
- Of these **3,308** are fresh frozen tumour and normal adjacent tissue (Table 3), **19,434** are blood and blood products, **25** are Cavitation Ultrasonic Surgical Aspirator (CUSA), **10** are cerebrospinal fluid

(CSF), **515** are paraffin embedded tissue (FFPE), with **1,589** 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	2475
Normal Tissue	833
Blood	19434
CUSA	25
CSF	10
FFPE	515
H&E	1589

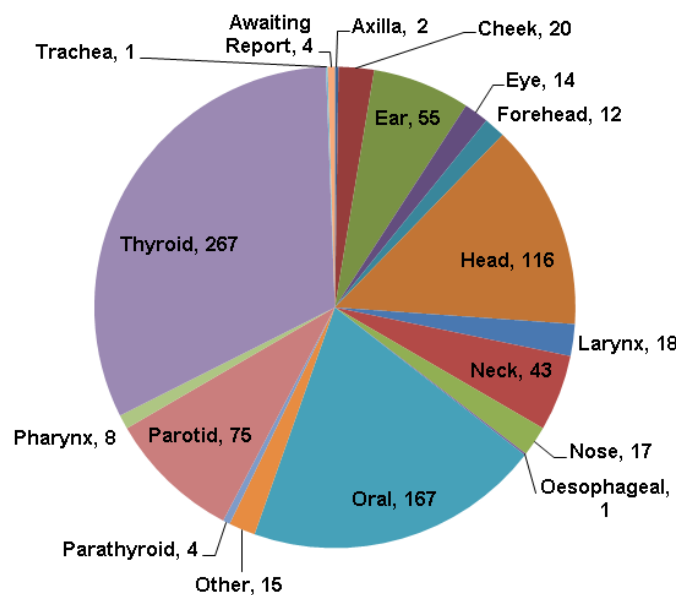
**Table 4** | Total Number of Blood Products Across All Cancers

BLOOD PRODUCT	TOTAL (n)
Whole Blood	3146
Plasma	6324
Serum	6232
Buffy Coat	3138
ctDNA	594

