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Subregional nurse-led oncology services supported by an outreach oncology team: building an optimal service framework

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Introduction

This is a quality improvement project involving the Bendigo Cancer Centre at Bendigo Health and the Kerang District Health Service (KDHS) and Swan Hill District Health Service (SHDH). The project aims to describe and explore how to optimise the subregional oncology services in KDHS and SHDH and the integrated support for these from an outreach oncology service of Bendigo Health.

The intended outcome is to use this information to reach consensus about a subregional oncology service framework relative to the above sites and to develop a formal Memorandum of Understanding (MOU), and schedule governing the service relationships.

The project was undertaken using a participatory action planning approach that engaged many participants from the relevant health services and communities, to reach an agreement on the project directions, tools and methods. The project further gathered and reflected on information to inform a new service framework. This includes considering how the outreach services and subregional oncology services can be optimised in a way that addresses everyone's needs and does so in a sustainable way.

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Brief overview of the literature

The need for rural oncology services to address the inequalities in access to treatment and lower treatment completion by rural populations, who have higher cancer burden than metropolitan populations, has been identified(1). This is a substantial national public health issue given that progress in reducing oncology mortality in rural populations is considered inadequate(2). To address the tyranny of distance, regional cancer centres, funded by the Australian government in 2010, have been a positive investment (3). Additionally in Victoria Integrated Cancer Services operate at a regional level to promote coordinated, accessible and timely cancer care for the population.

For people in rural and remote towns to access cancer care closer to home, it is common for smaller hospitals to provide oncology services with the support of virtual and physical outreach from regional centres, shown to be successful models (3-5). However, it is still challenging to define best practice for such sub-regional cancer services with the literature identifying widespread variation in the scope of rural and remote oncology units (6, 7). There is restricted consensus-based service planning for their optimal application to address community need, and to fit with the demands (including access and sustainability issues) of both managers and health service providers.

Provider opinions about planning for subregional oncology services can widely differ. Generalists compared with specialist oncology service providers had high agreement on service principles of patients getting an expedient diagnosis, high quality specialist treatment and well-coordinated care with effective cross-team communication. But they had very different views about practicalities of implementing rural oncology services to maximise service access, manage risk and ensure high quality (8). The Cancer Institute identifies that optimal service planning needs to consider governance, coordination, integration between specialist and primary care services and quality improvement systems, although rural oncology service planning is often piecemeal, where rural oncology services across a regional catchment can be fragmented or at minimum, poorly understood as a whole system of care (9).

Although there has been some work on remote subregional oncology service support using telehealth (virtual service support)(5), there remains limited information about specialist oncologist visiting models to support subregional oncology nurse-led units. Additionally there is limited information about the scope of practice of nurses leading care in subregional oncology units making it difficult to undertake workforce planning, staff training and development for these units. There is also a need for information about outreach oncology specifically given that it is relatively commonly subscribed by non-GP specialists in Australia (10). One study of regional hospitals showed that 41%

with oncology units had access to visiting oncologist services, and visits varied from weekly to 6 monthly and oncologist availability decreased with increasing remoteness. A high proportion (61%) of rural health services had nurse-led oncology services.(7) The oncologist support for subregional sites is inherent to ensuring patients are referred between sub-regional and regional services as needed, reviewed and that medications are authorised and managed with specialist oversight.

Outreach services work best when they are well integrated to the local context, provide real-time support between visits. However, the exact nature of visiting schedules, scope of treatments, communication processes and value of the service to all parties should be well established and understood by all stakeholders to enable transparency, the confidence of all service providers and good experiences and outcomes for patients (11, 12). One study of rural and remote outreach supported units identified there was poor communication between outreach and central clinics, delayed intervention, insufficient information meant the outreach site was left out of decisions(6).

In terms of promoting accessible, safe and high quality subregional oncology services, there is a strong need for formal consensus-based planning, appropriate governance and regular quality improvement systems. The basis for establishing any formal service framework and governance arrangements between health services is poorly studied, although in the Victorian context is critical to allay the potential quality and safety issues that happen when subregional patients may move between one service, region and chain of services, to another as part of their cancer journey. Having formal agreement and well-planned service processes had the potential to improve patient experiences and health outcomes.

