CONCERT

Centre for Oncology Education & Research Translation

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

YEARLY REPORT

JUNE 2017

Ingham Institute
Applied Medical Research

NSW GOVERNMENT Health
South Western Sydney
Local Health District

NSW GOVERNMENT Health
Illawarra Shoalhaven
Local Health District

SUMMARY

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; Main collection centre (Liverpool, Bankstown, South West Sydney Private and Strathfield Private Hospitals), Wollongong (Wollongong and Wollongong Private Hospitals) and Canberra (Canberra Hospital).

MAIN COLLECTION CENTRE

Total since Operation (November 2012 to June 2017):

- **One thousand and forty-one (1041)** cases donated tissue and blood to the CONCERT Biobank.
- Of these, **553** cases were Head and Neck Cancers (HNCa), **265** were Colorectal Cancer (CRC), **105** were Neurological (NRO) and **118** 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 Main Collection Centre Each Year by Cancer Type

Collections	2012 (Nov-Dec)	2013	2014	2015	2016	2017 (YTD)	TOTAL
HNCa	12	96	104	127	163	51	553
CRC	2	19	70	65	75	34	265
Neuro	0	17	19	27	24	18	105
BRT	0	0	0	55	36	27	118
TOTALS	**14**	**132**	**193**	**274**	**298**	**114**	**1041**

WOLLONGONG HUB

Total since Operation (2014 to June 2017):

- **One hundred and nine (109)** cases donated tissue and blood to the CONCERT Biobank.
- Of these, **15** cases were Head and Neck Cancers (HNCa), **5** were Colorectal Cancer (CRC), **6** were Neurological (NRO) and **3** were Gastrointestinal (GCa) 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 (YTD)	TOTAL
HNCa	8	8	27	15	58
CRC	0	0	0	5	5
Neuro	0	4	16	6	26
GCa	0	8	9	3	20
TOTALS	**8**	**20**	**52**	**29**	**109**

CANBERRA HUB

- Collections are imminent.

~THE FOLLOWING INFORMATION IS FOR THE **MAIN COLLECTION SITE ONLY**~

DEMOGRAPHICS

- 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 (**15%**) fall within the age bracket of **65-69 years** (Figure 2).

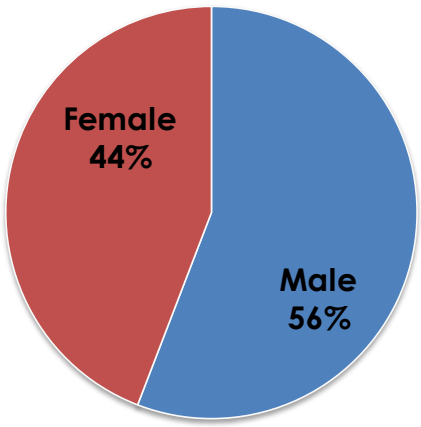
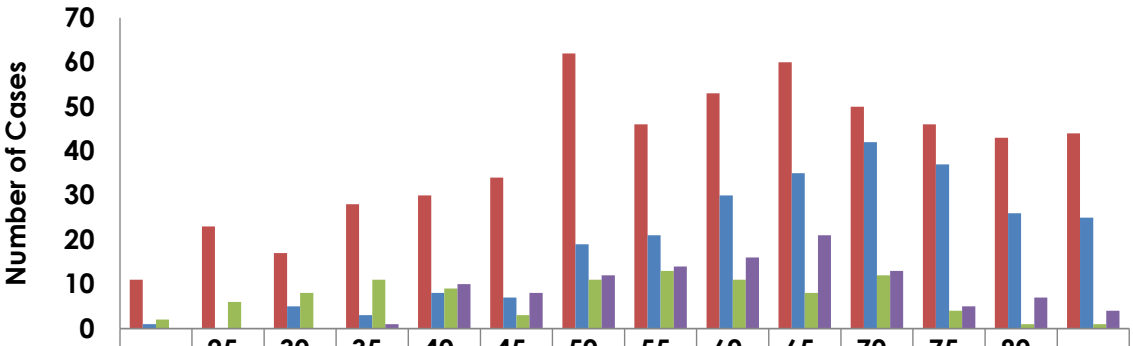