## Cancer Specific Biospecimens

### HNCa

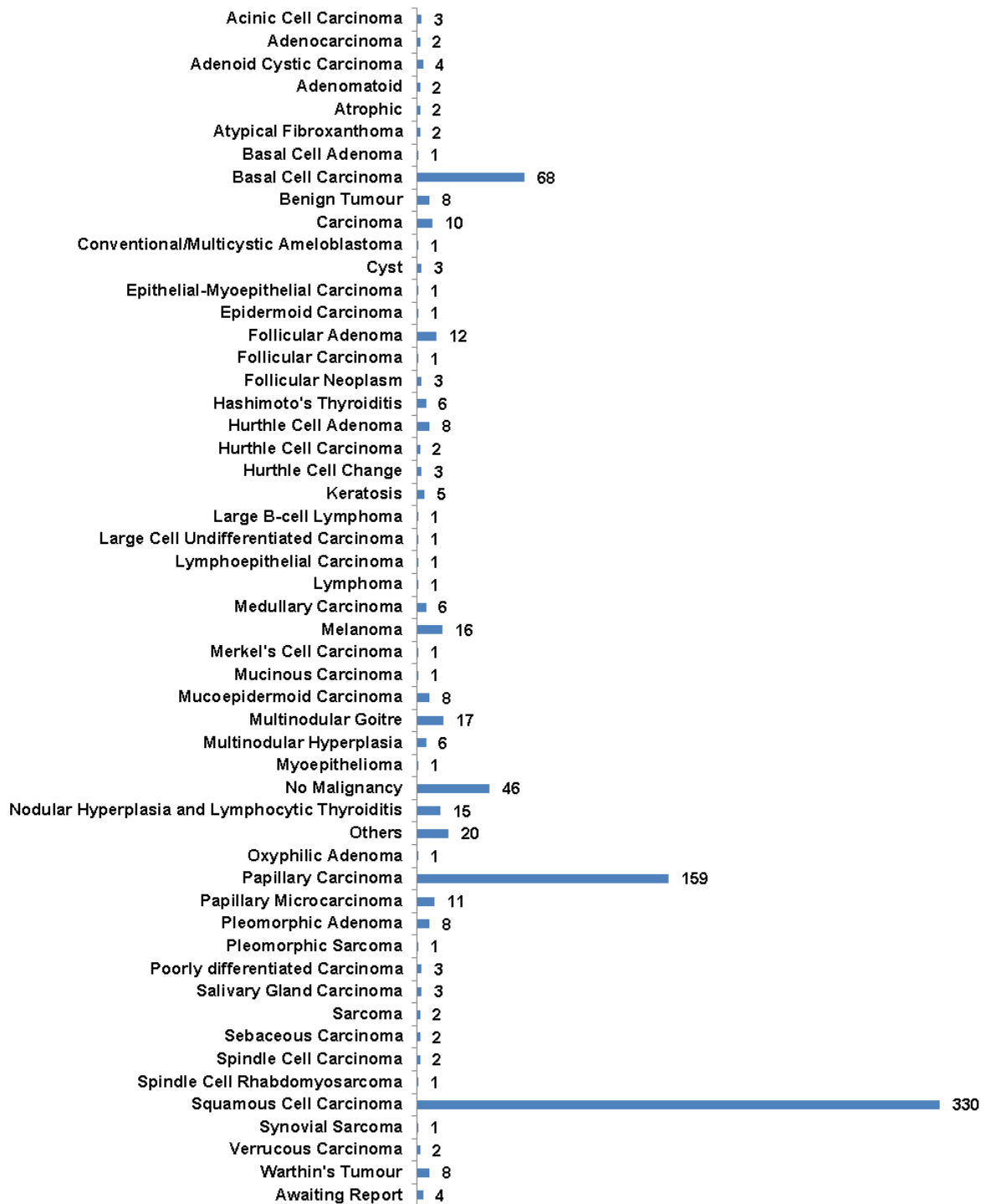
- Classification of HNCa by site reveals the largest proportion were **thyroid** followed by **oral** and **parotid** cancers (Figure 3).
- Classification of HNCa by histological type reveals the largest proportion were **squamous cell carcinoma** followed by **papillary carcinoma** (Figure 4).
- From 840 cases, there are 1,107 aliquots of tumour and normal adjacent tissue, 10,271 aliquots of bloods and blood products, 171 FFPE sections and 823 H&E slides (Table 5).
- Of these 840 cases, 257 (31%) have fresh tumour and normal adjacent tissue.



**Figure 3** | Number of HNCa Cases by Site

**Table 5 | Total Number of Specimens for HNCa**

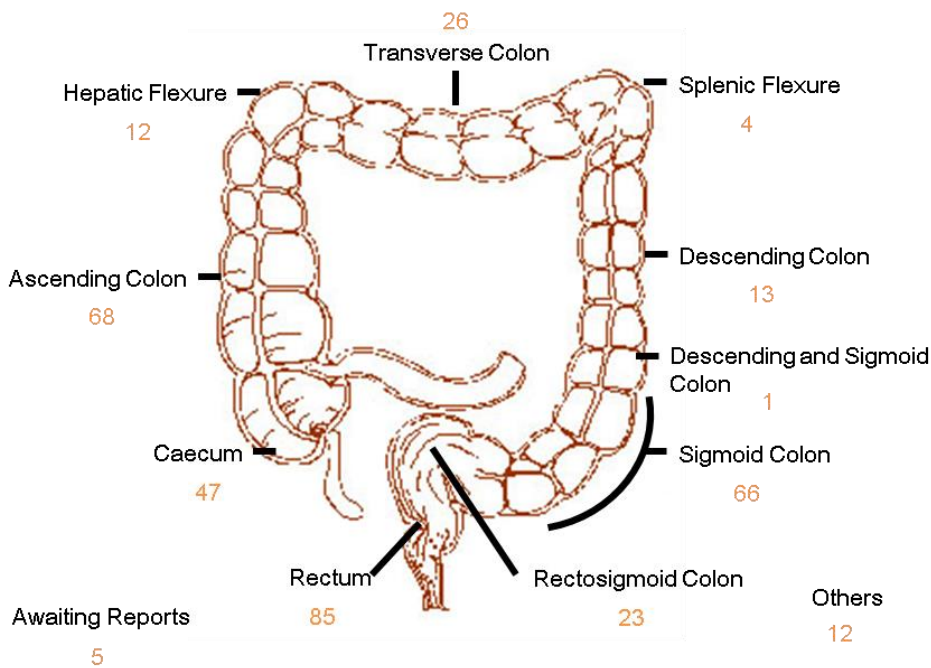
SPECIMEN TYPE	TOTAL (n)
Tumour Tissue	789
Normal Tissue	318
Blood	10271
FFPE	171
H&E	823



