



NEMICS surgical oncology service capability report

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NEMICS surgical oncology service capability report

1. Background

North East Melbourne Integrated Cancer Service (NEMICS) is one of three metropolitan clinical networks established in Victoria to support and facilitate the integration and coordination of cancer services across twelve tumour streams. North east Melbourne includes the catchments of Northern Health, Eastern Health, Austin Health, Mercy Hospital for Women, and all private hospitals within these areas.

The Victorian Department of Health is in the formative stages of developing a service capability framework for cancer services across the state. To pre-empt this work, NEMICS is reviewing the service capability of cancer services and cancer support services in its jurisdiction.

The purpose of this programme of work is to collect cancer service data that will be used to help ensure fair access to effective, prompt and high quality care wherever a patient is treated in the NEMICS region.

This will be achieved through the following deliverables:

1. Deliverable 1. List of cancer services in the NEMICS region and their attributes (May – June 2013)
2. Deliverable 2. Service capability profiles
 - a) Service capability profiles for day oncology and radiotherapy services in the region - Quality of service, capacity and access capabilities (May – September 2013)
 - b) Service capability profile for select cancer support services in the region - Quality of service, capacity and access capabilities (August – December 2013)
 - c) **Service capability profile for surgical oncology services in the region - Quality of service, capacity and access capabilities (September – March 2014)**
3. Deliverable 3. Work with Victorian Department of Health to pilot draft state wide service capability frameworks, sharing learning from local process (December – April 2014)

This paper addresses deliverable 2c – Service capability profile for surgical oncology services.

This paper assesses surgical oncology services within the NEMICS region. It sets out the way services are currently delivered and where they are delivered, as well as a clinical view on these arrangements.

The focus is on hospital surgical volumes and surgeons views on the current provision of surgery across 11 tumour streams and one specialist procedure (bone marrow transplants).

2. Overview of services

Table 1 shows the surgical volumes by tumour stream undertaken at each NEMICS campus. The volume range is also set out. There is considerable variation in the number of procedures carried out in NEMICS health services. This variation would be even greater, if surgeons per service were considered.

Table 1. Volume data for a selection of surgical procedures, by provider, by site in 2011/12.

		Austin Health - Austin Hospital	Austin Health - Repatriation Hospital	Eastern Health - Angliss Hospital	Eastern Health - Box Hill Hospital	Eastern Health - Maroondah Hospital	Eastern Health - Yarra Ranges	Mercy Hospital for Women	Northern Health - Northern hospital	Warringal Private Hospital	Epworth Eastern Hospital	Other NEMICS private hospitals	TOTAL VOLUME (procedures per annum)	VOLUME RANGE (excl. De-identified private hospitals)	NUMBER OF PROVIDERS IN NEMICS REGION
Procedure	Autogeneic bone marrow transplant	25	0	0	27	0	0	0	0	0	0	0	52	25-27	2
	Colectomies + other excisions of rectum	86	0	5	120	31	0	2	110	150	89	82	675	2-150	9+
	Malignant melanoma excisions	39	9	7	21	31	2	0	21	22	83	169	404	2-169	10+
	Oesophagectomies	7	0	0	7	0	0	0	0	1	16	3	34	1-16	5+
	Pancreatectomies	29	0	0	9	0	0	0	9	13	12	4	76	<4-29	6+
	Urological (prostatectomies, cystectomies, nephrectomies, orchiectomies)	198	19	2	114	19	1	14	51	147	312	132	1009	1-312	10+
	Brain and CNS	64	0	0	0	0	0	0	0	0	0	0	64	n/a	1
	Gynaecology (excl. cervical and early endometrial procedures and non-malignant gynaecological procedures)	0	0	0	27	1	0	149	19	11	38	9	254	1-149	7+
	Breast (Mastectomies + lumpectomies)	31	119	4	77	169	1	0	122	107	132	212	974	1-169	10+
	Lung (Lung resection, lobectomy, wedge resection, pneumonectomy)	117	0	0	15	0	0	0	6	37	19	20	214	6-117	6+

2.1. Surgical oncology survey

NEMICS administered a survey to surgeons who perform surgery in oncology in the NEMICS region. 30 surgeons completed the survey, of which 20 identified themselves as specialist oncology surgeons (the remaining 10 as general surgeons that perform surgery in oncology). One survey was not completed. Key results from the survey are set out below. Addendum 3a and 3b provides a copy of the survey questions and all results.

The tumour streams that were represented in the survey are set out below. Recipients were asked “(for your surgical sub-specialty) Are the number of hospital campuses who undertake resections/excisions within north east Melbourne region?” The responses are also set out below.

Table 2. Detail from survey – respondents, number of campuses

Tumour stream	Respondents	Opinion on number of campuses undertaking resections
Brain	1	About right
Breast	6	About right
Colorectal	4	About right
Head and neck	1	About right
Gynaecology	1	About right
Upper GI (Oesophago-gastric)	1	About right
Upper GI (HPB)	4	Mixed opinion too many / about right
Plastics	3	About right
Skin	2	Mixed opinion too many / about right
Thoracic / lung	2	Too many
Thyroid	1	About right
Genito-urinary	4	Mixed opinion too many / about right
Incomplete	1	n/a
Total	31	

Key result: According to some survey participants, surgery for hepato-pancreabiliary cancers, melanoma, lung cancers and genito-urinary cancers is being undertaken at too many hospitals.

No respondents stated that there were too few sites undertaking surgical resections for any of the tumour streams.

Recipients were asked “what, if any, are the co-location requirements of your tumour stream with (a) other surgical services (b) support services”.

Key results: For each surgical subspecialty, the following co-location requirements with other surgical services were identified:

Table 3. Detail from survey – co-location with other surgical services

Surgical sub-specialty	Co-location requirements with other surgical services
Brain	Plastics / endocrinology / no co-location requirements
Breast	Upper GI / urology / plastics / liver
Upper GI / HPB	Urology / colorectal / HPB with Upper GI
Plastics	Breast
Thyroid	Thoracic
Genito-urinary	Urology / colorectal / vascular

Across surgical subspecialties, medical oncology and radiation oncology, and interventional radiology were often stated as a co-location requirement.

For genito-urinary surgery, interventional radiology was seen as a required on site service for all survey recipients.

Having an ICU on site was seen as a requirement for genito-urinary, thyroid, plastics, Upper GI, HPB, gynaecology, colorectal and brain cancer surgery.

Other specific cancer service co-location requirements included:

- Skin cancer surgery to be co-located with nuclear medicine for lymphoscintigraphy
- HPB cancer surgery to be co-located with ERCP and EUS and a vascular unit
- Thyroid cancer surgery to be co-located with respiratory medicine, renal medicine, and cardiology.

Recipients were asked “(for your surgical sub-specialty) what are the three key areas of improvement required across north east Melbourne region?”

Table 4. Detail from survey – key improvement areas

Surgical sub-specialty	Key areas of improvement required across north east Melbourne region
Brain	Earlier referral [to specialist centre] Radiosurgery Service <i>[on site]</i>
Breast, Endocrine	Regular combined lists with plastic surgery GP education for shared-care in breast cancer follow up
Colorectal	Reduced delay in radiotherapy treatment Co-ordination of access to information across sites (ie. access to the other campuses) More general surgeons and fewer sub-specialists
Gynae-oncology	<i>Access to</i>] radiation oncology <i>[Provision of]</i> psycho-oncology support
Plastics and reconstructive	Access to multidisciplinary care Improved theatre access / clinical assess Streamlining of combined cases with other disciplines
Melanoma/sarcoma	Increase utilisation of sentinel lymph node biopsy for melanoma Better referral of patients with low volume metastatic disease for consideration of surgery or clinical trials Appropriate referral of sarcoma patients for pre-operative discussion in a MDM Centralise complex care to maximise recruitment to clinical trials Inadequate funding for surgery/reconstruction
Lung cancer / Thoracic Surgery	Improved ease of transfer of patients to expert care Secretarial support of MDM Improved access to rehab post surgical care Research support for clinicians Supportive care access for private patients
Thyroid	Surgeons to perform/supervise at least 10 thyroid per year Administration of RAI research
Upper GI / HPB	Integration of investigations across the health system Better inpatient bed access Regionalisation More ICU beds
Genito-urinary	Greater concentration of work enabling well trained urologists to become high-volume urologists Sub-specialisation <i>[Availability of a]</i> Da Vinci Robot in public hospitals and LDR Brachytherapy Continued support and improvement in multidisciplinary teams Advertising to referring doctors the high level of service provided by urologists specialising in oncology Transperineal prostate biopsy

Recipients were asked what the optimal configuration for north east Melbourne region was for their surgical subspecialty; and whether this would be of benefit or detriment to any of the following:

- Clinical best practice – quality of care and patient outcomes?
- Clinical dependency – meeting co-location requirements to deliver a safer service?
- Patient experience – fewer transfers, reduced lengths of stay, improved patient experience?
- Effective use of resource / financial efficiency – optimising scale economies and resource capability?
- Training and research – optimising training and collaborative research opportunities?

Key results:

A selection of comments for discussion is set out below:

- Neurosurgery: Restrict all neurosurgery to one campus
- Colorectal: All rectal cancers should be managed by colorectal surgeons in a colorectal department.
- Gynae-oncology: Some procedures should be restricted to 1-2 centres with specialist expertise
- HPB surgery: All surgery should be regionalised to a few centres
- Lung cancer surgery: Focus surgery in one hospital to maintain a high quality of surgical care.
- Melanoma surgery: All patients undergoing resection for sarcoma and advanced melanoma should be discussed in a pre-operative MDM and their surgery should be performed by a surgeon with experience in these areas. This will reduce misdiagnoses and reoperations rates.
- Genito-urinary cancer surgery: Continued concentration of urological oncology to high-volume surgeons and high-volume centres, enabling delivery of very high quality operations to patients. Centralise to a single campus with robotics and brachytherapy

Table 5. Detail from survey – optimal service configurations

Surgical sub-specialty	Optimal service configuration for north east Melbourne	Clinical best practice – quality of care and patient outcomes?	Clinical dependency – meeting co-location requirements to deliver a safer service?	Patient experience – fewer transfers, reduced lengths of stay, improved patient experience?	Effective use of resource / financial efficiency – optimising scale economies and resource capability?	Training and research – optimising training and collaborative research opportunities?
Colorectal	As at present - all rectal cancer to be managed by colorectal surgeons in a colorectal department	Y	Y	N May increase patient transfers within health services	N short term increase in cost	Y
Upper GI / HPB	All regionalised to a few centres	Y	Y	Y	Y	Y
Lung cancer / Thoracic Surgery	Focus resection surgery in one hospital to maintain high quality of surgical care	Y	Y	N May increase patient travel distance	-	-
Plastics and reconstructive	Plastic surgery units with access to multidisciplinary care.	Y	Y	Y	Y	Y
Melanoma	All patients undergoing resection for sarcoma and advanced melanoma should be discussed in a pre-operative MDM and their surgery should be performed by a surgeon with experience in these areas.	Y Avoid mis-diagnoses	-	Y reduce reoperation rates	Y	Y access to clinical trials
Thyroid	Undertake in most campus with a well trained surgeon with good volume	Y	-	Y	-	-
Genito-urinary	Single campus for robotics and Brachytherapy	Y	Y	Y	Y	Y
	Continued concentration of urological oncology to high-volume surgeons and high-volume centres, enabling delivery of very high quality operations to patients in the NE	Y	-	Y	-	Y

3. Breast cancer

The population for data analysis in this section is limited to patients with an acute admission for malignant, in situ or unknown/uncertain breast cancer (benign breast neoplasms are excluded).

3.1. Breast cancer admissions

Table 6 shows the number of acute medical and surgical breast cancer admissions by public health service in 2011/12. Mercy Hospital for Women does not undertake breast cancer surgery but does provide selected treatments for patients with breast cancer (for example salpingo-oophorectomy). The other public health services see over 100 newly diagnosed and recurrent breast cancer patients per health service. They meet the NICE Improving Outcomes Guidelines¹ that state that multidisciplinary teams should see 100 new cases per annum.

Table 6. Total number of breast cancer admissions by health service, 2011/12

BREAST CANCER (Malignant, In Situ, Unknown/Uncertain)	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Health Service					
Austin Health	193	1253	2	1448	303
Eastern Health	290	2434	5	2729	455
Mercy Hospital for Women*	5			5	5
Northern Health	142	858	2	1002	213
Total Public	630	4545	9	5184	963[^]
Epworth Eastern Hospital	168	1149	3	1320	264
Warringal Private Hospital	124	913		1037	185
Deidentified Private Hospitals	249	1157	2	1408	368
Total Private	541	3219	5	3765	x
Grand Total	1171	7764	14	8949	x

* Mercy Hospital for Women does not undertake breast cancer surgery

[^] Total unique patients across NEMICS is less than sum of each HS as one patient may attend more than one HS

X Unable to calculate unique patients across the private sector within NEMICS

3.2. Breast cancer surgery – NEMICS provider landscape

There are over 10 public and private sites providing breast cancer surgery in the NEMICS region. There is a trend across the public NEMICS providers toward integrating their surgical services under a single unit across sites. Improvements are evident in breast reconstructive surgery where in the past there were long waiting lists and variable access to immediate reconstruction.

3.3. Breast cancer surgery volumes

Table 7 shows the number of admissions with mastectomies and lumpectomies undertaken at each site and the ratio of mastectomies to lumpectomies. The data indicates that Austin Health (where breast surgery is undertaken at Austin Hospital and Austin Repatriation Hospital) undertook the highest volume of mastectomies, and Maroondah Hospital undertook the highest volume of lumpectomies in the region in 2011/12. All providers meet existing best practice guidelines² for surgical volumes per multidisciplinary team.

¹ NICE, Improving outcomes in breast cancer: manual update, 2002

² Ibid.

Table 7. Total number of breast procedures (mastectomy and other excision) by health service by site, 2011/12

Breast Cancer Surgery Volumes	Mastectomy admissions	Lumpectomy admissions	Ratio
Austin Health Austin	24	7	3.43
Austin Health Repat	53	66	0.80
Austin Health Total	77	73	1.05
Eastern Health Angliss	4	0	x
Eastern Health Box Hill	21	56	0.38
Eastern Health Maroondah	50	119	0.42
Eastern Health Yarra Ranges Health	0	1	0.00
Eastern Health Total	75	176	0.43
Northern Health Northern	44	78	0.56
Epworth Eastern Hospital	37	95	0.39
Warringal Private Hospital	21	86	0.24
Deidentified Private Hospitals	54	158	0.34
Total admissions	308	666	0.46
Benchmark / evidence	<i>30 per surgeon p.a. 60 per MDT p.a. (UK): 20 per MDT p.a. (QLD)</i>		

3.4. Breast cancer surgery – gaps and issues

Breast surgeons (N=6) who partook in the surgical oncology survey set out in section one highlighted the following:

- The number of campuses undertaking resections is about right.
- Regular combined lists with plastic surgery, and GP education for shared-care in breast cancer follow up were the listed key areas of improvement to breast cancer surgery provision in the NEMICS region.
- Breast cancer surgery benefits from being co-located with the following surgical units: Upper GI, urology, plastics, and liver surgery.