The focus of this study is on nurse-led oncology units in KDHS and SHDH services, supported by an oncology outreach service model from the Bendigo Regional Cancer Centre (Box 1). The sites were chosen as they had a common objective to improve understanding of and to optimise the subregional service, establish a service framework and formal governance arrangement. Additionally, the project was viewed as an avenue for informing the optimisation of subregional cancer service models more broadly, as part of Loddon Mallee Integrated Cancer Service (LMICS)'s work to implement the Victorian Cancer Plan locally and inform the state health Department and other integrated cancer services interested in options for subregional model enhancements.

Box 1 The model of service under review

Outreach oncologist and oncology nurse practitioner and clinical support staff travel by car from Bendigo, central Victoria (a town of around 100,000 population), to KDHS (town of 4,000)) which is 1.5 hours' drive away from their base practice, once per fortnight.

Subregional nurses in Swan Hill (employed in SHDH) (a town of around 10,000) travel 40 minutes to KDHS to attend the clinic fortnightly. Nurses meet with outreach providers for a face to face handover for 20 mins.

A day long oncology clinic ensues in KDHS, coupled with administration of paperwork and verbal hand over for all patients being treated at the KDHS and SHDH. The SHDH nurses return to SHDH to administer treatments. Patients and carers attend both services from the broad sub region with the longest travel time for patients 1.5 hours.

The outreach oncologists prescribe the anti-cancer agents by completing drug orders. Pharmacy orders are faxed later from Bendigo Health to subregional sites. If there are any adverse events, the nurses in these sites contact the oncologist or nurse practitioner to notify and take advice.

The team providing the outreach clinic fortnightly alternates every 2nd fortnight. It includes two oncologists in one rotation and an oncologist and nurse practitioner in the second rotation. The outreach oncologist or their back up staff at Bendigo Cancer Centre provide ad-hoc and after-hours support between visits.

The nurses at subregional sites administer the chemotherapy and other agents to patients for the duration of the treatment regime.

Methods

The project used a participatory action planning cycle which involved the participants in all stages of project development, data collection, reflection, and action. This meant that the concept of the project was stimulated from both the regional and subregional services, the background and rationale for the project was presented to all service CEOs, directors of clinical services, nursing unit managers and the service providers in the outreach and nurse-led units. The logic model was subsequently revised and re-circulated. At all stages, participants were able to comment on the data collection and provide feedback, as well as allowing the researchers to contact participants for further data collection, or more in-depth exploration. The intention was for this method to promote engagement, shared learning and to create practical outputs, for a real-world translation of the findings. The benefits of these planning methods have been described elsewhere as appropriate for dynamic planning of complex multi-site, multi-stakeholder issues that rely on strong engagement for solution-building(13).

Ethics was approved in each health and hospital service involved as project number LNR/17/BHCG/61.

Data collection involved face to face semi-structured one hour interviews with all participants using tailored tools for feedback on items relevant to each of the executive decision-makers, clinicians and service administrators in all sites. To explore

the qualities of the services, the tool was based on key indicators as defined by Clinical Oncological Society of Australia (COSA) standards(14), oncology nursing competencies (15, 16), optimal care pathways(17) and practice standards for rural outreach services identified in the published literature(18-25). They covered the outreach visits, the referrals process, treatments, pharmacy, nurse staffing, support and education, emergency management, primary care, service quality improvements, and risk and clinical governance, sustainability and costs.

Interviews were conducted in two cycles. The first was broad and covered all items, and asked participants on each item: "what happens now" and "is there anything that could be done better".

Results were recorded by two interviewers as written notes during the interview, not de-identified as stakeholder views were considered important to the project deliverables and this was consented as part of project ethics.

The written notes were then perused by four team members, including the two interviewers, and two others with strong rural health service planning experience, who reflected openly on the overall material during two meetings and discussed emerging themes.

Following these meetings, the results were thematically coded, further discussed in team meetings to refine and agree key themes and the elements which should underpin the components for a service framework and formal governance agreement.

Additionally, the aspects of the service as they were working now, and those that could be optimised were clearly summarised.

The second stage involved further interviews to gather more targeted information about the more detailed aspects of the service: the referral of patients to subregional sites, the specific oncology treatments, the exact staffing and protocols expected, the communication, the financial aspects of the services, workforce planning and oncologist willingness to trial different models of service delivery.

Medical records of all patients treated in KDHS and SHDH over a 12 month period (1 July 2016- 30 June 2017) were audited. And a random sample of these patient's files were also audited at the Regional Cancer Centre capturing the major cancer streams colorectal, breast, genitourinary, gastrointestinal. Data extraction was performed using the MedTech database and Information Patient Management systems (IPM).