Figure 1 | Gender Distribution Across All Cancers

BIOSPECIMENS

- The CONCERT Biobank inventory exceeds **20,500** biospecimens across all cancers (Table 3 and 4).
- Of these **2,160** are fresh frozen tumour and normal adjacent tissue (Table 3), **12,329** are blood and blood products, **25** are Cavitational Ultrasonic Surgical Aspirator (CUSA), **10** are cerebrospinal fluid (CSF), **359** are paraffin embedded tissue (FFPE), with **1,231** 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).



	<25	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+
HNCa	11	23	17	28	30	34	62	46	53	60	50	46	43	44
CRC	1	0	5	3	8	7	19	21	30	35	42	37	26	25
NRO	2	6	8	11	9	3	11	13	11	8	12	4	1	1
BRT				1	10	8	12	14	16	21	13	5	7	4

Figure 2 | Age Distribution Across All Cancers

Table 3 | Total Number of Specimens Across All Cancers

SPECIMEN TYPE	TOTALS (n)
Tumour Tissue	1533
Normal Tissue	627
Blood	12329
CUSA	25
CSF	10
FFPE	359
H&E	1231

Table 4 | Total Number of Blood Products Across All Cancers

BLOOD PRODUCT	TOTALS (n)
Whole Blood	2051
Plasma	4140
Serum	4092
Buffy Coat	2046

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 553 cases, the biobank holds 688 aliquots of tumour and normal adjacent tissue, 6522 aliquots of bloods and blood products, 126 FFPE sections and 666 H&E slides (Table 5).
- Of note, of 553 cases, 164 (30%) have fresh tumour and normal adjacent tissue.