With clinical input, the following NEMICS regional gaps and issues have been identified:

Low complexity breast surgery should be available locally to patients, as a day case where clinically appropriate. NEMICS providers have not fully moved to a day case model for wide local excisions or a 23 hour model for mastectomies, as is the trend internationally. However there are moves towards achieving this through implementing system changes and changes to surgical practice. System changes include carrying out robust pre-assessment checks and promoting enhanced working between the breast team and referrals to Hospital in the Home (HITH). One clinician stated a barrier to implementing a 23 hour model for mastectomies is due to difficulties in accessing outpatient physiotherapy in a timely manner prior to discharge. Also, these models are also governed by the patient's clinical needs and occasionally social needs, as well as the services ability to care for the patient at home.

There is some concern that reoperation rates vary significantly between providers. A low ratio of second operations is an indicator of best practice. Pre-operative MRI will reduce the need for re-excisions.

The multidisciplinary meetings model is established among public providers and some private providers. However patients are not discussed pre-operatively by the Eastern Health breast unit and this can be important for cohorts of patients (for example, those eligible for immediate reconstruction). Furthermore, some private providers have surgeons that are not affiliated with an MDM and thus patient's treatment recommendations are not multidisciplinary. However, mixed clinical opinion was received regarding which patients should be seen at an MDM; the counter argument being that all complex breast cancer patients

should be prioritised, as discussing all cases will lead to longer MDMs with inadequate discussion of complex cases.

Site specific areas for improvement include:

- There is limited infrastructure to undertake clinical trials in Eastern Health, but progress is being made with placements of research fellows.
- There is some concern that some private services are only offering implant reconstructions to patients when this is not always the most suitable type.

Key discussion points:

Should a day case model for breast cancer surgery be rolled out across all NEMICS providers?

Should NEMICS further investigate variance in re-operation rates for breast cancer surgery?

Should all breast MDMs have plastic surgery representation?

Should all patients be discussed at an MDM pre-operatively and how can this be achieved?

Does NEMICS have a role to play in education of GPs for shared care follow-up?

4. Colorectal cancer

The population for data analysis in this section is limited to patients with an acute admission for malignant colorectal or anal cancer (in situ, unknown/uncertain and benign colorectal neoplasms are excluded).

4.1. Colorectal cancer admissions

Table 8 shows the number of acute medical and surgical colorectal cancer admissions by public health service in 2011/12. Mercy Hospital for Women only undertakes colorectal cancer surgery in patients that have associated gynaecological disease. All identified services (except Mercy Hospital for Women where an Austin colorectal surgeon attends their gynaecology MDT) meet the NICE Improving Outcomes Guidelines for multidisciplinary teams seeing 120 new cases per annum.

Table 8. Total number of colorectal cancer admissions by health service, 2011/12

COLORECTAL and ANAL CANCER (Malignant)	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Health Service					
Austin Health	180	1366	102	1648	307
Eastern Health	205	1489	105	1799	397
Mercy Hospital for Women*	5			5	5
Northern Health	139	557	60	756	215
Total Public	529	3412	267	4208	891[^]
Epworth Eastern Hospital	209	994	87	1290	299
Warringal Private Hospital	115	1473	46	1634	226
Deidentified Private Hospitals	159	906	449	1514	699
Total Private	483	3373	582	4438	x
Grand Total	1012	6785	849	8646	x

* Mercy Hospital for Women does not undertake colorectal cancer surgery

[^] Total unique patients across NEMICS is less than sum of each HS as one patient may attend more than one HS

X Unable to calculate unique patients across the private sector within NEMICS

4.2. Colorectal cancer surgery – NEMICS provider landscape

There are over nine sites providing colorectal cancer surgery in the NEMICS region.

Table 9 lists the colorectal cancer surgery block and procedure codes used. Procedure code (3203900 Abdominoperineal proctectomy) was used for abdominoperineal resection (APR) volume calculations.

4.1. Colorectal cancer - surgical volumes

Table 10 shows the volume of colectomies and other excisions of the rectum undertaken at each site in 2011/12. It also sets out the volume of abdominoperineal excisions (APEs) for rectal cancer in 2011/12. APE volumes should be no more than 20% of all rectal cancer surgery as the preferred surgery is the less invasive lower anterior resection if surgically feasible. The data indicates that Eastern Health undertook the highest volume of procedures in 2011/12. Angliss hospital undertook five colectomies and Mercy Hospital for Women undertook two colectomies. NICE Improving Outcomes Guidelines recommend 20 procedures with curative intent per surgeon per annum³. We are unable to establish whether providers meet these practice guidelines for surgical volume, as only institutional volume is recorded.

³ NICE, Improving outcomes in colorectal cancer: manual update, 2004

Table 9 Colorectal cancer surgery block and procedure codes

Procedure block number	Block Description	Procedure Code	Procedure Description
0913	Colectomy	3200000	Limited excision of large intestine with formation of stoma
		3200001	Right hemicolectomy with formation of stoma
		3200300	Limited excision of large intestine with anastomosis
		3200301	Right hemicolectomy with anastomosis
		3200400	Subtotal colectomy with formation of stoma
		3200401	Extended right hemicolectomy with formation of stoma
		3200500	Subtotal colectomy with anastomosis
		3200501	Extended right hemicolectomy with anastomosis
		3200600	Left hemicolectomy with anastomosis
		3200601	Left hemicolectomy with formation of stoma
		3200900	Total colectomy with ileostomy
		3201200	Total colectomy with ileorectal anastomosis
0934	Rectosigmoidectomy or proctectomy	3203000	Rectosigmoidectomy with formation of stoma (Included in APE volume)
		3203900	Abdominoperineal proctectomy (Included in APE volume)
		3204700	Perineal proctectomy
		3206000	Restorative proctectomy
		3211200	Perineal rectosigmoidectomy
		4399301	Definitive intestinal resection and pull-through anastomosis
0935	Anterior resection of rectum	3202400	High anterior resection of rectum
		3202500	Low anterior resection of rectum
		3202600	Ultra low anterior resection of rectum
		3202800	Ultra low anterior resection of rectum with hand sutured coloanal anastomosis
		9220800	Anterior resection of rectum, level unspecified
0936	Total proctocolectomy	3201500	Total proctocolectomy with ileostomy
		3205100	Total proctocolectomy with ileo-anal anastomosis
		3205101	Total proctocolectomy with ileo-anal anastomosis and formation of temporary ileostomy

Table 10. Total number of colorectal procedures (colectomy, excision of rectum, abdomen-perineal excision) by health service by site, 2011/12

COLORECTAL SURGERY VOLUMES Malignant colorectal or anal cancer	Colectomy admissions	Excisions of rectum admissions (Rectosigmoidectomy or proctectomy, anterior resection of rectum, Total proctocolectomy)	Total admissions	Abdomino-perineal excision (APE)	% APE to all rectal excisions
Austin Health Austin (none at Repat)	44	42	86	4	9.52%
Eastern Health Angliss	5	0	5		
Eastern Health Box Hill	58	62	120	3	4.84%
Eastern Health Maroondah	17	14	31	0	0.00%
Mercy Hosp Women	2	0	2		
Northern Health Northern	53	57	110	5	8.77%
Epworth Eastern Hospital	64	86	150	8	9.30%
Warringal Private Hospital	44	45	89	3	6.67%
Deidentified Private Hospitals	52	30	82	6	20.00%
Total number of episodes	339	336	675	29	8.63%

4.2. Colorectal cancer surgery – gaps and issues

Colorectal surgeons (N=4) who partook in the surgical oncology survey set out in section one highlighted the following:

- The number of campuses undertaking resections is about right.
- Reduced delay in radiotherapy treatment, co-ordination of access to information across sites, and more general surgeons (fewer sub-specialists) were the listed key areas of improvement to colorectal cancer surgery provision in the NEMICS region.
- All rectal cancers should be managed by colorectal surgeons in a colorectal department.

With clinical input, the following NEMICS regional gaps and issues have been identified:

Colonic resections should be available locally and are often done by general surgeons. However, clinical feedback is that this surgery should be done by colorectal specialist surgeons. Rectal surgery is considered sub-specialist and as such should only be performed by colorectal specialist surgeons. Practice is increasingly being centralised to a single campus within multi-site health services to ensure co-location requirements are met (for example, rectal cancer surgery at Eastern Health is being moved to Box Hill Hospital, and surgeons will no longer undertake surgery at the Maroondah Hospital site).

There are benefits in having the following services collocated with a site performing colorectal resections (particularly in complex cases): an upper gastro-intestinal unit; a urology unit; orthopaedics and plastic surgery. However, clinical feedback is that defining minimum standards would achieve the same end as mandating co-location requirements.

Patients having their colorectal surgery undertaken at some private hospitals may not be discussed at an MDM. Clinician feedback is that there is a marked surgeon variation in practice, in part due to concerns about consent, privacy and the medico-legal implications of recommendations made by MDM participants who have no direct case involvement.

Key discussion points:

Should rectal surgery be restricted to a defined number of sites across NEMICS providers and to meet co-location requirements?

What levers exist to encourage private patients to be discussed in a multidisciplinary setting?

5. Genito-urinary cancers

The population for data analysis in this section limited to patients with an acute admission for malignant genitourinary cancer (in situ, unknown/uncertain and benign genitourinary neoplasms are excluded).

5.1. Genito-urinary cancer admissions

Table 11 shows the number of acute medical and surgical genito-urinary cancer admissions by health service in 2011/12.

Table 11. Total number of genito-urinary cancer admissions by health service, 2011/12

GENITO-URINARY CANCER (Malignant)	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Health Service					
Austin Health	412	985	78	1475	609
Eastern Health	263	888	98	1249	514
Mercy Hospital for Women*	1			1	1
Northern Health	95	200	41	336	179
Total Public	771	2073	217	3061	1286
Epworth Eastern Hospital	489	927	71	1487	690
Warringal Private Hospital	236	312	29	577	325
Deidentified Private Hospitals	326	848	124	1298	735
Total Private	1051	2087	224	3362	1750
Grand Total	1822	4160	441	6423	3036

* Mercy Hospital for Women does not undertake genito-urinary cancer surgery

5.2. Genito-urinary cancer surgery – NEMICS provider landscape

There are over 11 sites providing genito-urinary cancer surgery in the NEMICS region.

5.3. Genito-urinary cancer surgery – surgical volumes

Table 12 shows the volume of prostatectomies, cystectomies, nephrectomies, and orchiectomies undertaken at each site in 2011/12. The data indicates that Epworth Eastern undertook the highest volume of procedures in 2011/12 (the majority of which were prostatectomies). Angliss Hospital undertook two procedures, and Yarra Ranges undertook one procedure. Whilst the treating surgeon may be undertaking procedures across sites, there may be some risk in undertaking the surgery at these sites given the co-location requirements with adequate support services.

Northern Hospital does not meet the recommended NICE guidelines of undertaking 50 cystectomies / prostatectomies per MDT per annum⁴. Only Austin Health and Epworth Private Hospital meet the Queensland guidelines⁵ to perform 40 nephrectomies per MDT per annum (these guidelines state that of 30 of these should be laparoscopic nephrectomies but this data is not available).

⁴ NICE, Improving outcomes in urological cancers: the manual, 2002

⁵ Clinical Services Capability Framework version 3.1, Queensland Department of Health, 2011

Table 12. Total number of urological procedures (prostatectomies, cystectomies, nephrectomies, and orchiectomies) by health service by site, 2011/12

Health service	Prostatectomy admissions	Cystectomy admissions	Nephrectomy admissions	Orchiectomy admissions	Total admissions
Austin Health Austin	123	17	46	12	198
Austin Health Repat	19				19
Austin Health Total	142	17	46	12	217
Eastern Health Angliss	1			1	2
Eastern Health Box Hill	73	7	27	7	114
Eastern Health Maroondah	16			3	19
Eastern Health Yarra Ranges Health	1				1
Eastern Health Total	91	7	27	11	136
Mercy Hospital for Women		13	1		14
Northern Health Northern	33	2	10	6	51
Total Public admissions	266	39	84	29	418
Epworth Eastern Hospital	243	12	45	12	312
Warringal Private Hospital	114	6	21	6	147
Deidentified Private Hospitals	122	4	2	4	132
Total Private admissions	479	22	68	22	591
Total admissions	745	61	152	51	1009
Benchmark / evidence	<i>50 major pelvic cystectomy / radical prostatectomy p.a. Per MDT (QLD)</i>				
	<i>10 open nephrectomy, 30 laparoscopic nephrectomy p.a. Per MDT (QLD)</i>				
	<i>cumulative total of 50 radical bladder and prostate p.a. Per MDT (UK); 5 retroperitoneal lymph node dissections (QLD)</i>				

5.4. Genito-urinary cancer surgery – gaps and issues

Genito-urinary surgeons (N=4) who partook in the surgical oncology survey set out in section one highlighted the following:

- There is a mixed clinical view regarding the number of campuses undertaking resections.
- Interventional radiology was seen as a required on-site service.
- Greater concentration of work to enable well trained urologists to become high-volume urologists; increased sub-specialisation; availability of a Da Vinci Robot and Low dose rate brachytherapy in public hospitals; and the use of transperineal prostate biopsy were the listed key areas of improvement to genitor-urinary cancer surgery provision in the NEMICS region (Da Vinci surgery, LDR brachytherapy, and use of transperineal prostate biopsy are all supported by current best practice evidence).
- Continued concentration of uro-oncology to high-volume surgeons and high-volume centres - centralise to a single campus with robotics and brachytherapy.

With clinical input, the following NEMICS regional gaps and issues have been identified:

Clinician feedback was that whilst there is general support for high volume centres, limiting the number of sites for urology surgery would have a significant impact on training, and eventually patient outcomes, particularly in the private setting.

Key discussion points:

Should genito-urinary surgery be restricted to a defined number of sites across NEMICS providers?

What role, if any, does NEMICS have in facilitating the availability of high-cost best-practice diagnostic and treatment modalities for public patients?

6. Malignant melanoma

The population for data analysis in this section limited to patients with an acute admission for malignant melanoma (in situ, unknown/uncertain and benign neoplasms are excluded).

6.1. Malignant melanoma admissions

Table 13 shows the number of acute medical and surgical melanoma admissions by public health service in 2011/12.

Table 13. Total number of melanoma admissions by health service, 2011/12

MELANOMA (Malignant)	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Health Service					
Austin Health	73	118	2	193	89
Eastern Health	71	87		158	91
Mercy Hospital for Women*				0	0
Northern Health	27	12	1	40	29
Total Public	171	217	3	391	204
Epworth Eastern Hospital	90	64		154	93
Warringal Private Hospital	24	2		26	22
Deidentified Private Hospitals	176	39	1	216	169
Total Private	290	105	1	396	284
Grand Total	461	322	4	787	488

6.1. Malignant melanoma surgery – NEMICS provider landscape

The UK NICE skin cancer guidelines⁶ state that patients with invasive skin cancer associated with a greater risk or rarity, such as malignant melanoma, should be managed by a skin multidisciplinary team. In the NEMICS region a melanoma multidisciplinary meeting takes place fortnightly with clinical representation from each of the three public health services. This structure means that the MDT is equipped to access relevant sub-specialty expertise across the region.