The Medical record audit aimed to describe the characteristics of patients being treated and they treatment journey relative to current guidelines including optimal care pathways (OCP) and the findings from the service mapping interviews (17). The audit further evaluated identified the completeness of patient information available at different sites.

A review of broader administrative datasets was conducted to identify service volumes, trends and additional themes. These included the Victorian Admitted Episode Dataset and the Bendigo Health MedTech database.

Results

The results are presented in the following order. Part A - initial interview findings, Part B - the file audit and Part C - further interviews. The broader administrative data is integrated throughout the report.

Part A: Initial interview themes

1. Relationships, trust and community value

Strong trust and respectful relationships were evident between all staff involved in the service which had developed from the continuity of their coordinated service delivery… "Longer term staff helps" (outreach oncologist). The oncology nurses at both subregional sites loved their roles "It's rewarding and satisfying and we'd like to have more patients". The outreach oncologist agreed "I enjoy being part of the visiting team … and seeing the patient satisfaction from receiving treatment close to home". The outreach nurse practitioner suggested: "We love it because the patients are grateful, it's rewarding, and they get treatment closer to home."

There was strong social accountability to rural community (by outreach oncologists and staff in the subregional sites). Though managers at all sites thought the subregional oncology service may not be cost-effective, they wanted to see the service grow for servicing their local communities. They recognised that growth was bound by the available treatment infrastructure, staff, chairs and health service financing models.

2. Meeting face to face outreach location

All clinicians valued the face to face time during outreach visits. Telehealth was seen as a potential backup option but not able to wholly replace the face to face clinic. The subregional nurses at SHDH were willing to travel to KDHS, where the outreach team visited, but preferred the oncologists visited their site, noting the potential option of flying the oncologist in. However, not all oncologists were interested in longer travel to SHDH "not keen to go…" (citing reasons of time away from family, dead time driving).

3. Staff and workforce planning

The number of oncology nurses in subregional chemotherapy units varied. SHDH had two nurses available and KDHS had transitioned to a sole practitioner nurse model.

The subregional hospital managers and Nursing Unit Managers noted that there were not enough local nurses to recruit to the oncology service even though they were targeting recruitment at acute ward staff. More nurses were needed to cover the basic service and for leave (without having to close chairs). The subregional services wanted a bigger local oncology nurse staff pool and the outreach oncologist considered this important however a challenge to gain suitable and interested nurses

without a workforce planning strategy. "It would be optimal to have two nurses at each site for support, back up, sick, holiday leave and increased utilisation of the service".

4. Communication and information transfer

All participants agreed that the communication and information transfer systems could be improved. The outreach oncologist commonly initiates the primary referral from the regional service to the subregional service for relevant patients verbally (phone or face to face) to KDHS and SHDH or during the outreach visit. A typed correspondence letter followed, sent by mail, though this was often delayed "up to four to six weeks" (Oncology nurse subregional). The time-lag in the official referral necessitated nurses doing 'work arounds', typically contacting the oncology secretary at the Regional Cancer Centre for a fax or email copy to enable treatment which took up valuable clinical work time. Equally, the treatment completion at KDHS and SHDH was not always communicated to the Regional Cancer Centre.

Neither Oncologist correspondence nor treatment information at hospital level often did not make it to the GP. One GP recommended that "Information transfer could be improved if the hospitals used software aligned with the software used by the General Practice surgery" (GP, KDHS)

During outreach visits, the oncologist did a 20 minute, pre-scheduled verbal handover to nurses from SHDH. Nurses in KDHS only had informal handovers during the outreach visit and asked ad hoc questions like clarifying drug chart orders. SHDH nurses suggested "this time is satisfactory for our needs."

The community based pharmacist at KDHS sometimes received the drug charts but other times had to email the Regional Cancer Centre to request these charts by fax and hard copy. Both sub-regionals services found the scheduling of patients for treatment was "challenging to fit in the update to drug chart with current oncologist outreach visits occurring on a Thursday". This was particularly if there were any changes to treatment regimes, delay of treatments, significant patient travel time to arrange or short expiry on prescribed chemo agent.