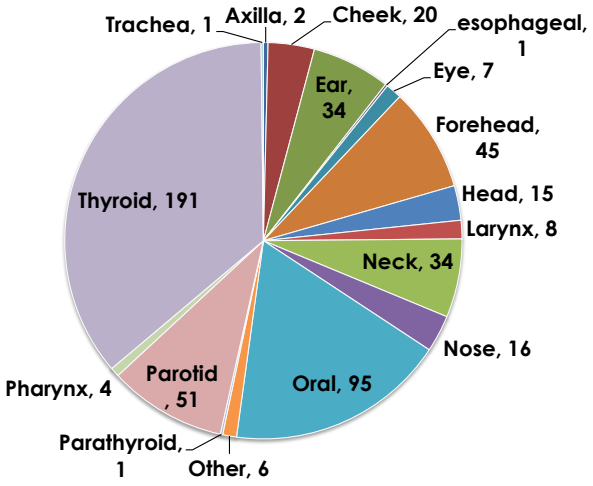


Figure 3 | Number of HNCa Cases by Site

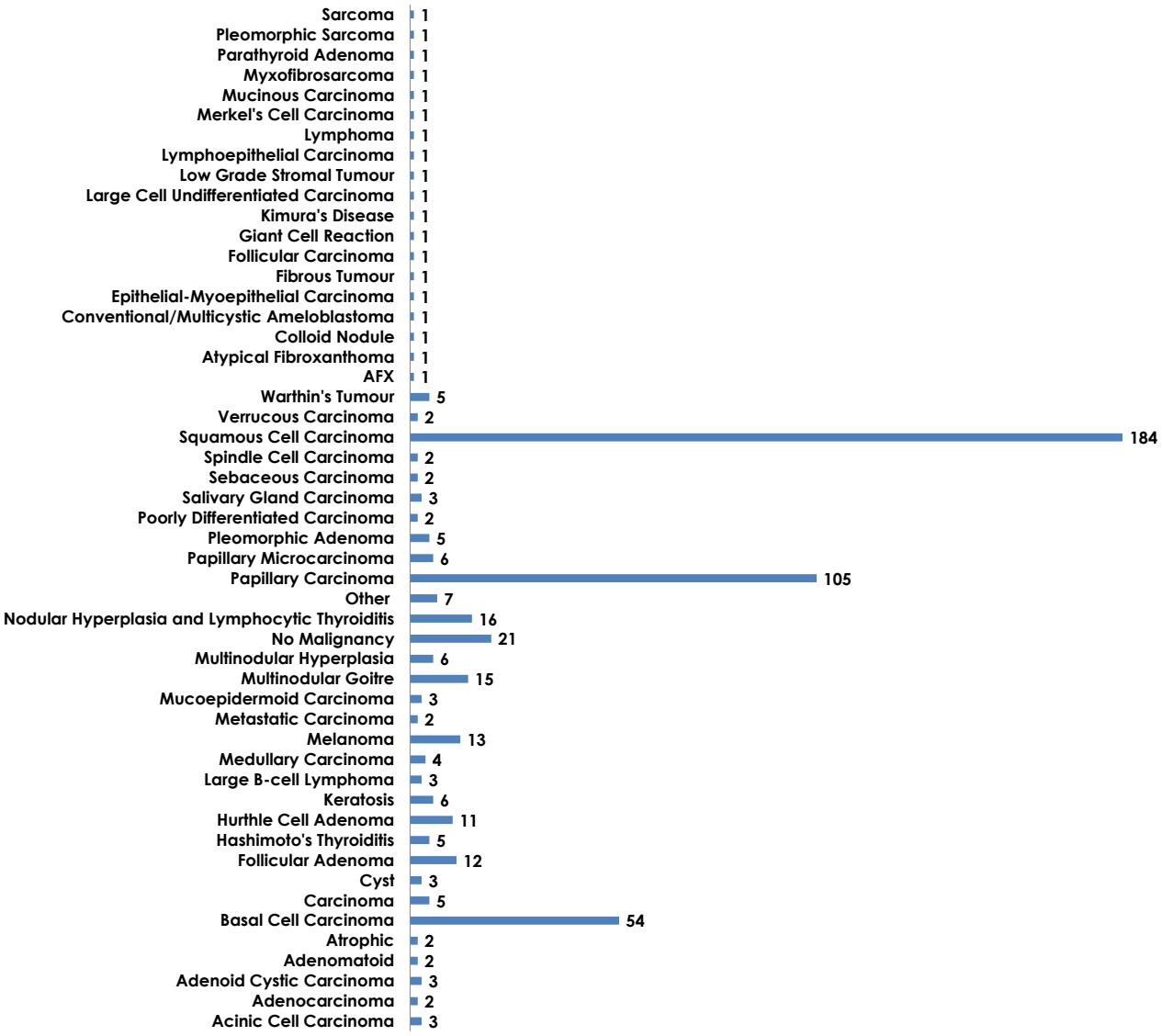


Figure 4 | Number of HNCa Cases by Histological Type

Table 5 | Total Number of Specimens for HNCa

SPECIMEN TYPE	TOTALS (n)
Tumour Tissue	473
Normal Tissue	215
Blood	6522
FFPE	126
H&E	666

CRC

- Classification of CRC by site reveals the largest proportion were located in the **sigmoid colon** followed by the **ascending colon** and rectum (Figure 5).
- Classification of CRC by histological type reveals the largest proportion were **adenocarcinoma** (Figure 6).
- From 265 cases, the biobank holds 925 aliquots of tumour and normal adjacent tissue, 3104 aliquots of bloods and blood products, 207 FFPE sections and 408 H&E slides (Table 6).
- Of note, of 265 cases, 163 (62%) have fresh tumour and normal adjacent tissue.