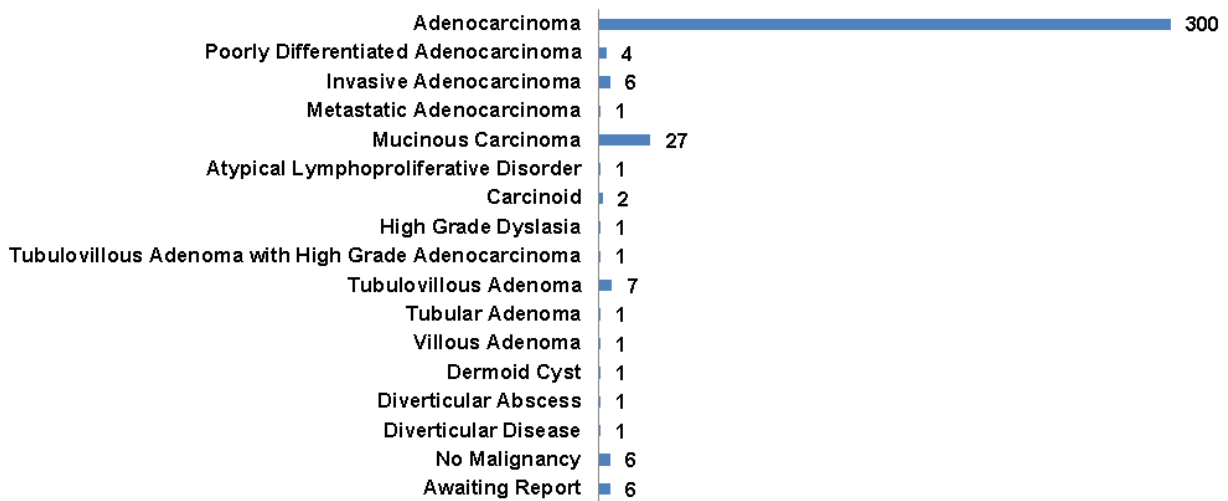
**Figure 4 | Number of HNCa Cases by Histological Type**

CRC

- 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 366 cases, there are 1,243 aliquots of tumour and normal adjacent tissue, 4,512 aliquots of bloods and blood products, 283 FFPE sections and 546 H&E slides (Table 6).
- Of these 366 cases, 218 (59%) have fresh tumour and normal adjacent tissue.



**Figure 5** | Number of CRC Cases by Site



**Figure 6** | Number of CRC Cases by Histological Type



**Table 6** | Total Number of Specimens for CRC

SPECIMEN TYPE	TOTAL (n)
Tumour Tissue	799
Normal Tissue	444
Blood	4514
CUSA	283
CSF	546

## NRO

- Classification of NRO by histological type reveals the largest proportion were **diffused astrocytic and oligodendroglial tumour** (Table 7).
- From 177 cases, there are 757 aliquots of tumour tissue, 2,374 aliquots of bloods and blood products, 25 CUSA specimens and 10 CSF specimens (Table 8).
- Of note, of 177 cases, 158 (89%) have fresh tumour and normal adjacent tissue.