5. Decisions about referring patients to the sub-region

Participants all agreed that the decision about referring patients to the subregion was judged at discretion of the oncologist in liaison with the oncology nurses at the sites. The oncologist decision was not written down but considered to be based on the patient's needs (privacy, local access, cost, travel, and getting more timely treatment), the scope of practice and confidence of subregional nurses "the [subregional nurses, SHDH] lack confidence with infusion reactions" (outreach oncologist). "I'm happy for any type of chemo to be delivered in [KDHS] that [nurse] feels comfortable to deliver" (outreach oncologist).

The nurses self-monitored their scope of work, "working within my comfort zone" and achieved delivery of more complex treatments by administering these on the day of the outreach visit, when the oncologist was present (KDHS).

The oncologists and nurses noted patient exclusions were, "based around patient safety" parameters of: chemotherapy with short expiry (less than four hours); previous reactions; complex treatments i.e. requiring long admissions, multi day and high risk therapies.

All participants thought it would be useful to have a common understanding, formally documented about patients eligible and excluded from referral (and any caveats), as decided in liaison with the visiting oncologist.

6. Complexity of care

A range of tumours were treated in KDHS and SHDH including common ones: breast; prostate & bladder; lung and colon/rectal and less common: pancreatic; mesothelioma; ovarian; glioma. Treatment intent varied from curative through to palliation. For the majority of new patients oncology nurses reported that "the first cycle of treatment is administered at the regional service". The oncology nurses conferred that they administered the following cluster of anti-cancer treatments:

- Chemotherapy agents –notably Taxanes, Anthracyclines and other including vesicants ('platin's)
- Biologic agents (including Immunotherapies/ Targeted therapies- ('Mab,))
- Supportive therapies

Therapies were administered via the following routes to include: oral, IV, Central Venous Access Device (CVAD). The nurses also managed ongoing maintenance of peripherally inserted central catheter (PICC) and PORTs (Tier 2 funded activity).

7. Safety, medical backup and emergency care

At KDHS doses were checked with the assistance of an acute ward registered nurse (Registered Nurse (RN) that is not oncology trained) as there was only one oncology-trained nurse. Medications were reviewed according to the dose on drug chart, and by nurses checking the eviQ[1] protocols online. The local site pharmacist did a "Slade triple check".

Any adverse events at both sites were reported immediately to the outreach oncologist via phone, then the local Director of Nursing (DON), the GP on call or patient's own GP, then documented in the medical record and submitted via the Victorian Health Incident Management System (VHIMS). All VHIMS events were then reported to Chief Medical Officer (CMO) at sites monthly or as necessary at the other subregional service. One oncologist noted "be useful to agree the communication

[1] eviQ Online resource of evidence based cancer treatment protocols to support health professionals in delivery of care.

for urgent and non-urgent situations…this could cut down on the number of phone calls and triage them more appropriately for oncologists".

Emergency staff back up varied between the sites based on available staff. SHDH used regularly rotating junior hospital doctors who were supported by stable senior hospital physician/s and several visiting GPs. KDHS used an Urgent Care Centre staffed by nurses with a single visiting GP in the community who managed all oncology issues. The hospital managers in KDHS noted the plans were to transition to a wholly nurse-led model yet the outreach oncologist thought the GP leadership for oncology care in KDHS was optimal for safety and quality. The outreach oncologist and Regional Cancer Centre wanted more clear information and consensus about emergency systems that were fit for purpose and upheld in the face of changes in hospital emergency staff of models.

Sites used protocols for Febrile Neutropenia (FN) that were accessible in paper and electronic format (Prompt) in Urgent Care, ED oncology and inpatient wards. The process for managing FN at sites, whereby the junior hospital doctors and on call GPs contacted the outreach oncologist by phone if they needed support or if a patient was admitted to the hospital on active treatment. To support them, the oncology unit provided them with a list of patients on active treatment, starting new treatments and relevant toxicity information. Nurses at SHDH took steps to minimise the risks and when aware that a high risk treatments were being administered or the patient had a history of hypersensitivity, by notifying local GPs and ensuring they had relevant drugs available and crash cart accessible. Patients in the sub-region were also given information about toxicities and self-taught to present and inform Emergency Department or Urgent Care in the case of an adverse event. The Emergency Department had access to the central medical record with scanned copies of the patient's oncology treatment history.

8. Training and professional support

In KDHS the nurses "delivered internal seminars to ward staff on FN, PICC and PORT maintenance". This was not occurring in SHDH.