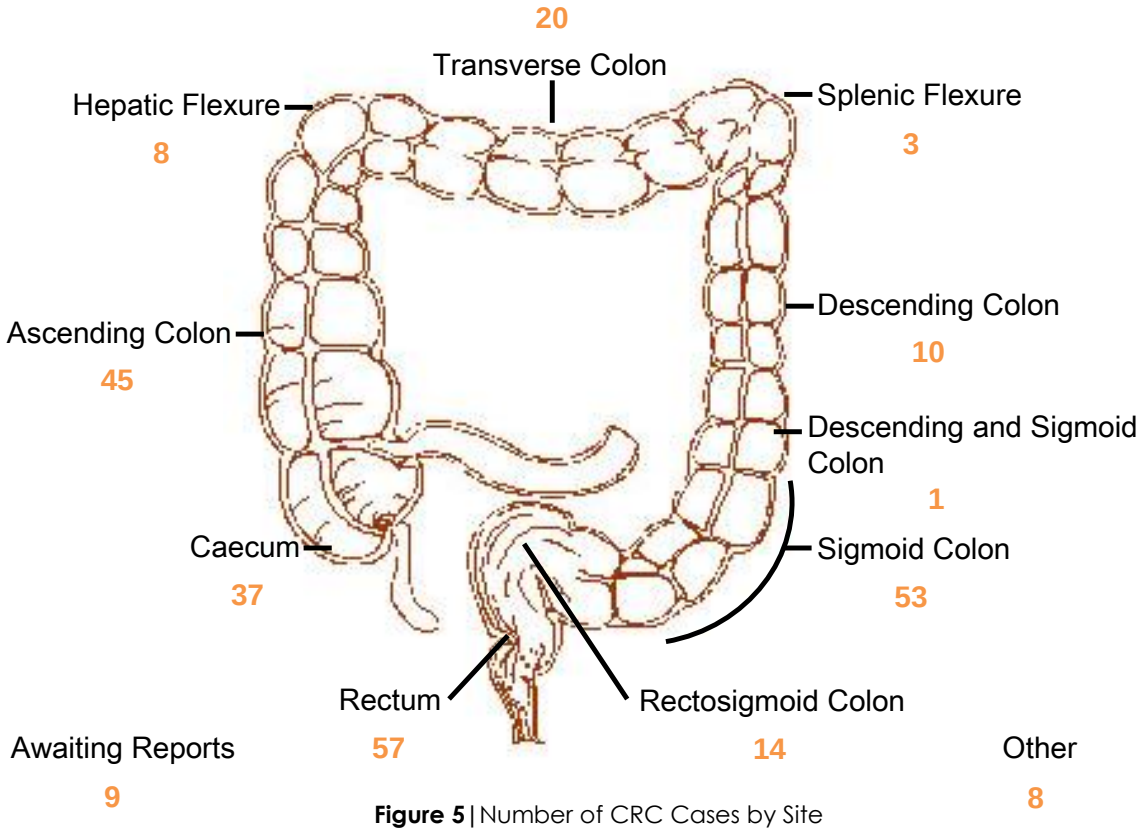


Figure 5 | Number of CRC Cases by Site

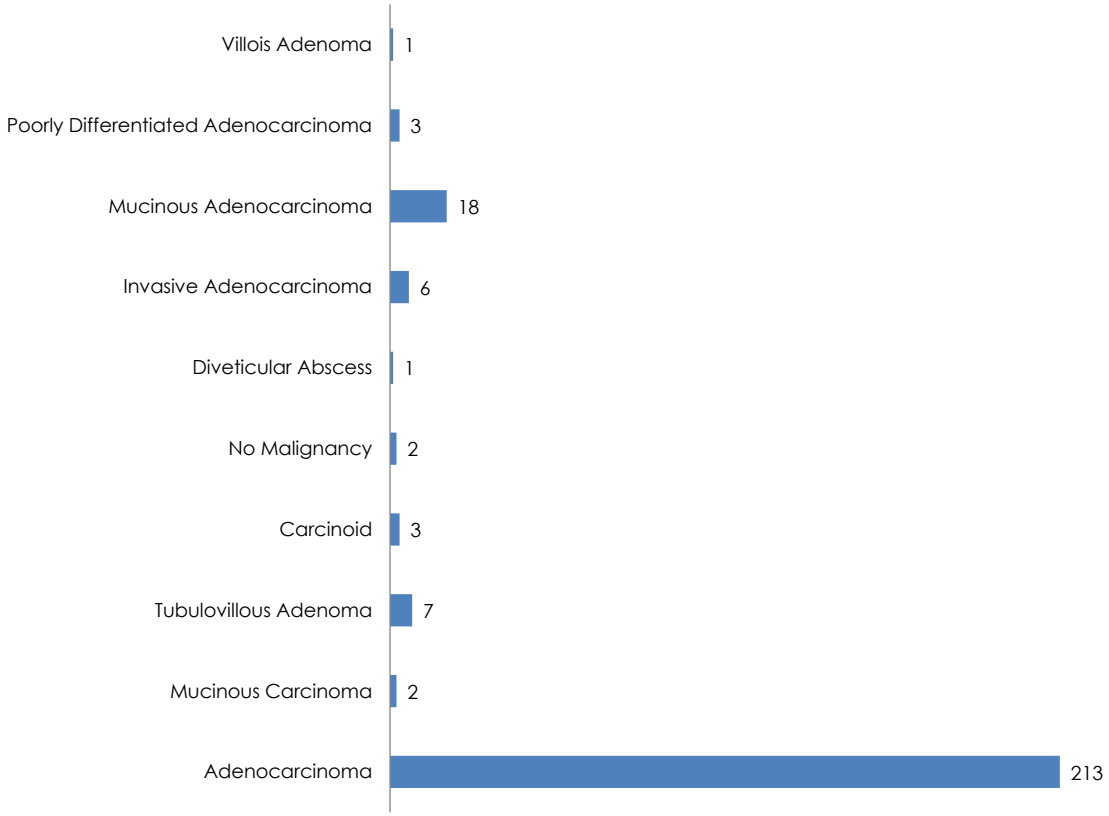


Figure 6 | Number of CRC Cases by Histological Type

Table 6 | Total Number of Specimens for CRC

SPECIMEN TYPE	TOTALS (n)
Tumour Tissue	557
Normal Tissue	368
Blood	3104
FFPE	207
H&E	408

NRO

- Classification of NRO by histological type reveals the largest proportion were **astrocytic tumours** (Table 7).
- From 105 cases, the biobank holds 435 aliquots of tumour tissue, 1380 aliquots of bloods and blood products, 25 CUSA specimens and 10 CSF specimens (Table 8).
- Of note, of 105 cases, 99 (94%) have fresh tumour and normal adjacent tissue.

Table 7 | Number of NRO Cases by Histological Type

HISTOLOGICAL TYPE	TOTAL (n)
Diffuse Astrocytic and Oligodendroglial	74
Ependymal	1
Neuronal and Mixed Neuronal-Glial	2
Embryonal	1
Cranial and Paraspinal Nerves	1
Meningiomas	6
Lymphomas	1
Sellar Region	1
Metastatic	1
Other	2

Table 8 | Total Number of Specimens for NRO

SPECIMEN TYPE	TOTALS (n)
Tumour Tissue	435
Blood	1380
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 (53%) occurred in the left breast.
- From 118 cases, the biobank holds 112 aliquots of tumour and normal adjacent tissue, 1323 aliquots of bloods and blood products, 26 FFPE sections and 157 H&E slides (Table 9).
- Of note, of 115 cases, 29 (25%) have fresh tumour and normal adjacent tissue.