6.2. Malignant melanoma surgery – surgery volumes

Table 14 shows the total number of skin excision procedures by health service by site in 2011/12. 274 of the 405 (68%) admissions with a melanoma excision took place in a private hospital setting.

⁶ NICE, Improving Outcomes for People with Skin Tumours including Melanoma: the Manual, 2006

Table 14. Total number of malignant melanoma excisions by health service by site, 2011/12

Health service	Melanoma excision admissions
Austin Health Austin	39
Austin Health Repat	9
Austin Health Total	48
Eastern Health Angliss	7
Eastern Health Box Hill	21
Eastern Health Healesville	1
Eastern Health Maroondah	31
Eastern Health Yarra Ranges Health	2
Eastern Health Total	62
Mercy Hospital for Women	
Northern Health Northern	21
Total public admissions	131
Epworth Eastern Hospital	83
Warringal Private Hospital	22
Deidentified Private Hospitals	169
Total private admissions	274
Total admissions	405
Benchmark / evidence	

6.3. Skin cancer surgery – gaps and issues

Skin cancer surgeons (N=3) who partook in the surgical oncology survey set out in section one highlighted the following:

- There is a mixed clinical view regarding the number of campuses undertaking skin cancer surgery.
- Skin cancer surgery should be co-located with nuclear medicine for lymphoscintigraphy.
- Increased utilisation of sentinel lymph node biopsy for melanoma, and better referral of patients with low volume metastatic disease for consideration of surgery or clinical trials were the listed key areas of improvement to skin cancer surgery provision in the NEMICS region.
- Plastic and reconstructive surgeons cited better access to multidisciplinary care as a key area of improvement.
- All patients undergoing resection for advanced melanoma should be discussed in a pre-operative MDM and their surgery should be performed by a surgeon with experience in these areas. This will reduce misdiagnoses and reoperations rates.

Key discussion points:

NEMICS administer a region wide melanoma MDM: Access and MDT representation should be reviewed in conjunction with any changes to regional service configuration to ensure that existing linkages are retained.

7. Lung cancer

The population for admission data analysis in this section is limited to patients with an acute admission for a lung tumour stream neoplasm (including malignant, in situ, unknown, and benign neoplasms). The population for the lung surgical excision analysis is expanded to include any neoplasm to ensure all lung secondaries are included.

7.1. Lung tumour stream admissions

Table 15 shows the number of acute medical and surgical admissions by health service in 2011/12.

Table 15. Total number of lung tumour stream admissions by public health service, 2011/12

LUNG TUMOUR STREAM (Malignant, in situ, unknown and benign)	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Health Service					
Austin Health	172	693	114	979	366
Eastern Health	44	746	37	827	236
Mercy Hospital for Women				0	
Northern Health	23	375	18	416	125
Total Public	239	1814	169	2222	700
Epworth Eastern Hospital	24	520	17	561	104
Warringal Private Hospital	29	431	9	469	98
Deidentified Private Hospitals	33	541	9	583	160
Total Private	86	1492	35	1613	362
Grand Total	325	3306	204	3835	1062

7.2. Lung cancer surgery – NEMICS provider landscape

There are over six sites providing lung cancer surgery in the NEMICS region. Austin Hospital is viewed as the informal hub of the region, where complex cases are referred in by other providers. There are no formalised referral pathways, but reportedly sound relationships between clinicians, and often the same surgeons managing patients across sites.

Austin Hospital is also the state wide provider of endobronchial palliative laser therapy and palliative endobronchial stenting.

7.3. Lung cancer surgery - surgical volumes

Table 16 shows the volume of specialised lung excision procedures⁷ undertaken at each site in 2011/12.

The data indicate that Austin Hospital undertook the highest volume of procedures in 2011/12. The Northern Hospital undertook six specialised lung procedures. There is considerable variation in the number of procedures carried out in NEMICS health services (range 6 – 117). Evidence published since in the United Kingdom suggests that the best outcomes are achieved in centres performing more than 60 lung cancer resections per year⁸. In those performing fewer than 60 it has been shown that outcomes are still significantly better if more than 20 lung cancer resections are performed a year⁹. Northern Health, Eastern Health, and Epworth Eastern fall below this best practice benchmark.

⁷ The following procedures are included in the analysis: Lung resection, lobectomy, wedge resection, and pneumonectomy

⁸ Cheung, MC. et al., 'Impact of teaching facility status and high-volume centers on outcomes for lung cancer resection: an examination of 13,469 surgical patients', *Ann Surg Oncol*. 2009;16(1):3-13

⁹ Ibid.

Table 16. Total number of lung procedures (specialised lung excision procedures) by health service by site, 2011/12

Health service	Specialised lung excision admissions
Austin Health Austin	117
Austin Health Repat	0
Austin Health Total	117
Eastern Health Angliss	0
Eastern Health Box Hill	15
Eastern Health Healesville	0
Eastern Health Maroondah	0
Eastern Health Yarra Ranges Health	0
Eastern Health Total	15
Mercy Hospital for Women	0
Northern Health Northern	6
Total public admissions	138
Epworth Eastern Hospital	19
Warringal Private Hospital	37
Deidentified Private Hospitals	20
Total private admissions	76
Total admissions	214
Benchmark / evidence	<i>20 therapeutic procedures p.a. (UK)</i>

7.4. Lung cancer surgery – gaps and issues

Lung surgeons (N=2) who partook in the surgical oncology survey set out in section one highlighted the following:

- The number of campuses undertaking resections is about right.
- Improved access to rehabilitation post surgical care, research support for clinicians, and supportive care access for private patients were the listed key areas of improvement to lung cancer surgery provision in the NEMICS region.
- Focus surgery in one hospital to maintain a high quality of surgical care.

With clinical input, the following NEMICS regional gaps and issues have been identified:

The surgical cancer survey detailed in section 1 of this report noted that some clinicians felt that there were too many sites undertaking lung resections across NEMICS providers. Whilst the clinical evidence base for a small number of high volume lung cancer surgery units is sound, the current NEMICS provider landscape already has bed capacity issues. NEMICS providers refer in to Austin Hospital for more complex lung surgery but anecdotal evidence suggests cases are often not referred due to bed shortages. Furthermore, given that there are no formal arrangements in place, what defines complex surgery is discretionary; and referral pathways are contingent on existing relationships across campuses. Anecdotal evidence suggests better links are required between Maroondah Hospital and Austin Hospital regarding referral of complex cases for lung cancer surgery.

There are only three specialised cardio-thoracic surgeons across Melbourne and cardiac surgeons often do very small volumes of thoracic surgery, so there are both maintenance of clinical expertise and succession planning issues.

Key discussion points:

Does NEMICS have a role to play in improving access to supportive care for private patients and all patient access to rehabilitation services?

Should there be more formal referral pathways in place to further restrict the number of sites undertaking lung cancer resections or will this exacerbate bed capacity issues?

8. Gynaecological cancers

The population for data analysis in this section is limited to patients with an acute admission for a malignant gynaecological cancer (*in situ*, unknown/uncertain and benign neoplasms are excluded).

8.1. Gynaecological cancer admissions

Table 17 shows the number of acute medical and surgical gynaecological cancer admissions by public health service in 2011/12. All public health services except for Mercy Hospital for Women fall short of the UK NICE guidelines to see a minimum of 200 new cases per annum¹⁰.

Table 17. Total number of gynaecological cancer admissions by health service, 2011/12

Gynaecology (Malignant)	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Health Service					
Austin Health	12	81	5	98	39
Eastern Health	79	368	2	449	120
Mercy Hospital for Women	189	536		725	234
Northern Health	37	75		112	48
Total Public	317	1060	7	1384	419
Epworth Eastern Hospital	47	232		279	64
Warringal Private Hospital	17	35		52	24
Deidentified Private Hospitals	49	218		267	87
Total Private	113	485	0	598	175
Grand Total	430	1545	7	1982	594

8.2. Gynaecological cancer surgery – NEMICS provider landscape

There are over seven sites providing gynaecological cancer surgery in the NEMICS region. Mercy Hospital for Women is the region's specialist gynaecology hospital (as well as for maternity and obstetrics). Austin Health has a shared care arrangement with Mercy Hospital for Women. Austin Health and Northern Health patients are discussed at the Mercy Hospital for Women's multidisciplinary meeting whereas Eastern Health presents their patients at the Monash Health gynaecology MDM.

8.3. Gynaecological cancer surgery - surgical volumes

Table 18 shows the volume of gynaecological procedures¹¹ undertaken at each site in 2011/12. The data indicates that Mercy Hospital for Women undertook the highest volume of procedures in 2011/12. There is considerable variation in the number of procedures carried out in NEMICS health services (range 1-149).

¹⁰ NICE, Improving Outcomes in Gynaecological Cancers: The manual, 1999

¹¹ Cervical and early endometrial procedures, and non-malignant gynaecological procedures are excluded from the analysis

Table 18. Total number of gynaecological cancer procedures by health service by site, 2011/12

Health service	Specialized gynaecological excision admissions for malignant cancers (Oophorectomy, Other excision procedures on ovary, Salpingo-oophorectomy, Abdominal hysterectomy, Vaginal hysterectomy, Excision procedures on vagina, Vulvectomy, Other excision procedures on vulva, perineum or clitoris)
Austin Health Austin	0
Austin Health Repat	0
Austin Health Total	0
Eastern Health Angliss	0
Eastern Health Box Hill	27
Eastern Health Healesville	1
Eastern Health Maroondah	1
Eastern Health Total	29
Mercy Hospital for Women	149
Northern Health Northern	19
Total public admissions	197
Epworth Eastern Hospital	38
Warringal Private Hospital	11
Deidentified Private Hospitals	9
Total private admissions	58
Total admissions	255
Benchmark / evidence	

8.4. Gynaecological cancer surgery cancer surgery – gaps and issues

The gynaecological cancer surgeon (N=1) who partook in the surgical oncology survey set out in section one highlighted the following:

- The number of campuses undertaking resections is about right.
- Access to radiation oncology and the provision of psycho-oncology support were the listed key areas of improvement to gynaecology cancer surgery provision in the NEMICS region.
- Some procedures should be restricted to 1-2 centres with specialist expertise.

With clinical input, the following NEMICS regional gaps and issues have been identified:

An area of clinical concern is the patient management of vulval pre-malignancies across Victoria. These cases should be managed by a specialist unit with appropriate pathology review in order to detect early cancers. Currently patients with this condition are not referred in appropriately or are referred without adequate pathology.

There is mixed clinical feedback as to whether patients with high grade atypical endometrial hyperplasia, a pre-malignant condition commonly associated with technically complex cases (given high levels of co-morbidities such as morbidly obese patients) should also only be seen in specialist centres. Currently, specialist referral centres do not have the capacity to take all referrals.

Key discussion points:

Does NEMICS have a role to play in the provision of psycho-oncology support and access to radiation therapy for gynaecology cancer patient in the NEMICS region?

How, if at all, can NEMICS facilitate appropriate referral for pre-malignant conditions requiring management by a specialist unit, across NEMICS and across Victoria?

9. Head and neck cancers

The population for data analysis in this section is limited to patients with an acute admission for a malignant head and neck (including larynx) cancer (in situ, unknown/uncertain and benign neoplasms are excluded). Note that thyroid cancers are reported in the thyroid and endocrine cancers section.

9.1. Head and neck cancer admissions

Table 19 shows the number of acute medical and surgical head and neck cancer admissions by public health service in 2011/12. Whilst both Eastern Health and Northern Health services fall short of the UK NICE guidelines to see a minimum of 100 new cases per annum¹², the NICE guidelines include the management of thyroid cancer cases.

Table 19. Total number of head and neck cancer admissions by health service, 2011/12

Head and Neck (Malignant) Health Service	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Austin Health	87	241	2	330	106
Eastern Health	21	46		67	45
Mercy Hospital for Women				0	0
Northern Health	5	3		8	8
Total Public	113	290	2	405	155
Epworth Eastern Hospital	5	3		8	5
Warringal Private Hospital	7			7	6
Deidentified Private Hospitals	31	22		53	44
Total Private	43	25	0	68	55
Grand Total	156	315	2	473	210

9.2. Head and neck cancer surgery – NEMICS provider landscape

Head and neck surgery at The Northern Hospital is managed by the Austin head and neck surgical unit. As there is no standalone head and neck unit at The Northern Hospital, an ENT surgeon VMO is usually brought on site for radical / neck dissections (there are circa eight ENT surgeons who share a list at The Northern Hospital) or the patient is referred in to the Austin Hospital for their surgical management by the head and neck unit.

Head and neck surgery at Austin Health is undertaken across both Austin Hospital and Repatriation campuses. Complex and oncology cases tend to be referred to the former to meet co-location requirements (for example, there is no ICU or HDU at the Repatriation campus). The benefit of splitting surgery across campuses is the Repatriation campus allows for faster turnover given the smaller campus size and thus accommodates simple benign surgical cases.

9.3. Head and neck cancer surgery - surgical volumes

Table 20 shows the volume of head and neck cancer procedures undertaken at each site in 2011/12.

The data indicate that Austin Health undertook the highest volume of procedures in 2011/12.

There is considerable variation in the number of procedures carried out in NEMICS health services (range 1-57).

¹² NICE, Improving Outcomes in Head and Neck Cancers – The Manual, 2004

Table 20 Total number of head and neck cancer procedures by health service by site, 2011/12

Health service	Head and neck excision admissions for malignant cancers
Austin Health Austin	57
Austin Health Repat	5
Austin Health Total	62
Eastern Health Angliss	1
Eastern Health Box Hill	14
Eastern Health Maroondah	0
Eastern Health Yarra Ranges	1
Eastern Health Total	16
Mercy Hospital for Women	0
Northern Health Northern	3
Total public admissions	81
Epworth Eastern Hospital	5
Warringal Private Hospital	5
Deidentified Private Hospitals	23
Total private admissions	33
Total admissions	114
Benchmark / evidence	100 new cases p.a. (UK)

9.4. Head and neck cancer surgery – gaps and issues

The head and neck surgeon (N=1) who partook in the surgical oncology survey set out in section one suggested the number of campuses undertaking resections is about right.

With clinical input, the following NEMICS regional gaps and issues have been identified:

There are some reported issues regarding the appropriateness of referrals for incidental findings in cases that should be referred for ENT surgical case management but are instead managed by thyroid or general surgeons without adequate ENT input (for example, cases requiring tracheostomy or with local core paralysis).

There are desirable co-location requirements with maxillo-facial, plastics, neuro-surgery (particularly for pituitary gland tumours), and thyroid surgery.

Key discussion points:

What role, if any, is there for NEMICS to facilitate appropriate referral for cases requiring ENT surgical case management? How might this be monitored?

Will instituting a NEMICS regional thyroid multidisciplinary meeting impact head and neck units? What opportunities are there to improve referral and linkages through this forum?

10. Thyroid cancers

The population for data analysis in this section is limited to patients with an acute admission for thyroid neoplasms (malignant and benign neoplasms are reported separately).