Professional support for nurses was ad hoc and informal overall, limited by available time during each outreach visit and demands of clinical work. The oncologists answered any questions which the nurses had during the outreach visit, but there were no formal professional upskilling sessions. Support is also provided throughout the year via telephone conversations with oncology nurses in the Regional Cancer Centre.

In both sites the Oncology Nurses were working in isolation as the only nurses with formal training necessitating the importance of them being across new developments in cancer care. The oncology nurses maintained their competencies, driven by their enjoyment of the job and desire to provide optimal care to patients, rather than a formal professional development plan (with NUMs of DONs). One had completed the regional chemotherapy course, CVADS every 12 months, routinely complete the EVIQ (also facilitator for EVIQ), attended study days and sought additional work experience at the Regional Cancer Centre. However, more formal education was sought on special topics, support for technical skills and more networked peer support regionally.

At KDHS there were two other oncology educated nurses working casually, not routinely in the unit. Only one of the NUMs was planning to support nurse training in oncology.

The outreach oncologist team had a limited sense of nursing skills and scope of practice, but one suggested "formal assessment" and "spending another day at the sites" to get a better idea would help them to provide more targeted support for up-skilling. Another suggested "specific education, including a mixture of online and face to face training" might be good.

Both services were supported by experienced pharmacists (10 to 20 years' oncology-related experience). They followed strict protocols for practice-pharmacy act guidelines and hospital prompt (regional). Both individuals indicated they were "working within their comfort zone for advanced clinical practice".

9. Other aspects of quality of care

Subregional sites reported that their patients were not able to access to the full suite of high quality cancer care such as Multi-disciplinary Meeting (MDM) treatment recommendations, nurse MDM participation, clinical trial access nor full range of supportive care. Many staff raised that access to the same quality of service as provided in the Regional Cancer Centre was important, but it competed with other more immediate priorities like managing the service volume.

The hospital Chief Executive Officers (CEOs) and NUMs noted that the oncology unit participated in hospital-level quality improvement and reporting processes. The oncology nurses however, reported doing a range of problem based quality improvement on the job, rather than as part of a formal "review and improve the service" routine. However, the outreach oncologists didn't know about any quality improvement in the KDHS and 2 units, nor did they have any input about this. Further they were not systematically reviewing and engaging in improving the quality of outreach service, mainly due to lack of time "not enough time to review and improve the booking process".

10. Infrastructure

There was evidence of old, decrepit oncology units in the sub-region, with limited space around the chemotherapy chairs. Whist one subregional unit had undergone a redevelopment three years ago (more chairs and storage space and planning), the computer used for clinical records was dislocated from the treatment area, was outdated and inefficient. There was also no infrastructure for e-prescribing in either site. "Ideally an electronic chemo prescribing using the same method and template would be best at all sites" (subregional nurses).

One subregional service operated within a community pharmacy model, with regular visits and close communication between the oncology nurses. The other had an onsite pharmacist. Both models communicated closely with the subregional oncology nurses.

All cytotoxic agents were purchased and couriered 100% pre-prepared by SLADE (Heidelberg), however some targeted therapies - Monoclonal Antibodies ('Mabs')

were able to be mixed up where the onsite pharmacist is based at one subregional because this service has a Laminar flow unit. Some specialised drugs were couriered from the nearest large regional pharmacy.

11. Revenue, Cost and sustainability

There are numerous old and new government (state and commonwealth) and private revenue streams that are available for cancer services. Interviews revealed that in both sites the revenue had been allocated several years ago and not necessarily revisited and tailored in an optimal way to suit the current service. Some of the available revenue streams were not described, or not described accurately.

Both sites used Medicare (MBS) billing for the oncology visits. Outreach oncologists can bill up to three patients per hour per consultant up to 20 patients within a six hour day (total 50 + patients). But one outreach oncologist stated that outreach is "Not about making money by delivering public clinics". There was flow on work from the outreach clinic to the regional cancer centre that was not well costed.

The revenue was donated back to the Regional Cancer Centre under a private practice agreement with the outreach oncologist (employed in the Regional Cancer Centre as a salaried oncologist with rights to private practice). The Regional Cancer Centre covers all costs associated with the visiting team (oncologist, nurse practitioner, administrator salary costs and travel and infrastructure costs).

Both sites used PBS arrangements to cover the costs of the eligible chemotherapy agents and other drugs.

The SHDH health service receives non-admitted funding (TIER 2), this revenue is not allocated towards the chemotherapy service.