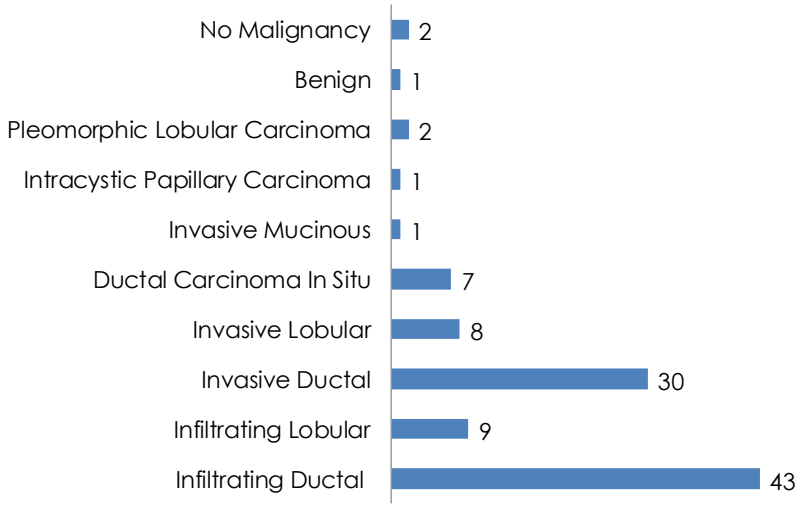


Figure 7 | Number of BRT Cases by Histological Type

Table 9 | Total Number of Specimens for BRT

SPECIMEN TYPE	TOTALS (n)
Tumour Tissue	68
Normal Tissue	44
Blood	1323
FFPE	26
H&E	157

CONCERT BIOBANK PUBLICATIONS AND PRESENTATIONS

Publications (2016-2017)

- Lai K, Matthews S, Wilmott J, Killingsworth M, Caixeiro NJ, Wykes J, Samakeh A, Forstner D, Niles N, Hong A, Lee CS. High LC3C expression correlates with poor survival in oral cavity squamous cell carcinoma patients. Patholo 2017 Feb. doi: 10.1016/j.pathol.2016.09.060
- Lai K, Killingsworth M, Caixeiro NJ, Yong JLC, Hong A, Lee CS. Specific localisation of LC3B in autophagosome: a correlative labelling study with nanoparticle in oral squamous cell carcinoma. Patholo 2017. doi: 10.1016/j.pathol.2016.09.059
- Jabbour J, Milross C, Sundaresan P, Ebrahimi A, Shepherd HL, Dhillon HM, Morgan G, Ashford B, Abdul-Razak M, Wong E, Veness M, Palme CE, Froggatt C, Cohen R, Ekmejian R, Tay J, Roshan D, Clark JR.

Education and support needs in patients with head and neck cancer: A multi-institutional survey. Cancer. 2017 Jan 12. doi: 10.1002/cncr.30535

- Lai K, Killingsworth M, Matthews S, Caixeiro NJ, Evangelista C, Wu X, Wykes J, Samakeh A, Forstner D, Niles N, Hong A, Lee CS. Differences in survival outcome between oropharyngeal and oral cavity squamous cell carcinoma in relation to HPV status. J Oral Pathol Med. 2016 Dec 9. doi: 10.1111/jop.12535
- Caixeiro NJ, Morteza A, de Souza P, Lee CS. The Centre for Oncology Education and Research Translation (CONCERT) Biobank. Open Journal of Bioresources. 2015 2(1):p.Art.e3. doi:http://dx.doi.org/10.5334/ojb.ai
- Caixeiro NJ, Lai K, Lee CS. Quality assessment and preservation of RNA from biobank tissue specimens – A systemic review. J Clin Pathol. 2016 Mar;69(3):260-5. doi: 10.1136/jclinpath-2015-203384.

CURRENT PROJECTS

- The CONCERT Biobank Scientific Advisory Committee (SAC) has received 4 applications for the use of biospecimens, with 2 applications approved, 1 pending and 1 refused.
- Further, the CONCERT Biobank is assisting **17** cancer research studies (Table 10), which totals over 3,900 specimens recruited to assist in these projects. The CONCERT Biobank has also initiated **3** biobank research studies aimed at increasing ethical use of human specimens for research and increase trust by patient communities to research but also promote use of representative materials and more efficient cancer research.

Table 10 | 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	Ongoing	√	√	√	√
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	Pending	Ongoing	√	√		
PET LABRADOR Study	TROG	Clinical Trials	2016	Breast	N/A	Commencing		√		√
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			√	
Project Title - Biobank Initiated										
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	√	√		√

ACKNOWLEDGEMENTS

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