10.1. Thyroid cancer admissions

Table 21 shows the number of acute medical and surgical malignant thyroid cancer admissions by public health service in 2011/12. Table 21 shows the number of acute medical and surgical benign thyroid cancer admissions by public health service in 2011/12.

Table 21. Total number of malignant thyroid cancer admissions by health service, 2011/12

Malignant Thyroid Cancer	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Health Service					
Austin Health	50	74		124	93
Eastern Health	13	3	1	17	14
Mercy Hospital for Women				0	0
Northern Health	31	2		33	26
Total Public	94	79	1	174	122
Epworth Eastern Hospital	16			16	12
Warringal Private Hospital	6			6	5
Deidentified Private Hospitals	21			21	19
Total Private	43	0	0	43	36
Grand Total	137	79	1	217	158

Table 22. Total number of benign thyroid cancer admissions by health service, 2011/12

Benign Thyroid Cancer	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Health Service					
Austin Health	24	3	1	28	27
Eastern Health	28	14	1	43	39
Mercy Hospital for Women					
Northern Health	17	2		19	19
Total Public	69	19	2	90	85
Epworth Eastern Hospital	15			15	15
Warringal Private Hospital	18			18	18
Deidentified Private Hospitals	33			33	33
Total Private	66	0	0	66	66
Grand Total	135	19	2	156	151

10.2. Thyroid cancer surgery – NEMICS provider landscape

There are over eight sites providing thyroid cancer surgery in the NEMICS region. At Eastern Health, ENT surgeons manage most of the thyroid cases; whereas thyroid surgeons manage the majority of cases at The Northern Hospital.

Radio-iodine treatment is a common post-operative treatment for thyroid cancer. Austin Hospital is the only NEMICS provider to offer this treatment (and one of two Melbourne providers, the other being at The Royal Melbourne Hospital) and patients are referred in from The Northern Hospital if they require this treatment.

10.3. Thyroid cancer surgery - Surgical volumes

Table 23 shows the volume of thyroidectomies undertaken at each site in 2011/12. The data indicate that Austin Hospital undertook the highest volume of procedures in 2011/12.

Table 23. Total number of thyroidectomies by health service by site, 2011/12

Health service	Thyroidectomy admissions		Parathyroidectomy admissions		Total admissions
	Malignant	Benign	Malignant	Benign	
Austin Health Austin	38	18	4	11	71
Austin Health Repat	0	0	0	0	0
Austin Health Total	38	18	4	11	71
Eastern Health Angliss	1	0	0	0	1
Eastern Health Box Hill	8	14	0	4	26
Eastern Health Maroondah	2	4	0	6	12
Eastern Health Total	11	18	0	10	39
Mercy Hospital for Women	0	0	0	0	0
Northern Health Northern	31	9	1	8	49
Total public admissions	80	45	5	29	159
Epworth Eastern Hospital	13	8		7	28
Warringal Private Hospital	6	14	1	8	29
Deidentified Private Hospitals	17	18		16	51
Total private admissions	36	40	1	31	108
Total admissions	116	85	6	60	267

10.4. Thyroid cancer surgery – gaps and issues

The thyroid surgeon (N=1) who partook in the surgical oncology survey set out in section one highlighted the following:

- There are too many sites undertaking resections.
- A minimum volume of performing or supervising at least 10 thyroid cancer surgeries per year, and the administration of radioactive iodine research were listed key areas of improvement for thyroid cancer surgery provision in the NEMICS region.
- Thyroid cancer surgery should be co-located with thoracic surgery.
- Thyroid cancer surgery to be co-located with respiratory medicine, renal medicine, and cardiology.

With clinical input, the following NEMICS regional gaps and issues have been identified:

Across NEMICS thyroid cancers are not adequately discussed at multidisciplinary meetings. There is often no input from radiology or pathology and each health service organises their thyroid and endocrine tumours under different units, influencing clinical management.

In addition, there is variability in who is qualified to undertake thyroidectomies; different surgical specialties might sub-specialise in thyroid cancer, which influences who is best placed to attend a malignant thyroid MDM. For example, an increasing number of ENT surgeons are managing thyroid cancers, whilst endocrine surgeons still manage the majority of cases.

As such, there is a clinical view that poor work-up and initial treatment of thyroid lumps lead to inappropriate treatment decisions. Subsequently, multiple subsequent or salvage operations are required, which are more complex. Conversely, some patients are treated too radically.

Thyroid surgeons have expressed an interest in convening a regional MDM across the three main providers. However, clinical feedback is that given the large volume of benign tumours, it is impractical to

discuss all of these pre-surgically so an effective regional MDM would be premised on appropriate case selection of those patients who would benefit from pre-operative discussion.

Representation from endocrinology, thyroid surgeons, pathology, and nuclear medicine physicians (as most commonly patients with well differentiated cancer have radio iodine therapy post-surgery) should attend.

NEMICS is currently scoping levels of interest to establish a regional malignant thyroid MDM.

Key discussion points:

Is the development of a NEMICS regional thyroid MDM supported by each of the constituent health services?

What surgical specialties are best placed to attend a regional thyroid MDM given the variance in sub-specialisation?

11. Brain and CNS cancers

The population for data analysis in this section is limited to patients with an acute admission for brain and CNS cancers. Primary and secondary brain and CNS cancers are reported separately.

11.1. Brain and CNS cancer admissions

Table 24 and Table 25 show the number of acute medical and surgical brain and CNS cancer admissions by public health service in 2011/12 for primary and secondary cancers respectively.

Table 24. Total number of primary brain and CNS cancer admissions by health service, 2011/12

Primary CNS Cancer	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Health Service					
Austin Health	62	417	1	480	95
Eastern Health	1	37		38	36
Mercy Hospital for Women	1	1		2	2
Northern Health	4	7		11	8
Total Public	68	462	1	531	133
Epworth Eastern Hospital		6		6	3
Warringal Private Hospital		27		27	6
Deidentified Private Hospitals	2	35		37	17
Total Private	2	68	0	70	26
Grand Total	70	530	1	601	159

Table 25. Total number of secondary brain and CNS cancer admissions by health service, 2011/12

Secondary CNS Cancer	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Health Service					
Austin Health	75	308	8	391	144
Eastern Health	13	418	8	439	111
Mercy Hospital for Women		6		6	3
Northern Health	1	120	3	124	42
Total Public	89	852	19	960	286
Epworth Eastern Hospital	8	152		160	53
Warringal Private Hospital	1	100		101	20
Deidentified Private Hospitals	1	124		125	42
Total Private	10	376	0	386	115
Grand Total	99	1228	19	1346	401

11.2. Brain and CNS cancer surgery

There is one provider for brain and CNS cancer surgery in the NEMICS region, Austin Hospital. In 2011-12, Austin undertook a total of 64 procedures - 35 procedures (34 admissions) on patients with primary brain tumours, and 38 procedures (36 admissions) on patients with brain metastases. These volumes meet the Queensland guidelines¹³ to perform 25 craniotomies for tumours per multidisciplinary team per annum, and indicate that appropriate referral pathways in to the specialist centre are in place.

¹³ Clinical Services Capability Framework version 3.1, Queensland Department of Health, 2011

The neurosurgeon surgeon (N=1) who partook in the surgical oncology survey set out in section one highlighted the following:

- The number of campuses undertaking resections is about right.
- Earlier referral to specialist care and availability of radio-surgery at specialist centres were the listed key areas of improvement to brain cancer surgery provision in the NEMICS region.
- All neurosurgery should be restricted to one campus in the region.

Key discussion points:

Activity and volume data indicate that appropriate referral pathways in to the specialist centre are appropriate.

12. Upper gastro-intestinal cancers – oesophagus and stomach

The population for data analysis in this section is limited to patients with an acute admission for oesophageal and gastric cancers.

12.1. Gastro-oesophageal cancer admissions

Table 26 shows the number of acute medical and surgical admissions for gastro-oesophageal cancer by health service in 2011/12. None of the public health services meet the UK NICE guidelines¹⁴ to see a cumulative total of 450 new cases per annum (100 new oesophago-gastric, 150 gastric, and 200 pancreatic cancer cases).

Table 26. Total number of gastro-oesophageal cancer admissions by health service, 2011/12

Gastro-oesophageal cancers (Malignant)	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Health Service					
Austin Health	46	128	51	225	85
Eastern Health	46	384	57	487	117
Mercy Hospital for Women*				0	0
Northern Health	26	66	29	121	48
Total Public	118	578	137	833	242
Epworth Eastern Hospital	46	272	37	355	75
Warringal Private Hospital	13	216	26	255	41
Deidentified Private Hospitals	21	178	98	297	139
Total Private	80	666	161	907	255
Grand Total	198	1244	298	1740	497

12.2. Gastro-oesophageal cancers– NEMICS provider landscape

There are over seven sites providing oesophago-gastric cancer surgery in the NEMICS region. Gastro-oesophageal surgeons tend to operate across public and private hospitals as visiting medical officers from the tertiary centres. As such, it is likely that NEMICS private patients are discussed in an MDM and where appropriate, have their surgery in a public hospital. There are training benefits to performing oesophagectomies at the public sites and as such many of the private patients are transferred to a public hospital for their surgery. For gastric surgery and benign conditions, private patients tend to be treated in the private setting.

12.3. Gastro-oesophageal – Surgical volumes

12.3.1. Oesophagectomies

Table 27 shows the volume of oesophagectomies undertaken at each site in 2011/12.

The data indicate that Epworth Eastern Hospital undertook the highest volume of procedures in 2011/12. Very small volumes of resections are recorded for other NEMICS private hospitals (de-identified) and all providers are performing well below UK NICE guidelines¹⁵ of 100 oesophago-gastric procedures per multidisciplinary team per annum, and the ANZGOSA guideline¹⁶ of 30 oesophago-gastric procedures on malignant neoplasms per annum for training units. All providers with the exception of Epworth Eastern Hospital are not meeting Queensland Department of Health guidelines¹⁷ of eight resections per multidisciplinary team per annum.

¹⁴ NHS Executive, Improving Outcomes Guidance in Upper Gastrointestinal Cancers – The Manual, 2001

¹⁵ Ibid.

¹⁶ <http://www.anzgos.org/pdf/anzgos-post-fellowship-training-final.pdf>

¹⁷ Clinical Services Capability Framework version 3.1, Queensland Department of Health, 2011

Table 27. Total number of oesophagectomies by health service by site, 2011/12

Health service	Oesophagectomy admissions		Total admissions
	Gastro-oesophageal primary cancer (C15 or C16)	Other neoplasms	
Austin Health Austin	6	1	7
Austin Health Repat			0
Austin Health Total	6	1	7
Eastern Health Angliss			0
Eastern Health Box Hill	7		7
Eastern Health Maroondah			0
Eastern Health Total	7		7
Mercy Hospital for Women			0
Northern Health Northern			0
Total public admissions	13	1	14
Epworth Eastern Hospital	15	1	16
Warringal Private Hospital	1		1
Deidentified Private Hospitals	3		3
Total private admissions	19	1	20
Total admissions	32	2	34
Benchmark / evidence	15-20 per surgeon p.a. (UK), 100 new cases p.a. per MDT (UK) (– OG and gastric) 8 oesophagectomies p.a. per MDT (QLD) 30 oesophagectomies per training unit p.a. for malignant neoplasms ANZGOSA		

12.3.2. Gastric cancers

Table 28 shows the volume of gastrectomies undertaken at each site in 2011/12.

The data indicate that all providers meet the Queensland Department of Health guidelines of 5 gastrectomies per annum when taking in to consideration that Maroondah Hospital, who performed three resections, now operate under a single Eastern Health MDT.

Table 28. Total number of gastrectomies by health service by site, 2011/12

Health service	Gastrectomy admissions		Total admissions
	Gastro-oesophageal primary cancer (C15 or C16)	Other neoplasms	
Austin Health Austin	13	2	15
Austin Health Repat			0
Austin Health Total	13	2	15
Eastern Health Angliss			0
Eastern Health Box Hill	5	1	6
Eastern Health Maroondah	2	1	3
Eastern Health Total	7	2	9
Mercy Hospital for Women			0
Northern Health Northern	7	1	8
Total public admissions	27	5	32
Epworth Eastern Hospital	16	7	23
Warringal Private Hospital	7	8	15
Deidentified Private Hospitals	7	0	7
Total private admissions	30	15	45
Total admissions	57	20	77
Benchmark / evidence	5 gastrectomies p.a. per MDT (QLD)		

12.4. Gastro-oesophageal cancer surgery – gaps and issues

The gastro-oesophageal surgeon (N=1) who partook in the surgical oncology survey set out in section one highlighted the following:

- The number of campuses undertaking resections is about right.
- Integration of investigations across the health system, better inpatient bed access, regionalisation, and more ICU beds were the listed key areas of improvement to upper GI cancer surgery provision in the NEMICS region.
- Upper GI cancer surgery should be co-located with the following surgical units: HPB, urology, and colorectal surgery.

With clinical input, the following NEMICS regional gaps and issues have been identified:

ANZGOSA guidelines published in October 2013¹⁸ state

“major Upper GI and HPB surgical procedures are complex and carry significant risks of morbidity and mortality [...] The published literature demonstrates a strong relationship between increasing hospital or institutional volumes and reduced mortality in all major oesophago-gastric and hepato-pancreato-biliary resections. There is also evidence that long term outcomes including overall survival are also improved. Not only are outcomes improved by increased individual surgeon volumes but specialisation of both the surgeon and the unit has an important role to play.”

A summary of the guidelines is set in Table 29:

Table 29. ANZGOSA guidelines (2013) for oesophageal and gastric resections

ANZGOSA guideline	Oesophageal / gastric resections
Training requirements	<ul style="list-style-type: none"> • RACS Fellowship in General Surgery • a. Post Fellowship Training Program in Upper GI Surgery <p><i>Or</i> b. Equivalent clinical training in an established OG / gastric surgical centre for >1yr</p>
Re-credentialing of established OG surgeons	<ul style="list-style-type: none"> • Regularly perform OG / gastric resections • Regularly attend MDT meetings • Meet RACS requirements for CPD with content relevant to OG resection • Demonstrate ongoing performance of OG / gastric resection based on peer reviewed clinical audit
Minimally invasive surgery requirements	OG / gastric Surgeons without specific training in Minimally Invasive Oesophagectomy (MIA) / Laparoscopic Gastric Cancer Resection, should apply for extended scope of practice for introduction of a new procedure
Hospital requirements	Perform OG/ gastric resection in hospitals in which other major procedures are regularly performed with ICU facilities, access to interventional radiology, interventional endoscopy, 24hr on site medical services, emergency theatre access.

¹⁸ ANZGOSA guidelines for hospitals and/or health services to assist in credentialing of surgeons performing oesophageal resection in Australia and New Zealand, ANZGOSA, 2013

In addition to the arguments presented by ANZGOSA, there is a demonstrable economic benefit to centralisation of surgical services given the duplication of resource among NEMICS providers. In addition, there is a clinical driver for gastric resections to be referred in to specialist upper GI units with increased sub-specialisation.