The KDHS health service was block funded (volume of services too low to enable activity based funding). The block funding is allocated to health service priorities and KDHS includes in its priorities intravenous chemotherapy and supportive care. Further investment in oncology services needs to be balanced against other community-based service investments.

Both health services billed the private health insurer model for patients, however neither site had clarity about the revenue stream to hospital.

KDHS and SHDH cover all costs associated with the administration of the chemotherapy. This includes nursing staff, during hours and after hour's medical support, administrative support, facilities, supplies and governance.

All sites thought that the service may run at a loss to their organisation, in that the revenue generated would not cover the service costs but costs and benefits had been poorly articulated. Most interviewees noted that the benefits to the community, and sustaining access, were the over-riding concern. Subregional managers considered local chemotherapy "is a community good, rather than cost-benefit to the service". The sub-region site with WEIS funding intended to "grow the service to have enough volume to support financial benefits".

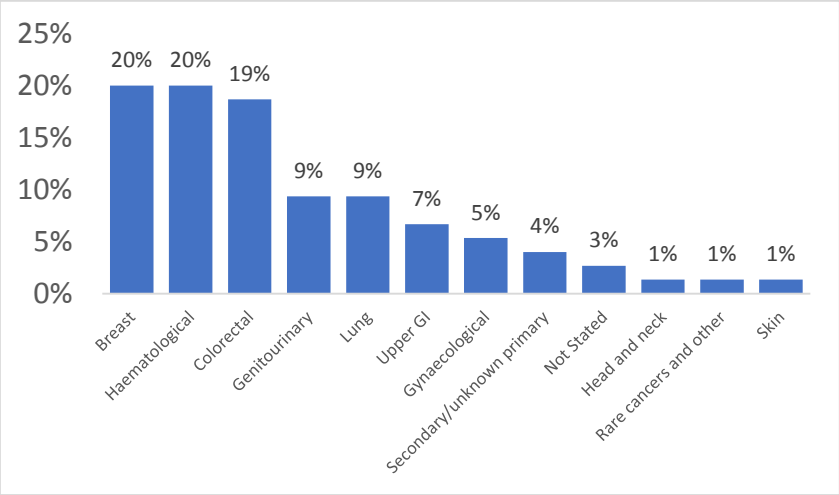
Part B: Medical record audit

The medical record audit results were largely consistent with information from interviews.

1. Cancer patient profile, treatment intent and drug classes administered

Figure 1 shows the tumour types that patients received treatment for in KDHS and SHDH combined.

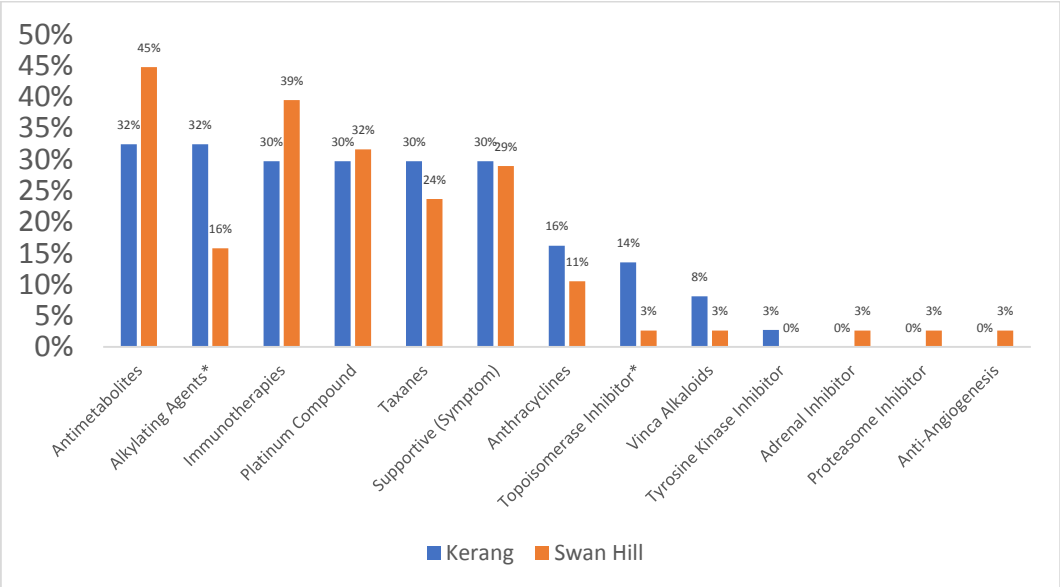
Figure 1. *Percentage of Tumour streams treated in the subregional sites, 2016-2017*



2. Types of drugs administered

Figure 2 demonstrates the types of drug classes administered at the subregional sites. A further breakdown of the regimes administered is outlined in Appendix 2.