**Table 7** | Number of NRO Cases by Histological Type

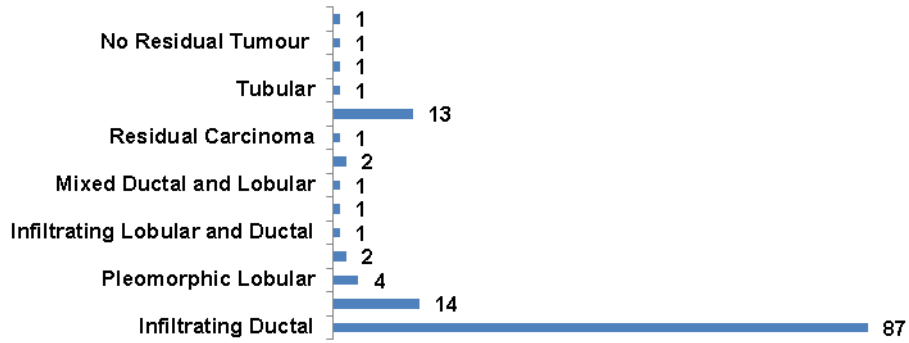
HISTOLOGICAL TYPE	TOTAL (n)
Diffuse Astrocytic and Oligodendroglial	117
Other Astrocytic Tumor	5
Neuronal and Mixed Neuronal Glial	17
Cranial and Paraspinal Nerves	2
Embryonal	1
Ependymal	8
Metastatic	1
Sellar Region	2
Lymphoma	2
Meningioma	7
Others	12
Awaiting Report	3

**Table 8** | Total Number of Specimens for NRO

SPECIMEN TYPE	TOTAL (n)
Tumour Tissue	754
Normal Tissue	3
Blood	2146
CUSA	25
CSF	10

## BRT

- Classification of BRT by histological type reveals the largest proportion was **infiltrating ductal carcinomas** (Figure 7).
- The majority of BRT cancer cases (59%) occurred in the left breast.
- From 132 cases, there are 112 aliquots of tumour and normal adjacent tissue, 1,530 aliquots of bloods and blood products, 26 FFPE sections and 185 H&E slides (Table 9).
- Of these 132 cases, 29 (22%) have fresh tumour and normal adjacent tissue.



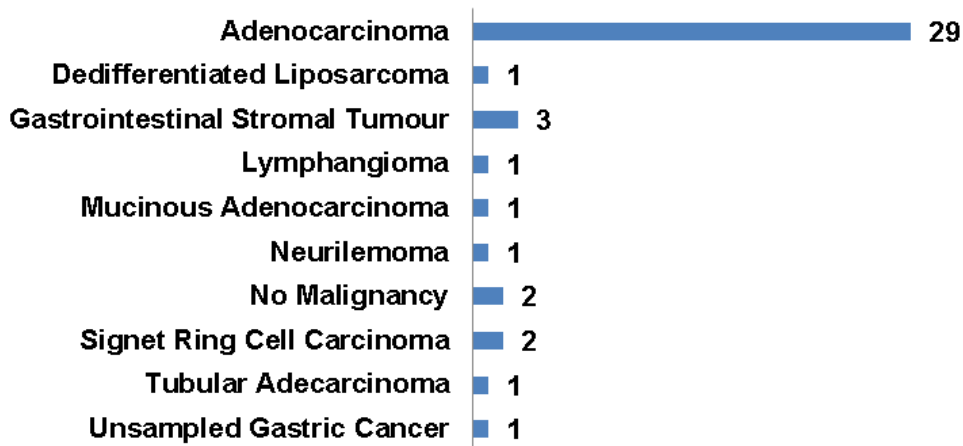
**Figure 7** | Number of BRT Cases by Histological Type