There is a clinical view that The Northern Hospital lacks adequate support services to manage patients with oesophago-gastric cancers and there is a clinical and economic benefit for patients requiring gastrectomies to be referred in to a tertiary centre. Oesophago-gastric resections should be located on a site with PET, interventional cardiology and endoscopic ultrasound.

There is also a voiced concern among NEMICS clinicians regarding the appropriateness of referral pathways from regional hospitals and some private hospitals where thoracic surgeons are not appropriately referring oesophageal cancer patients in to a tertiary centre for their radical treatment. Clinical feedback is that regional centres should be divided along natural catchment lines and relationships fostered through NEMICS to create appropriate referral pathways.

Key discussion points:

Should there be more formal referral pathways in place to further restrict the number of sites undertaking gastric cancer resections?

How, if at all, can NEMICS facilitate appropriate referral for oesophago-gastric cancers requiring management by a specialist unit, across NEMICS and across Victoria?

13. Upper gastro-intestinal cancers – pancreas, liver and biliary tract cancers

The population for data analysis in this section is limited to patients with an acute admission for pancreatic, liver and biliary tract cancers (or HPB: hepato-pancreato-biliary).

13.1. HPB cancer admissions

Table 30 shows the number of acute medical and surgical admissions for pancreatic cancer by public health service in 2011/12. Table 31 and Table 32 show the number of acute medical and surgical admissions for primary and secondary liver and biliary tract cancers by public health service in 2011/12.

Table 30. Total number of pancreatic cancer admissions by health service, 2011/12

Pancreatic cancer (Malignant)	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Health Service					
Austin Health	51	253	24	328	95
Eastern Health	17	229	13	259	69
Mercy Hospital for Women*		10		10	2
Northern Health	11	117	5	133	31
Total Public	79	609	42	730	190
Epworth Eastern Hospital	25	274	14	313	56
Warringal Private Hospital	14	298	5	317	39
Deidentified Private Hospitals	18	262	8	288	59
Total Private	57	834	27	918	154
Grand Total	136	1443	69	1648	344

Table 31. Total number of primary liver and intrahepatic bile duct cancer admissions by health service, 2011/12

Primary liver and biliary tract cancer (Malignant)	Acute admissions based on DRG type				Unique patients
	Surgical	Medical	Other	Total	
Health Service					
Austin Health	207	286	31	524	215
Eastern Health	39	81	12	132	66
Mercy Hospital for Women					
Northern Health	12	42	1	55	25
Total Public	258	409	44	711	299
Epworth Eastern Hospital	11	82	4	97	25
Warringal Private Hospital	11	78	2	91	16
Deidentified Private Hospitals	36	72	7	115	37
Total Private	58	232	13	303	78
Grand Total	316	641	57	1014	377

Table 32. Total number of secondary liver and biliary tract cancer admissions by health service, 2011/12

Secondary liver and biliary tract cancer (Malignant)	Acute admissions based on DRG type				Unique patients
	Health Service	Surgical	Medical	Other	
Austin Health	138	1382	34	1554	343
Eastern Health	73	1755	37	1865	375
Mercy Hospital for Women*	4	44		48	11
Northern Health	31	572	16	619	149
Total Public	246	3753	87	4086	865
Epworth Eastern Hospital	87	779	25	891	182
Warringal Private Hospital	27	861	4	892	121
Deidentified Private Hospitals	111	673	20	804	219
Total Private	225	2313	49	2587	522
Grand Total	471	6066	136	6673	1387

13.2. HPB cancers – NEMICS provider landscape

There are over six sites providing pancreatic cancer surgery in the NEMICS region and six sites undertaking liver excision procedures.

Given joint appointments across Warringal private hospital and Austin Health, and Eastern Health and Epworth Eastern, the same protocols are used for HPB surgery.

13.3. HPB cancers – Surgical volumes

13.3.1. Pancreatectomies

Table 33 shows the volume of pancreatectomies undertaken at each site in 2011/12. The data indicate that Austin Hospital undertook the highest volume of procedures in 2011/12. Very small volumes of resections are recorded at NEMICS private hospitals (de-identified). All providers except Austin Hospital are performing well below the Queensland minimum volume guideline of 16 pancreatectomies per MDT per annum¹⁹ and most below the ANZHPBA guideline of 10 resections per annum for training units²⁰.

However, all HPB surgeons operating at private hospitals in the region have joint public appointments. Joint appointments help ensure that private patients are reviewed in a multidisciplinary setting.

¹⁹ Clinical Services Capability Framework version 3.1, Queensland Department of Health, 2011

²⁰ <http://www.anzhpba.com/pdf/anzhpba-fellowship-hpb-surgery.pdf>

Table 33. Total number of pancreatectomies by health service by site, 2011/12

Health service	Pancreatectomy admissions			
	Pancreatic primary cancer (C25)	Other neoplasms	Ratio Pancreatic cancer/ other neoplasms	Total admissions
Austin Health Austin	19	10	1.90	29
Austin Health Repat				0
Austin Health Total	19	10	1.90	29
Eastern Health Angliss				0
Eastern Health Box Hill	4	5	0.80	9
Eastern Health Maroondah				0
Eastern Health Total	4	5	0.80	9
Mercy Hospital for Women				0
Northern Health Northern	7	2	3.50	9
Total public admissions	30	17	1.76	47
Epworth Eastern Hospital	9	3	3.00	12
Warringal Private Hospital	6	7	0.86	13
Deidentified Private Hospitals	1	3	0.33	4
Total private admissions	16	13	1.23	29
Total admissions	46	30	1.53	76
Benchmark / evidence	16 pancreatic p.a. per MDT (QLD) 6 pancreatic per surgeon (QLD) 10 pancreatic p.a per training unit or 25 – 30 p.a. per training unit if pancreas is dominant unit (ANZHPBA)			

13.3.2. Selected liver excision procedures

Table 34 shows the volume of liver and biliary tract excisions undertaken on patients with a diagnosis of liver and biliary tract cancer, liver and biliary tract metastases and other neoplasms at each site in 2011/12.

The data indicate that Austin Hospital undertook the highest volume of procedures in 2011/12. No provider meets the Queensland Department of Health minimum volume guideline²¹ of 15 excisions per MDT per annum for HCC except Austin Hospital who performed 33 liver excision procedures to treat HCC in 2011/12. No provider meets the Queensland Department of Health minimum volume guideline²² of 30 excisions per MDT per annum for liver metastases. The ANZHPBA guideline²³ for training units to undertake 20 liver resections per annum (primary and metastases) is only met by Austin Hospital. The data shows there is considerable variation in the number of procedures carried out in NEMICS health services (range 7 – 59). This variation would be even greater, if surgeons per service were considered.

²¹ Ibid.

²² Ibid.

²³ <http://www.anzhpba.com/pdf/anzhpba-fellowship-hpb-surgery.pdf>

Table 34. Total number of liver excision procedures by health service by site, 2011/12

Health service	Liver and biliary tract excision admissions			
	Liver and biliary tract primary cancer (C22 – C24)	Liver and biliary tract secondary cancer (C787)	Other neoplasms	Total admissions
Austin Health Austin	37	25	9	71
Austin Health Repat				
Austin Health Total	37	25	9	71
Eastern Health Angliss				
Eastern Health Box Hill	3	6	4	13
Eastern Health Maroondah				
Eastern Health Total	3	6	4	13
Mercy Hospital for Women				
Northern Health Northern	3	7	0	10
Total public admissions	43	38	13	94
Epworth Eastern Hospital	1	15	2	18
Warringal Private Hospital	2	11	5	18
Deidentified Private Hospitals	3	11	4	18
Total private admissions	6	37	11	54
Total admissions	49	75	24	148
Benchmark / evidence	30 liver mets / 15 HCC p.a. per MDT (QLD) 10 liver mets / 5 HCC p.a. per surgeon (QLD)			

13.4. HPB cancer surgery – gaps and issues

HPB surgeons (N=4) who partook in the surgical oncology survey set out in section one highlighted the following:

- There is a mixed clinical opinion regarding the number of campuses undertaking resections.
- HPB cancer surgery should be co-located with the following surgical units: Upper GI (gastro-oesophageal) and urology surgery.
- HPB cancer surgery to be co-located with ERCP and EUS, and a vascular unit.
- Earlier referral to specialist care, and availability of radio-surgery at specialist centres were the listed key areas of improvement to HPB cancer surgery provision in the NEMICS region.

With clinical input, the following NEMICS regional gaps and issues have been identified:

There are too many centres undertaking HPB surgery in the NEMICS region. One clinical view is that due to joint appointments the best approach may be to improve joint working and shared units rather than restricting sites undertaking surgery.

Another clinical view is to mandate reporting of outcomes supported by independent audit verification of data, including a review of radiology (for both resection and by-pass cases). This way, the appropriateness of the treatment decision, individual surgeon caseload, and whether it has been discussed in a multidisciplinary setting would be able to be assessed. It is surmised that this would lead to self regulation of resections being undertaken. Working with ANZHBA to facilitate the establishment of standardised protocols for peri and post operative management would drive protocol driven reporting.

Poor quality EUS and MRI is a regional issue and negatively impacts on the ability to categorise incidental pancreatic lesions, early diagnosis of liver tumours, and deciding on the most appropriate treatment plan. There is no MBS rebate on liver MRI scans whilst CT scans are an insufficient imaging modality for

diagnosing and treating liver tumours. Furthermore, there is a perceived undersupply of endoscopic ultrasound and PET scans for pancreatic lesions in Melbourne.

The characterization of incidental liver lesions is seen to be done poorly, particularly via private imaging centres.

Treatment planning for hepatoma and for cholangiocarcinoma requires different surgical expertise and there are thus benefits from having separate MDMs for these tumour types. Not all services have sub-specialty expertise for both tumour types. However, clinicians also noted that the volume of cholangiocarcinomas are relatively low and may not reach critical levels to establish a separate MDM.

While transplantation is an option for only a small minority of liver cancer patients, early referral for potential transplant patients should be made to a liver transplant unit where the specialist multidisciplinary teams should determine their suitability for transplant.

In addition, there are benefits to co-locating with an HPB unit and liver transplant as there is an overlap in disease pattern and thus overlap in intensivist and anaesthetist expertise. With co-location, these specialties get double exposure and therefore improved institutional expertise.

There are certain other co-location requirements to undertake HPB surgery according to clinicians. HPB surgery should be undertaken in settings with an ICU, interventional radiology (available 24/7), and a high quality of ward staff. Histopathology with frozen section being available intra-operatively is also a best practice requirement.

Currently, several hospitals do not meet these requirements:

- All NEMICS providers who undertake HPB surgery have an on-site ICU.
- Warringal Private Hospital reports a limited pathology service that is contracted out. However, the VMO surgeons undertaking pancreatic surgery at Warringal use Austin Health pathology.
- Visiting surgeons from The Northern Hospital are undertaking some HPB surgery at John Fawkner private hospital where there are inadequate support services onsite.

Given the high level of morbidity and poor outcomes for patients undergoing HPB surgery, quality of life at 1,3,6, and 12 months after surgery is a valuable quality indicator. There may be a role for NEMICS in instituting this patient reported measure.

Key discussion points:

Are too many sites undertaking HPB surgery across NEMICS providers? If so, is the best approach to (a) restrict the number of sites undertaking resections to ensure co-location requirements are met (b) improve joint working and shared units (c) mandate reporting of outcomes supported by independent surgical audit?

Does NEMICS have a role to play in the availability of radio-surgery at providers?

Should protocols for peri and post operative management of HPB patients be standardised across hospitals?

Should there be separate MDMs for hepatoma and cholangiocarcinoma?

Is there a role for NEMICS to address the quality issues and undersupply of diagnostic imaging modalities across NEMICS providers?

14. Bone Marrow Transplants

There are no providers of allogeneic bone marrow transplants in the NEMICS region. Austin Hospital is preparing a business plan to provide this service. Currently NEMICS providers refer to the Royal Melbourne Hospital for patients requiring allogeneic transplants.

There are two providers of autologous bone marrow transplants in the NEMICS region: Austin Hospital and Eastern Hospital Box Hill. Table 35 shows the volume of autologous transplants undertaken by NEMICS providers in 2011-12.

Table 35. Total number of bone marrow transplants by health service by site, 2011/12

Health Service	Transplant volumes 2011-12	
	Allogeneic	Autologous
Austin Health	*	25
Eastern Health		27
Mercy Hospital for Women		0
Northern Health		0
Total Public		52
Epworth Eastern Hospital		0
Warringal Private Hospital		0
Deidentified Private Hospitals		0
Total Private		0
Grand Total		52

** Austin Health preparing a business case for Allogeneic Transplants*

Key discussion points:

Is the proposed provision for allogeneic bone marrow transplants at Austin Hospital a required service addition / addressing a regional gap?

15. Common themes across tumour streams

With clinical input, the following NEMICS regional gaps and issues have been identified that are applicable across several or all tumour streams:

15.1. The public – private hospital system

Given there is no way to regulate the private hospitals, it is difficult to ensure that patients are discussed in a multidisciplinary meeting (MDM). Joint appointments help to alleviate this. However the quality and composition of MDMs is equally important and difficult to monitor and link to patient outcomes.

Related to this, the public system could not cope if complex surgery was restricted to public hospitals so private patients being discussed at an MDM is a better way of ensuring best practice delivery of care.

Further, initiatives are required to enable surgical training in private hospitals to alleviate capacity constraints at public providers.

15.2. The cancer workforce

Increased sub-specialisation has knock on effects for general surgery provision. One solution is the set up of acute general surgical wards that enable specialist surgeons to maintain their general surgical expertise on a rotational basis.

Also, there is a need for sub-specialty cancer liaison nurses (particularly for HPB and upper gastro-intestinal cancers) to alleviate resource constraints and improve service provision.

15.3. The rural – metropolitan divide

Given the poor prognosis for some cancer patients, another important consideration is best practice for treating patients in regional and rural Victoria given the huge geographical spread. For example, for patients in remote areas diagnosed with distal metastases, should they be transferred to a specialist centre to ensure proper assessment or is local management adequate and fairer to the patient?

16. Summary

This paper has set out the way services are currently delivered and where they are delivered as well as a clinical view on these arrangements.

The focus has been on hospital surgical volumes and surgeons' views on the current provision of surgery across 11 tumour streams and one specialist procedure.

The advantages of maintaining a clinical environment that provides a platform for delivery of best practice developments are well documented in international literature. These include the co-location with support services; the association between volumes and outcomes; and the opportunity for maintaining clinical expertise, shared learning and decision making, and training.

Addendum 1 sets out the international clinical evidence base for centralisation of cancer surgery and **addendum 2** sets out co-location requirements for specialised surgery.

Addendum 3 provides a copy of the surgical oncology survey questionnaire and complete analysis of responses.

Addendum 4 explains how the admissions and surgical volume data set out in this document was derived, including a list of the diagnosis codes and procedure codes included.

This paper is one of several inputs to map surgical oncology services in the NEMICS region and support the development of defined referral pathways for sub-specialist services.

Addendum 1. Extract from London Health Programmes Cancer case for change (2011) - centralisation of specialist services

Improving quality and outcomes

There is strong evidence to suggest peri-operative mortality and long-term survival worsen as hospital surgical volume decreases²⁴. Numerous studies in recent decades have examined the relationship between high volume hospitals, long-term survival and peri-operative mortality, including for complex cancer services^{25, 26}. The following studies demonstrate high volume hospitals have better outcomes for major cancer resections and other high risk procedures:

- A recently published study scrutinised 135 published studies covering a range of 27 surgical procedures or clinical conditions, and looked at both hospital volume and doctor/surgeon volume for the condition studied²⁷. The report concluded that most of these studies highlighted a direct relationship between volumes and improved outcomes. This was most marked in complex or high risk procedures, such as complex surgery and cancer treatment.
- A systematic review evidenced an inverse relationship between hospital surgical volume and mortality²⁸.
- A review of provider volumes and outcomes for cancer procedures in the UK undertaken in 2005 found that high volume providers had significantly better outcomes for complex cancer surgery, particularly pancreatectomy, oesophagectomy, gastrectomy and rectal resection²⁹.

Technological advances are also driving more centralisation of specialist services. The most complex cases require a range of diagnostic and treatment equipment to be available in one place. This would require locating high technology equipment in centres of expertise with sufficient concentrations of experienced trained staff, and where there are enough cases, to justify the technology's cost³⁰.

Research has found that improvements in imaging have led to a more accurate diagnosis regarding the spread of disease. Previously surgeons would operate and then determine disease spread. Imaging has led to a reduced number of resections by detecting inoperable cancers or diseases, which had already metastasised. As improvements in chemotherapy treatments become available, the primary treatment option will become a mix of chemotherapy and radiotherapy rather than surgery.

Specialist expertise

Surgeons and their teams who see more of a particular diagnosis or perform a greater number of specific procedures, for rare and common cancers, typically achieve higher quality outcomes.^{31,32} For example, the association between higher surgeon volume and better outcomes from surgeons undertaking oesophagectomies has been highlighted in the Cancer Reform Strategy³³ where between 1997 and 2005,

²⁴ K Bilimoria, DJ Bentram, JM Feinglass, et al, 'Directing Surgical Quality Improvement Initiatives: Comparison of Perioperative Mortality and Long-Term Survival for Cancer Surgery', *J Clin Oncol*, 2008, 26:4626-4633

²⁵ HS Luft, JP Bunker & AC Enthoven, 'Should operations be regionalized? The empirical relation between surgical volume and mortality', *N Engl J Med.*, 1979, 301:1364-9

²⁶ CB Begg, LD Cramer, WJ Hoskins & MF Brennan, 'Impact of hospital volume on operative mortality for major cancer surgery', *JAMA*, 1998, 280:1747-51

²⁷ EA Halm, C Lee, MR Chassin, 'Is volume related to outcome in health care? A systematic review and methodologic critique of the literature', *Ann Intern Med*, 2002, 137:511-52

²⁸ T van Heek, et al, 'Hospital Volume and Mortality After Pancreatic Resection', *Ann Surg*, 2005, 242(6): 781-790

²⁹ Killeen et al, 'Provider volume and outcomes for oncological procedures', *Journal of the Royal Society of Medicine*, 2007, 100:122-124

³⁰ NHS London, Healthcare for London: A Framework for Action, 2007

³¹ BE Hillner, TJ Smith & CE Desch, Hospital and physician volume or specialization and outcomes in cancer treatment: importance in quality of cancer care, 2000

³² FN Joudi & BR Konety, 'The Volume/Outcome Relationship in Urologic Cancer Services', *Supportive Cancer Therapy*, October 2004, 2/1(42-6), 1543-2912

³³ Department of Health, *Cancer Reform Strategy*, 2007

surgeons undertaking these procedures reduced from 309 surgeons in 147 trusts to 188 surgeons in 96 trusts. There was an average 1.5 fold increase in the number of such operations per trust and per surgeon. The number of patients that died in hospital following one of these operations almost halved in this period (from 9.4% to 4.9%). A US review³⁴ reported differences in mortality rates of 10% when high volume units were compared to low volume units for a number of complex high-risk surgical procedures, including pancreatic cancer surgery and oesophageal cancer surgery as set out in Table 36.

Table 36. Age adjusted mortality from cancer against annual surgeon volume for four cancer surgical procedures



Volume is only one of a number of factors. Other factors include training and experience, complementary surgical teams, hospital resources, organisation and processes of care can also influence outcomes. It is fundamental that specialist services are available and delivered by appropriately qualified teams with sufficient practice to maintain their skills and sustain expertise. Centralisation of specialist cancer services will provide a means of consolidating scarce specialist expertise to improve clinical quality. Such concentration of care, with large numbers of patients, creates centres of excellence and supports training to ensure cover is provided to release staff for training.

Volume to support audit of outcomes and to enhance research

Critical mass provides the basis for the meaningful audit of outcomes, which cannot be precisely measured in small volume services. A single specialist team and higher volumes will allow for better assessments of outcomes and, subsequently, more sophisticated outcome measures to enable benchmarking and international comparison. This would be achieved through recording data over time as systems are established and service infrastructure is developed.

³⁴ JD Birkmeyer, TA Stukel, AE Siewers, et al, ‘Surgeon volume and operative mortality in the United States’, *New England Journal of Medicine*, 2003, 27;349(22):2117-27

Addendum 2: Extract from London Health Programmes Cancer co-dependencies framework (2011)

The following content is an extract from a publication that sets out the consensus of circa 160 London based clinicians and supported by wider clinical and public consultation and endorsement prior to its publication:

There is currently no clinically agreed consensus on the essential services required for specialist cancer services. However, there is a large body of work, including NICE improving outcomes guidance that describes the key elements required for both common and rare cancer services.

There is also evidence to indicate that co-location of services can improve outcomes for patients undergoing complex cancer procedures. Studies have suggested that collocating support services on site contributes to improved patient outcomes at high volume hospitals^{35, 36}. One study recognises that “the association between increasing hospital volume and [a reduction in] post-operative mortality appears to derive mainly from a full spectrum of clinical services that may facilitate the prompt recognition and treatment of complications”. The report concludes that “a hospital [with] an array of clinical services will facilitate the timely management of virtually any medical or surgical complication”³⁷. Another study, examining the relationship between on site clinical resources and mortality in pancreatic resections, found a 68% reduction in peri-operative mortality when all the clinical resources studied were present in the hospital³⁸.

The framework sets out the dependencies for specialist cancer services using the following definitions:

Coding	Definition
PURPLE	Optimal service collocation (dependent relationship) Location: Collocation on the same hospital site
LILAC	Desirable service collocation (moderately dependent relationship) Location: If possible, collocated within the same hospital site, otherwise in the same trust

When determining the levels of dependency within the framework, the following has been considered:

- Clinical dependency – Is the co-location of the service required to deliver a safe service?
- Patient experience – will the co-location of the service result in fewer transfers, reduced lengths of stay and improved patient experience?
- Effective use of resource and financial efficiency – will co-location use available resource more effectively, optimise scale economies and resource capability, and reduce duplication?

³⁵ DR Urbach & NN Baxter, ‘Does it Matter what a Hospital is “High Volume” for? Specificity of Hospital Volume-Outcome Associations for Surgical Procedures: Analysis of Administrative Data’, *Quality and Safety in Health Care*, 2004;13: 379-383

³⁶ B Joseph, JM Morton, T Hernandez-Boussard, I Rubinfeld, C Faraj, V Velanovich, ‘Relationship Between Hospital Volume, System Clinical Resources, and Mortality in Pancreatic Resection’, *Journal of the American College of Surgeons*, April 2009 (Vol. 208, Issue 4, Pages 520-527, DOI: 10.1016/j.jamcollsurg.2009.01.019)

³⁷ KG Billingsley, AM Morris, JA Dominitz, B Matthews, S Dobie, W Barlow, GE Wright, L Baldwin, ‘Surgeon and Hospital Characteristics as Predictors of Major Adverse Outcomes Following Colon Cancer Surgery: Understanding the Volume-Outcome Relationship’, *Arch Surg.* 2007;142(1):23-31

³⁸ B Joseph, JM Morton, T Hernandez-Boussard, I Rubinfeld, C Faraj, V Velanovich, ‘Relationship Between Hospital Volume, System Clinical Resources, and Mortality in Pancreatic Resection’, *Journal of the American College of Surgeons*, April 2009 (Vol. 208, Issue 4, Pages 520-527, DOI: 10.1016/j.jamcollsurg.2009.01.019)

- Optimal level of service – will service co-location improve service delivery?

Taking a service from the left hand column and reading across will show the level of dependency on other services. The framework is only intended to be read in this way, and not vertically.

Figure 1: Co-dependencies framework for specialist cancer services with wider surgical service

		GENERAL SERVICE													
		Breast general surgery	Lung surgery (thoracic surgery)	Colorectal general surgery	Bladder and Prostate general surgery	Oesophago-gastric surgery	Testicular surgery	Penile surgery	Renal general surgery	UAT general surgery	Thyroid general surgery	Brain and CNS general surgery	Gynaecological surgery	Pancreatic surgery	Liver service
CR		1	2	3	4	5	6	7	8	9	10	11	12	13	14
SPECIALIST SURGERY / SPECIALIST PROCEDURE	Breast cancer surgery	a	1												
	Lung cancer surgery	b		1											
	Colorectal cancer surgery	c			1	2									1
	Bladder and Prostate cancer surgery	d			1	2			1						
	Oesophago-gastric cancer surgery	e		1	2		1			1				1	
	Testicular cancer surgery	f		1		1		1							
	Penile cancer surgery	g							1						
	Renal cancer surgery	h		1	1	1				1					
	UAT cancer surgery	i		1	1					1	1	1			
	Thyroid cancer surgery	j		1						1	1				
	Brain and CNS cancer surgery (NOTE 3)	k								1		1			
	Gynaecological cancer surgery	l			1	2	1						1		
	Pancreatic cancer surgery	m			1		1							1	1
	Liver cancer surgery	n												1	1
	Haematopoietic progenitor cell transplantation (HPCT) (NOTE 4)	o													
	Skin cancer surgery	p													

Cell Reference	Explanatory Notes
F4	The dependency between specialist testicular cancer surgery and bladder and prostate surgery is specifically for residual disease managed surgically undertaken by specialist retroperitoneal surgeons or urologists. Most often undertaken laproscopically or robotically assisted.
I2 / J2	UAT cancer surgery may require cardiothoracic surgeons to access the upper part of the chest, usually the superior mediastinum to resect UAT or thyroid tumours that reach into the thorax.
L4	The dependency between gynaecological cancer surgery and urology is for both specialist uro-oncology as well as general urology (endoscopic and reconstructive urology).
L5	The dependency between gynaecological cancer surgery and oesophago-gastric surgery is more specifically a requirement to have upper gastrointestinal surgery onsite as radical ovarian cancer de-bulking involves access to the upper abdomen and may include a diaphragmatic strip, resection of surface liver deposits and a splenectomy

Addendum 3a: NEMICS surgical oncology survey

Who should complete this survey?

This 6 question survey is for surgeons who perform surgery in oncology and who practice in north east Melbourne.

Please circulate as appropriate.

North east Melbourne includes the catchments of Northern Health, Eastern Health, Austin Health, and all private hospitals within these areas.

Who is delivering this survey and why?

North East Melbourne Integrated Cancer Service (NEMICS) is one of three metropolitan clinical networks established in Victoria to support and facilitate the integration and coordination of cancer services across ten tumour streams.

The Victorian Department of Health is in the formative stages of developing a service capability framework for cancer services across the state. To pre-empt this work, NEMICS is reviewing the service capability of cancer services and cancer support services in its jurisdiction. To date, day oncology units, radiation oncology units and some key support services have been assessed.

How will the information be used?

This survey is one of several inputs to map surgical oncology services in the NEMICS region and support the development of defined referral pathways for sub-specialist services.

Surveys are anonymous and any data that would enable an individual to be identified will be treated as confidential.

Instructions

Please:

- Respond to the questions for the surgical management in your primary tumour stream only.
- **Return to Alexandra Philpott at Alexandra.philpott@austin.org.au by Sunday 10th November (if you would prefer to provide feedback in person please contact me on (03) 9496 3048)**
- Continue your responses on subsequent pages if required.

<p>1. What best describes your role? Please tick the appropriate box:</p>	<p><input type="checkbox"/> general surgeon that performs surgery in oncology</p> <p>Primary tumour stream: _____</p> <p><input type="checkbox"/> specialist oncology surgeon</p> <p>Sub-specialty: _____</p>
<p>Please respond to the following questions for the <i>surgical</i> management in your <i>primary</i> tumour stream only.</p>	
<p>2. Are the number of hospital campuses who undertake resections/excisions within north east Melbourne region:</p>	<p><input type="checkbox"/> Too many <input type="checkbox"/> Too few</p> <p><input type="checkbox"/> About right <input type="checkbox"/> Unsure</p>
<p>3. What, if any, are the co-location requirements of your tumour stream with:</p>	
<p>Other surgical services (e.g. HPB cancer surgery with upper GI surgery):</p>	
<p>Support services (e.g. with ICU, with interventional radiology):</p>	
<p>4. What are the 3 key areas of improvement required across north east Melbourne region?</p>	
<p>•</p>	
<p>•</p>	
<p>•</p>	
<p>5a. What is the optimal service configuration for north east Melbourne region?</p>	
<p>Consider the optimal number of campuses who undertake resections? Should resections be restricted to a certain number of campuses but local units be retained as they are currently?</p>	
<p>5b. Comment on how this service reconfiguration would be of benefit or detriment to each of the following:</p>	
<p>Clinical best practice –quality of care and patient outcomes?</p>	
<p>Clinical dependency – meeting co-location requirements to deliver a safer service?</p>	
<p>Patient experience –fewer transfers, reduced lengths of stay, improved patient experience?</p>	
<p>Effective use of resource / financial efficiency – optimising scale economies and resource capability?</p>	
<p>Training and research – optimising training and collaborative research opportunities?</p>	
<p>6. Do you have any further comments on the appropriateness of current service provision?</p>	
<p>Consider surgeon expertise, discussion at MDMs, referral pathways, resection volumes per annum</p>	

Addendum 3b. Analysis of responses: Surgical oncology survey

NEMICS administered a survey to surgeons who perform surgery in oncology in the NEMICS region. 30 surgeons completed the survey, of which 20 identified themselves as specialist oncology surgeons (the remaining 10 as general surgeons that perform surgery in oncology). 1 survey was not completed. The tumour streams that were represented in the survey are set out below. Recipients were asked “(for your surgical sub-specialty) Are the number of hospital campuses who undertake resections/excisions within north east Melbourne region?” 29 respondents answered this question. The responses are also set out below.