**Table 9** | Total Number of Specimens for BRT

SPECIMEN TYPE	TOTAL (n)
Tumour Tissue	68
Normal Tissue	44
Blood	1530
FFPE	26
H&E	185

### GCa

- 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 (40%).
- From 42 cases, there are 83 aliquots of tumour and normal adjacent tissue, 580 aliquots of bloods and blood products, 17 FFPE sections and 17 H&E slides (Table 10).
- Of these 42 cases, 14 (33%) have fresh tumour and normal adjacent tissue.



**Figure 8** | Number of GCa Cases by Histological Type

**Table 10** | Total Number of Specimens for GCa

SPECIMEN TYPE	TOTAL (n)
Tumour Tissue	59
Normal Tissue	24
Blood	580
FFPE	17
H&E	17

## Pancreatic Cancer

- Classification of pancreatic cancer by histological type reveals the largest proportion was **adenocarcinoma** (Figure 9).
- From 12 cases, there are 6 aliquots of tumour and normal adjacent tissue, 165 aliquots of bloods and blood products, 6 FFPE sections and 6 H&E slides (Table 11).
- Of these 12 cases, 2 (16%) have fresh tumour and normal adjacent tissue.

**Table 11** | Number of Pancreatic Cancer Cases by Histological Type

HISTOLOGICAL TYPE	TOTAL (n)
Adenocarcinoma	10
Atypical Carcinoid Tumour	1
Carcinoid Tumour	1

**Table 12** | Total Number of Specimens for Pancreatic Cancer

SPECIMEN TYPE	TOTAL (n)
Tumour Tissue	6
Normal Tissue	0
Blood	165
FFPE	6
H&E	6

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

## CURRENT PROJECTS

- The CONCERT Biobank Scientific Advisory Committee (SAC) has received **6** applications for the use of biospecimens, with **5** applications approved and **1** refused.
- Further, the CONCERT Biobank is assisting **31** cancer research studies (Table 13), which totals over 4,560 specimens recruited to assist in these projects.
- The CONCERT Biobank has also initiated **4** 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; and enabling real-time clinical data capture from electronic medical records to annotate biospecimens stored in Biobanks.

**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 through put 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	Ongoing	✓			
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: Development of patient-derived gastric cancer cell models for genetic, phenotypic and drug response analysis and investigation of the role of circulating tumour cells and circulating tumour DNA 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	Ongoing	✓		✓	
Biomarkers of lung cancer for diagnostic and prognostic purposes	Prof CS Lee	Pathology	2018	Lung	N/A	Commencing	✓			
Discovery of biomarkers of pancreatic cancer for diagnostic and prognostic	Prof CS Lee	Pathology	2018	Pancreatic	N/A	Commencing	✓	✓		
Biomarkers of gastric and oesophageal cancer for diagnostic and prognostic purposes	Prof CS Lee	Pathology	2018	Gastric Oesoph	N/A	Commencing	✓	✓		
Immune network analysis in patients with head and neck cancer in the Illawarra	Dr Thomas Guy	Wollongong Hospital	2018	Head and Neck	N/A	Ongoing		✓		✓
<b>Project Title - Biobanking Initiatives</b>										
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	20	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	✓			✓

## ACKNOWLEDGEMENTS

The CONCERT Biobank would like to acknowledge the participants, surgeons, pathologists, physicians, nurses and other medical staff for their in-kind support of the biobank as well as the support services of the South Western Area Pathology Service (SWAPS) and South Eastern Area Laboratory Services (SEALS). The CONCERT Biobank would also like to acknowledge its funding sources, the Cancer Institute NSW, Illawarra Shoalhaven Local Health District (ISLHD) Cancer Division, Western Sydney University and University of New South Wales.

Please visit our website: [biobank.inghaminstitute.org.au](http://biobank.inghaminstitute.org.au)