Tumour stream	Respondents	Opinion on number of campuses undertaking resections
Brain	1	About right
Breast	6	About right
Colorectal	4	About right
Head and neck	1	About right
Gynaecology	1	About right
Upper GI – oesophago - gastric	1	About right
Upper GI - HPB	4	Mixed opinion too many / about right
Plastics	3	About right
Skin	2	Mixed opinion too many / about right
Thoracic / lung	2	Too many
Thyroid	1	About right
Genito-urinary	4	Mixed opinion too many / about right
Incomplete	1	n/a
Total:	31	

Answer choices	Responses	Tumour stream
Too many	20.69% / 6 respondents	Upper GI – 1 of 5 skin - 1 of 2 Thoracic – 2 of 2 Genito-urinary – 2 of 4
Too few	0% / 0 respondents	
About right	72.41% / 21 respondents	Brain – 1 of 1 Breast – 5 of 6 Colorectal -3 of 4 Head and neck – 1 of 1 Gynaecology – 1 of 1 Upper GI (HPB)– 2 of 5 Upper GI (OG) – 1 of 1 Plastics – 3 of 3 Skin – 1 of 2 Thyroid – 1 of 1 Genito-urinary – 2 of 4
Unsure	6.90% / 2 respondents	Colorectal – 1 of 4 Upper GI – 1 of 5
Total:	29 respondents	

For each surgical subspecialty, the following co-location requirements were identified:

Surgical sub-specialty	Co-location requirements with other surgical services	Co-location requirements with: Support services
Brain	Plastics (3) / endocrinology (1) / no co-location requirements (1)	Medical oncology (1) / Radiation oncology (1) / ICU (1) / interventional radiology (1)
Breast	Upper GI (2) / urology (1) / plastics (1) / liver (1)	Medical oncology (1) / Radiation oncology (1) / Radiology (3) / nuclear medicine (1)
Colorectal	-	ICU (2) / interventional radiology (2) / MRI (1) / PET (1) / stomal therapy (1)
Head and neck	-	-
Gynaecology		ICU (1) / Interventional radiology (1) / PET (1)
Upper GI / HPB	Urology (1) / colorectal (1) / HPB with Upper GI (1) / no co-location requirements (1)	Vascular (1) / ICU (2) / Interventional radiology (2) / ERCP and EUS (1)
Plastics	Breast (1)	Dermatology (1) / ENT (1) / radiotherapy (1) / ICU (1) / Interventional radiology (1)
Skin	-	nuclear medicine for lymphoscintigraphy
Thoracic / lung	-	Radiation oncology (1)
Thyroid	Thoracic (1)	ICU (2) / respiratory medicine (1) / renal (1) / cardiology (1) / interventional radiology (2)
Genito-urinary	Urology (1) / colorectal (1) / vascular (2)	Medical oncology (1) / Radiation oncology (1) / ICU (3) / Interventional radiology (4) (da vinci robot) / radioactive iodine (1)

Recipients were asked “(for your surgical sub-specialty) what are the three key areas of improvement required across north east Melbourne region?” Responses are set out below.

Surgical sub-specialty	Key areas of improvement required across north east Melbourne region
Brain	<p>Earlier referral [to specialist centre]</p> <p>Radiosurgery Service</p>
Breast, Endocrine	<p>Regular combined lists with plastic surgery</p> <p>More breast surgeons to cater for the busy public clinics</p> <p>GP education for shared-care in breast cancer follow up</p>
Colorectal	<p>Reduced delay in radiotherapy treatment</p> <p>Co-ordination of access to information across sites (ie. access to the other campuses)</p> <p>More outpatient clinic time</p> <p>Database support in a clerical role</p> <p>More operating time</p> <p>Clinical nurse specialist</p> <p>More general surgeons and fewer sub-specialists</p>
Gynae-oncology	<p>Radiation Oncology</p> <p>Psycho-oncology support</p>
Plastics and reconstructive	<p>Access to multidisciplinary care</p> <p>Better theatre access</p> <p>Accessible MDTs</p> <p>Better clinic access</p> <p>OR lists and funding</p> <p>Timing of combined cases with other disciplines</p>
Melanoma/sarcoma	<p>Increase utilisation of sentinel lymph node biopsy for melanoma</p> <p>Access to theatre to operate (waiting list too long)</p> <p>Better referral of patients with low volume metastatic disease for consideration of surgery or clinical trials</p> <p>Access to public outpatient (waiting list too long)</p> <p>Appropriate referral of sarcoma patients for pre-operative discussion in a MDM</p> <p>Centralise complex care to maximise recruitment to clinical trials</p> <p>Inadequate funding for surgery/reconstruction</p>
Lung cancer / Thoracic Surgery	<p>Improved ease of transfer of patients to expert care</p> <p>Secretarial support of MDM</p>

Surgical sub-specialty	Key areas of improvement required across north east Melbourne region
	<p>Improved access to rehab post surgical care</p> <p>Research support for clinicians</p> <p>Supportive care access for private patients</p>
Thyroid	<p>Surgeons to perform/supervise at least 10 thyroid per year</p> <p>Administration of RAI</p>
Upper GI / HPB	<p>research</p> <p>Integration of investigations across the health system</p> <p>Collaboration</p> <p>Better inpatient bed access</p> <p>Regionalisation</p> <p>More ICU beds</p>
Genito-urinary	<p>Subspecialisation</p> <p>Increased theatre lists</p> <p>Greater concentration of work enabling well trained urologists to become high-volume urologists</p> <p>Da Vinci Robot</p> <p>Collaboration</p> <p>Public hospital robot availability</p> <p>Continued support and improvement in multidisciplinary teams</p> <p>LDR Brachytherapy</p> <p>Advertising to referring doctors the high level of service provided by urologists specialising in oncology</p> <p>Transperineal prostate biopsy</p>

Recipients were asked what the optimal configuration for north east Melbourne region was for their surgical subspecialty; and whether this would be of benefit or detriment to any of the following fields:

Clinical best practice –quality of care and patient outcomes?
Clinical dependency – meeting co-location requirements to deliver a safer service?
Patient experience –fewer transfers, reduced lengths of stay, improved patient experience?
Effective use of resource / financial efficiency – optimising scale economies and resource capability?
Training and research – optimising training and collaborative research opportunities?

Responses are set out below.

Surgical sub-specialty	Optimal service configuration for north east Melbourne	Comments against a-e (above)
Brain	Restrict all neurosurgery to <i>[one campus]</i>	
Breast, Endocrine	Current configuration is adequate (2)	
Colorectal	As at present - all rectal cancer to be managed by colorectal surgeons in a colorectal department	+ve benefit: a, b, e -ve: May increase patient transfers within health services (e.g. MH to BHH) (c) -ve: short term increase in cost (d)
	Colon and rectal cancer surgery should be performed at every campus in the area.	More campuses translates to more training opportunities, more clinic time and therefore patient access, and more streamlined service
	Current setup is adequate (2)	Withdrawal of Public Radiation Oncology a major problem
Gynae oncology	Same number of service centres but some particular procedures should be restricted to 1 -2 centres with special expertise	
Upper GI / HPB	All regionalised to a few centres	Benefits a - e
	Current number of campuses is about right.	
	<i>[Restrict to]</i> two HPB/Upper GI units	
Lung cancer / Thoracic Surgery	Focus resection surgery in one hospital to maintain high quality of surgical care	+ve benefit: a, b -ve: May increase patient travel distance
Plastics and reconstructive	Plastic surgery units with access to multidisciplinary care.	Benefits a - e
	no change necessary	
	Need local units. <i>[Current]</i> site configuration ok.	
Melanoma/sarcoma	All patients undergoing resection for sarcoma and advanced melanoma should be discussed in a pre-operative MDM and their surgery should be performed by a surgeon with experience	+ve: Avoid misdiagnoses (a) +ve: reduce reoperation rates from inappropriate primary resection (c) (d)

Surgical sub-specialty	Optimal service configuration for north east Melbourne	Comments against a-e (above)
	in these areas.	+ve: access to clinical trials through centralisation
	No <i>[reconfiguration]</i> . Waiting list already too long	
Thyroid	Undertake in most campus with a well trained surgeon with good volume	+ve: assist in delivering best practice (a) +ve: c
Genito-urinary	Single campus for robotics and Brachytherapy	Benefits a - e
	Greater centralisation of major surgery	
	Continued concentration of urological oncology to high-volume surgeons and high-volume centres, enabling delivery of very high quality operations to patients in the NE	+ve: a, c, e

Addendum 4. Data limitations, diagnosis codes and procedure codes used to derive surgical volume data

The majority of procedure volume tables in this document show a single figure for each provider. These charts show the number of *admissions* over 2011-2012 where defined procedures were carried out on patients with a primary diagnosis of a tumour at the site operated upon. For example, admissions for prostatectomies that were carried out when the primary diagnosis is a prostate tumour.

The data shows patient admissions for the procedure rather than each procedure undertaken within the same admission. This is because a surgeon may undertake two or more procedures during the same operation. For example, two procedures such as a wedge resection and a lobectomy can be undertaken on a patient under one anaesthesia so, to more accurately indicate surgical volumes, this has been counted as a single procedure.

For some tumour types, a significant proportion of surgical procedures undertaken by the same specialist multidisciplinary team are on patients with either:

- A primary diagnosis of a tumour at a site other than the site operated upon (for example, pancreatectomies carried out when the primary diagnosis is a stomach tumour); or
- Other disease.

In such cases it has been necessary to add these additional figures in the tables to illustrate maintenance of clinical expertise.

These tables show:

- The number of defined procedures carried out on patients with a primary diagnosis of a tumour at the site operated upon.
- The number of defined procedures carried out on patients with a primary diagnosis of a tumour at a site other than the site operated upon.

Limitations of the data

Much of the data in this report is generated from the Victorian Admitted Episode Dataset (VAED). Where this is the case, this has been noted. VAED data is compiled from data routinely submitted by health services to the Department of Health and is used to monitor activity and a range of performance indicators including surgical volumes and outcomes.

The VAED is only able to determine surgical volume by site, not by individual surgeon. This needs to be borne in mind when comparing with international minimum volume requirements.

Volumes data has been recorded at site level so to accurately assess site specific gaps, the co-location of surgical support services, and referral pathways between both sites and health services. In cases where the same surgeons and the same MDT are managing patients across sites, this is noted in the report.

Other data limitations:

1. The data is for a single year (2011/12 is reported). The data is intended to show a snapshot of service delivery to stimulate discussion.
2. Service change since 2011/12 has been noted in the document, but for consistency, all 2011/12 data is shown (for example, Maroondah Hospital no longer routinely undertake gastrectomies but have a number recorded for those performed on-site in 2011/12).

Despite these issues, VAED data remains the most reliable form of data available to inform the project, and is routinely used at a state level to investigate hospital activity.

Diagnosis codes and procedure codes used

Table 37 below sets out the diagnosis codes and procedure codes used for each tumour stream in this document.

Table 37. Diagnosis and procedure codes used for each tumour stream

Diagnosis codes		Procedure codes
Breast		
C500	Malignant neoplasm of nipple and areola	1744 Excision of lesion of breast 1747 Subcutaneous mastectomy 1748 Simple mastectomy
C501	Malignant neoplasm of central portion of breast	
C502	Malignant neoplasm of upper-inner quadrant of breast	
C503	Malignant neoplasm of lower-inner quadrant of breast	
C504	Malignant neoplasm of upper-outer quadrant of breast	
C505	Malignant neoplasm of lower-outer quadrant of breast	
C506	Malignant neoplasm of axillary tail of breast	
C508	Overlapping malignant lesion of breast	
C509	Malignant neoplasm of breast, unspecified part	
D050	Lobular carcinoma in situ of breast	
D051	Intraductal carcinoma in situ of breast	
D057	Other carcinoma in situ of breast	
D059	Carcinoma in situ of breast, unspecified	
D486	Neoplasm of uncertain or unknown behaviour of breast	
Colorectal and Anal		
C180	Malignant neoplasm of caecum	0913 Colectomy 0934 Rectosigmoidectomy or proctectomy 0935 Anterior resection of rectum 0936 Total proctocolectomy
C181	Malignant neoplasm of appendix	
C182	Malignant neoplasm of ascending colon	
C183	Malignant neoplasm of hepatic flexure	
C184	Malignant neoplasm of transverse colon	
C185	Malignant neoplasm of splenic flexure	
C186	Malignant neoplasm of descending colon	
C187	Malignant neoplasm of sigmoid colon	
C188	Overlapping malignant lesion of colon	
C189	Malignant neoplasm of colon, unspecified part	
C19	Malignant neoplasm of rectosigmoid junction	
C20	Malignant neoplasm of rectum	
C210	Malignant neoplasm of anus, unspecified	
C211	Malignant neoplasm of anal canal	
C212	Malignant neoplasm of cloacogenic zone	
C218	Overlapping malignant lesion of rectum, anus and anal canal	
Genito-urological		
C600	Malignant neoplasm of prepuce	1048 Partial nephrectomy 1049 Complete nephrectomy 1051 Complete nephrectomy for removal of transplanted kidney 1053 Radical nephrectomy 1054 Nephroureterectomy 1102 Cystectomy 1184 Orchidectomy 1165 Transurethral prostatectomy 1166 Other closed prostatectomy 1167 Open prostatectomy
C601	Malignant neoplasm of glans penis	
C602	Malignant neoplasm of body of penis	
C608	Overlapping malignant lesion of penis	
C609	Malignant neoplasm of penis, unspecified	
C61	Malignant neoplasm of prostate	
C620	Malignant neoplasm of undescended testis	
C621	Malignant neoplasm of descended testis	
C629	Malignant neoplasm of testis, unspecified	
C630	Malignant neoplasm of epididymis	
C631	Malignant neoplasm of spermatic cord	
C632	Malignant neoplasm of scrotum	
C637	Other specified male genital organs	
C638	Overlapping malignant lesion of male genital organs	
C639	Malignant neoplasm of male genital organ, unspecified	
C64	Malignant neoplasm of kidney, except renal pelvis	
C65	Malignant neoplasm of renal pelvis	
C66	Malignant neoplasm of ureter	
C670	Malignant neoplasm of trigone of bladder	
C671	Malignant neoplasm of dome of bladder	
C672	Malignant neoplasm of lateral wall of bladder	

Diagnosis codes	Procedure codes
C673 Malignant neoplasm of anterior wall of bladder C674 Malignant neoplasm of posterior wall of bladder C675 Malignant neoplasm of bladder neck C676 Malignant neoplasm of ureteric orifice C677 Malignant neoplasm of urachus C678 Overlapping malignant lesion of bladder C679 Malignant neoplasm of bladder, unspecified C680 Malignant neoplasm of urethra C681 Malignant neoplasm of paraurethral gland C688 Overlapping malignant lesion of urinary organs C689 Malignant neoplasm of urinary organ, unspecified	
Melanoma	
C430 Malignant melanoma of lip C431 Malignant melanoma of eyelid, including canthus C432 Malignant melanoma of ear and external auricular canal C433 Malignant melanoma of other and unspecified parts of face C434 Malignant melanoma of scalp and neck C435 Malignant melanoma of trunk C436 Malignant melanoma of upper limb, including shoulder C437 Malignant melanoma of lower limb, including hip C438 Overlapping malignant melanoma of skin C439 Malignant melanoma of skin, unspecified	1620 Excision of lesion(s) of skin and subcutaneous tissue 1662 Excision, eyelid 1663 Excision, ear 1664 Excision, lip
Lung	
Any neoplasm code (C00 to D48) to ensure lung primary and secondaries are detected. Lung tumour stream codes listed below: C33 Malignant neoplasm of trachea C340 Malignant neoplasm of main bronchus C341 Malignant neoplasm of upper lobe, bronchus or lung C342 Malignant neoplasm of middle lobe, bronchus or lung C343 Malignant neoplasm of lower lobe, bronchus or lung C348 Overlapping malignant lesion of bronchus and lung C349 Malignant neoplasm of bronchus or lung, unspecified C384 Malignant neoplasm of pleura C390 Malignant neoplasm of upper respiratory tract, part unspecified C398 Overlapping malignant lesion of respiratory and intrathoracic organs C399 Malignant neoplasm of ill-defined sites within the respiratory system C450 Mesothelioma of pleura C451 Mesothelioma of peritoneum C452 Mesothelioma of pericardium C457 Mesothelioma of other sites C459 Mesothelioma, unspecified D021 Carcinoma in situ of trachea D022 Carcinoma in situ of bronchus and lung D023 Carcinoma in situ of other parts of respiratory system D024 Carcinoma in situ of respiratory system, unspecified D142 Benign neoplasm of trachea D143 Benign neoplasm of bronchus and lung D144 Benign neoplasm of respiratory system, unspecified D190 Benign neoplasm of mesothelial tissue of pleura D191 Benign neoplasm of mesothelial tissue of peritoneum D197 Benign neoplasm of mesothelial tissue of other sites D199 Benign neoplasm of mesothelial tissue, unspecified D381 Neoplasm of uncertain or unknown behaviour of trachea, bronchus and lung D382 Neoplasm of uncertain or unknown behaviour of pleura D385 Neoplasm of uncertain or unknown behaviour of other respiratory organs D386 Neoplasm of uncertain or unknown behaviour of respiratory organ, unspecified	0551 Partial resection of lung 0552 Lobectomy of lung 0553 Pneumonectomy
Gynaecological	

Diagnosis codes		Procedure codes
C510	Malignant neoplasm of labium majus	1243 Oophorectomy
C511	Malignant neoplasm of labium minus	1244 Other excision procedures on ovary
C512	Malignant neoplasm of clitoris	1252 Salpingo-oophorectomy
C518	Overlapping malignant lesion of vulva	1268 Abdominal hysterectomy
C519	Malignant neoplasm of vulva, unspecified	1269 Vaginal hysterectomy
C52	Malignant neoplasm of vagina	1282 Excision procedures on vagina
C530	Malignant neoplasm of endocervix	1292 Vulvectomy
C531	Malignant neoplasm of exocervix	1293 Other excision procedures on vulva, perineum or clitoris
C538	Overlapping malignant lesion of cervix uteri	
C539	Malignant neoplasm of cervix uteri, unspecified	
C540	Malignant neoplasm of isthmus uteri	
C541	Malignant neoplasm of endometrium	
C542	Malignant neoplasm of myometrium	
C543	Malignant neoplasm of fundus uteri	
C548	Overlapping malignant lesion of corpus uteri	
C549	Malignant neoplasm of corpus uteri, unspecified	
C55	Malignant neoplasm of uterus, part unspecified	
C56	Malignant neoplasm of ovary	
C570	Malignant neoplasm of fallopian tube	
C571	Malignant neoplasm of broad ligament	
C572	Malignant neoplasm of round ligament	
C573	Malignant neoplasm of parametrium	
C574	Malignant neoplasm of uterine adnexa, unspecified	
C577	Malignant neoplasm of other specified female genital organs	
C578	Overlapping malignant lesion of female genital organs	
C579	Malignant neoplasm of female genital organ, unspecified	
C58	Malignant neoplasm of placenta	
Head and neck		
C000	Malignant neoplasm of external upper lip	Head and Neck
C001	Malignant neoplasm of external lower lip	0303 Excision procedures on external ear
C002	Malignant neoplasm of external lip, unspecified	0312 Excision procedures on eardrum or middle ear
C003	Malignant neoplasm of upper lip, inner aspect	0317 Excision procedures on ossicles of ear
C004	Malignant neoplasm of lower lip, inner aspect	0323 Mastoidectomy
C005	Malignant neoplasm of lip, unspecified, inner aspect	0324 Other excision procedures on mastoid or temporal bone
C006	Malignant neoplasm of commissure of lip	0331 Excision procedures on inner ear
C008	Overlapping malignant lesion of lip	0376 Excision procedures on nasal turbinates
C009	Malignant neoplasm of lip, unspecified	0377 Removal of intranasal lesion
C01	Malignant neoplasm of base of tongue	0378 Other excision procedures on nose
C020	Malignant neoplasm of dorsal surface of tongue	0385 Intranasal removal of polyp from nasal sinuses
C021	Malignant neoplasm of border of tongue	0386 Other excision procedures on nasal sinuses
C022	Malignant neoplasm of ventral surface of tongue	0392 Excision procedures on tongue
C023	Malignant neoplasm of anterior two-thirds of tongue, part unspecified	0397 Excision procedures on salivary gland or duct
C024	Malignant neoplasm of lingual tonsil	0403 Excision of lesion of mouth or palate
C028	Malignant neoplasm of overlapping lesion of tongue	0404 Other excision procedures on mouth, palate or uvula
C029	Malignant neoplasm of tongue, unspecified	0412 Tonsillectomy or adenoidectomy
C030	Malignant neoplasm of upper gum	0413 Other excision procedures on tonsils or adenoids
C031	Malignant neoplasm of lower gum	
C039	Malignant neoplasm of gum, unspecified	
C040	Malignant neoplasm of anterior floor of mouth	
C041	Malignant neoplasm of lateral floor of mouth	
C048	Overlapping malignant lesion of floor of mouth	
C049	Malignant neoplasm of floor of mouth, unspecified	
C050	Malignant neoplasm of hard palate	
C051	Malignant neoplasm of soft palate	
C052	Malignant neoplasm of uvula	
C058	Overlapping malignant lesion of palate	
C059	Malignant neoplasm of palate, unspecified	
C060	Malignant neoplasm of cheek mucosa	
C061	Malignant neoplasm of vestibule of mouth	
C062	Malignant neoplasm of retromolar area	

Diagnosis codes		Procedure codes
C068	Overlapping malignant lesion of other and unspecified parts of mouth	0420 Pharyngectomy
C069	Malignant neoplasm of mouth, unspecified	0421 Other excision procedures on pharynx
C07	Malignant neoplasm of parotid gland	0524 Laryngectomy
C080	Malignant neoplasm of submandibular gland	0525 Other excision procedures on larynx
C081	Malignant neoplasm of sublingual gland	Haematological
C088	Overlapping malignant lesion of major salivary glands	0806 Excision procedures on lymph node of neck
C089	Malignant neoplasm of major salivary gland, unspecified	Skin/Plastics
C090	Malignant neoplasm of tonsillar fossa	1620 Excision of lesion(s) of skin and subcutaneous tissue
C091	Malignant neoplasm of tonsillar pillar (anterior)(posterior)	1626 Microscopically controlled excision of lesion(s) of skin
C098	Overlapping malignant lesion of tonsil	1630 Excision of ulcer or sinus of skin and subcutaneous tissue
C099	Malignant neoplasm of tonsil, unspecified	1662 Excision, eyelid
C100	Malignant neoplasm of vallecula	1663 Excision, ear
C101	Malignant neoplasm of anterior surface of epiglottis	1664 Excision, lip
C102	Malignant neoplasm of lateral wall of oropharynx	1699 Resection of mandible
C103	Malignant neoplasm of posterior wall of oropharynx	1700 Resection of maxilla
C104	Malignant neoplasm of branchial cleft	1701 Resection of other facial bone
C108	Overlapping malignant lesion of oropharynx	1703 Osteotomy or ostectomy of zygoma
C109	Malignant neoplasm of oropharynx, unspecified	1704 Osteotomy or ostectomy of zygoma with internal fixation
C110	Malignant neoplasm of superior wall of nasopharynx	1705 Osteotomy or ostectomy of mandible or maxilla
C111	Malignant neoplasm of posterior wall of nasopharynx	1706 Osteotomy or ostectomy of mandible or maxilla with internal fixation
C112	Malignant neoplasm of lateral wall of nasopharynx	1707 Osteotomy or ostectomy of mandible or maxilla, procedures in combination
C113	Malignant neoplasm of anterior wall of nasopharynx	1708 Osteotomy or ostectomy of mandible or maxilla with internal fixation, procedures in combination
C118	Overlapping malignant lesion of nasopharynx	
C119	Malignant neoplasm of nasopharynx, unspecified	
C12	Malignant neoplasm of pyriform sinus	
C130	Malignant neoplasm of postcricoid region	
C131	Malignant neoplasm of aryepiglottic fold, hypopharyngeal aspect	
C132	Malignant neoplasm of posterior wall of hypopharynx	
C138	Overlapping malignant lesion of hypopharynx	
C139	Malignant neoplasm of hypopharynx, unspecified	
C140	Malignant neoplasm of pharynx, unspecified	
C142	Malignant neoplasm of Waldeyer ring	
C148	Overlapping malignant lesion of lip, oral cavity and pharynx	
C300	Malignant neoplasm of nasal cavity	
C301	Malignant neoplasm of middle ear	
C310	Malignant neoplasm of maxillary sinus	
C311	Malignant neoplasm of ethmoidal sinus	
C312	Malignant neoplasm of frontal sinus	
C313	Malignant neoplasm of sphenoidal sinus	
C318	Overlapping malignant lesion of accessory sinuses	
C319	Malignant neoplasm of accessory sinus, unspecified	
C320	Malignant neoplasm of glottis	
C321	Malignant neoplasm of supraglottis	
C322	Malignant neoplasm of subglottis	
C323	Malignant neoplasm of laryngeal cartilage	
C328	Overlapping malignant lesion of larynx	
C329	Malignant neoplasm of larynx, unspecified	
Thyroid		
Malignant		0113 Parathyroidectomy
C73	Malignant neoplasm of thyroid gland	0114 Thyroidectomy
C750	Malignant neoplasm of parathyroid gland	
Benign		
D34	Benign neoplasm of thyroid gland	
D351	Benign neoplasm of parathyroid gland	
Brain and CNS		
Brain and CNS Primary		0015 Removal of intracranial lesion
C690	Malignant neoplasm of conjunctiva	0016 Other intracranial excision
C691	Malignant neoplasm of cornea	0017 Skull base surgery for lesion
C692	Malignant neoplasm of retina	0080 Removal of lesion of nerve

Diagnosis codes	Procedure codes
<p>C693 Malignant neoplasm of choroid C694 Malignant neoplasm of ciliary body C695 Malignant neoplasm of lacrimal gland and duct C696 Malignant neoplasm of orbit C698 Overlapping malignant lesion of eye and adnexa C699 Malignant neoplasm of eye, unspecified C700 Malignant neoplasm of cerebral meninges C701 Malignant neoplasm of spinal meninges C709 Malignant neoplasm of meninges, unspecified C710 Malignant neoplasm of cerebrum, except lobes and ventricles C711 Malignant neoplasm of frontal lobe C712 Malignant neoplasm of temporal lobe C713 Malignant neoplasm of parietal lobe C714 Malignant neoplasm of occipital lobe C715 Malignant neoplasm of cerebral ventricle C716 Malignant neoplasm of cerebellum C717 Malignant neoplasm of brain stem C718 Overlapping malignant lesion of brain C719 Malignant neoplasm of brain, unspecified C720 Malignant neoplasm of spinal cord C721 Malignant neoplasm of cauda equina C722 Malignant neoplasm of olfactory nerve C723 Malignant neoplasm of optic nerve C724 Malignant neoplasm of acoustic nerve C725 Malignant neoplasm of other and unspecified cranial nerves C728 Overlapping malignant lesion of brain and other parts of central nervous system C729 Malignant neoplasm of central nervous system, unspecified</p> <p>Brain and CNS Secondaries C793 Secondary malignant neoplasm of brain and cerebral meninges C794 Secondary malignant neoplasm of other and unspecified parts of nervous system</p>	<p>0082 Other neurectomy 0161 Excision procedures on eyeball 0170 Keratectomy 0171 Excision of lesion of limbus 0181 Other excision procedures on sclera 0189 Excision procedures on iris, ciliary body or anterior chamber 0207 Vitrectomy 0226 Other excision procedures on orbit</p>
Oesophago-gastric	
<p>Gastro-oesophageal C150 Malignant neoplasm of cervical part of oesophagus C151 Malignant neoplasm of thoracic part of oesophagus C152 Malignant neoplasm of abdominal part of oesophagus C153 Malignant neoplasm of upper third of oesophagus C154 Malignant neoplasm of middle third of oesophagus C155 Malignant neoplasm of lower third of oesophagus C158 Overlapping malignant lesion of oesophagus C159 Malignant neoplasm of oesophagus, unspecified C160 Malignant neoplasm of cardia C161 Malignant neoplasm of fundus of stomach C162 Malignant neoplasm of body of stomach C163 Malignant neoplasm of pyloric antrum C164 Malignant neoplasm of pylorus C165 Malignant neoplasm of lesser curvature of stomach, unspecified C166 Malignant neoplasm of greater curvature of stomach, unspecified C168 Overlapping malignant lesion of stomach C169 Malignant neoplasm of stomach, unspecified</p>	<p>Oesophagectomy 0858 Oesophagectomy by abdominal and thoracic mobilisation 0859 Oesophagectomy by abdominal and cervical mobilisation 0860 Oesophagectomy by abdominal and transthoracic mobilisation</p> <p>Gastrectomy 0875 Partial gastrectomy 0877 Selective vagotomy with partial gastrectomy 0878 Selective vagotomy with partial gastrectomy following previous procedure for peptic ulcer disease 0879 Other gastrectomy</p>
Pancreatic	
<p>C250 Malignant neoplasm of head of pancreas C251 Malignant neoplasm of body of pancreas C252 Malignant neoplasm of tail of pancreas C253 Malignant neoplasm of pancreatic duct C254 Malignant neoplasm of endocrine pancreas C257 Malignant neoplasm of other parts of pancreas C258 Overlapping malignant lesion of pancreas</p>	<p>0978 Pancreatectomy</p>

Diagnosis codes		Procedure codes
C259	Malignant neoplasm of pancreas, part unspecified	
Liver and biliary tract		
C220	Liver cell carcinoma	<i>Liver excisions</i> <i>Selected procedures in blocks:</i> 0953 Excision procedures on liver 3041400 Excision of lesion of liver 3041500 Segmental resection of liver 3041800 Lobectomy of liver 3042100 Trisegmental resection of liver 9034600 Total hepatectomy 0954 Repair procedures on liver 9031700 Transplantation of liver
C221	Intrahepatic bile duct carcinoma	
C222	Hepatoblastoma	
C223	Angiosarcoma of liver	
C224	Other sarcomas of liver	
C227	Other specified carcinomas of liver	
C229	Malignant neoplasm of liver, unspecified	
C23	Malignant neoplasm of gallbladder	
C240	Malignant neoplasm of extrahepatic bile duct	
C241	Malignant neoplasm of ampulla of Vater	
C248	Overlapping malignant lesion of biliary tract	
C249	Malignant neoplasm of biliary tract, unspecified	
C787	Secondary malignant neoplasm of liver and intrahepatic bile duct code by liver excision procedures	