Figure 2 *Classes of chemo therapeutic agents (by drug class) administered at the subregional sites* 2016-2017

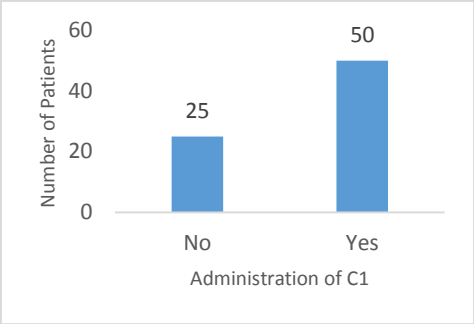


The exact treatments provided for different patient types were extracted for consideration in further interviews.

3. *First cycle of Treatment (C1)*

The file audit revealed that despite the report by interviews, the commencement of first cycle (C1) of treatment was not routinely given at the regional service. This was noted for follow up interview. Figure 3 confirms that 50 (67%) of patients in the sample, received their first cycle C1 of treatment in the subregional services.

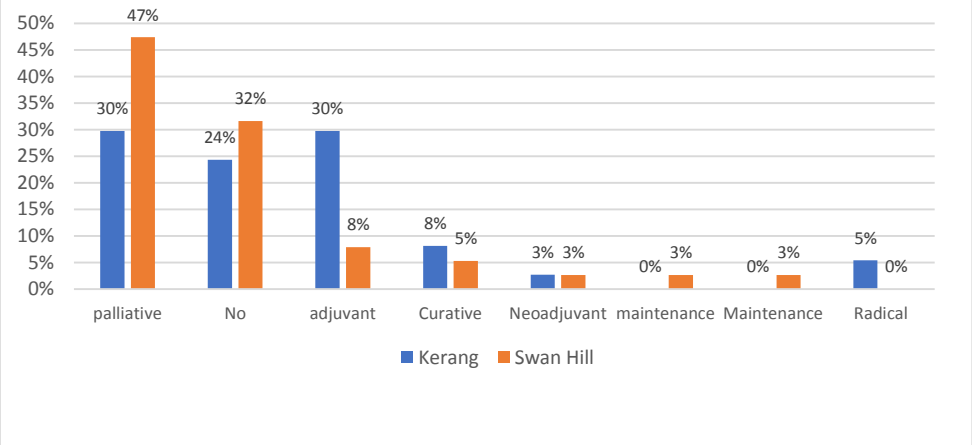
Figure 3. Number of patients receiving first cycle of clinical treatment at the subregional SHDH016-2017



4. *Treatment intent*

Figure 4 demonstrates the treatment intent at the subregional sites, predominantly palliative treatment and adjuvant therapies are the most common intention of treatment noted.

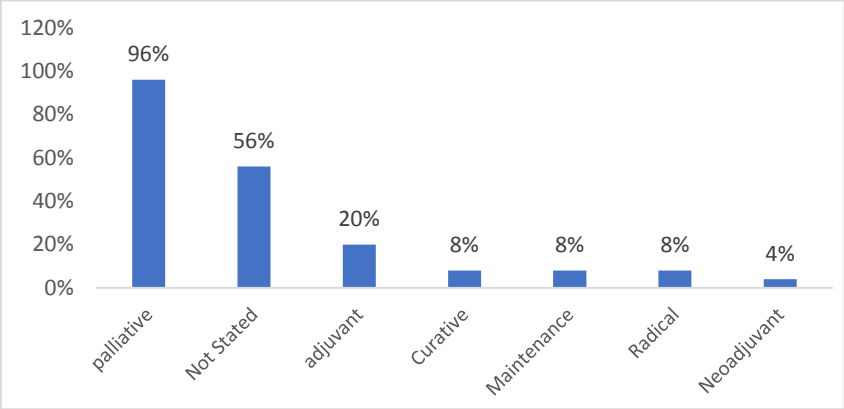
Figure 4. Treatment intention at the subregional sites, 2016-2017



5. Treatment intention C1

Figure 5 demonstrates that 96% of patients received C1 at the subregion for palliative intent, and may be keen to have treatment closer to home.

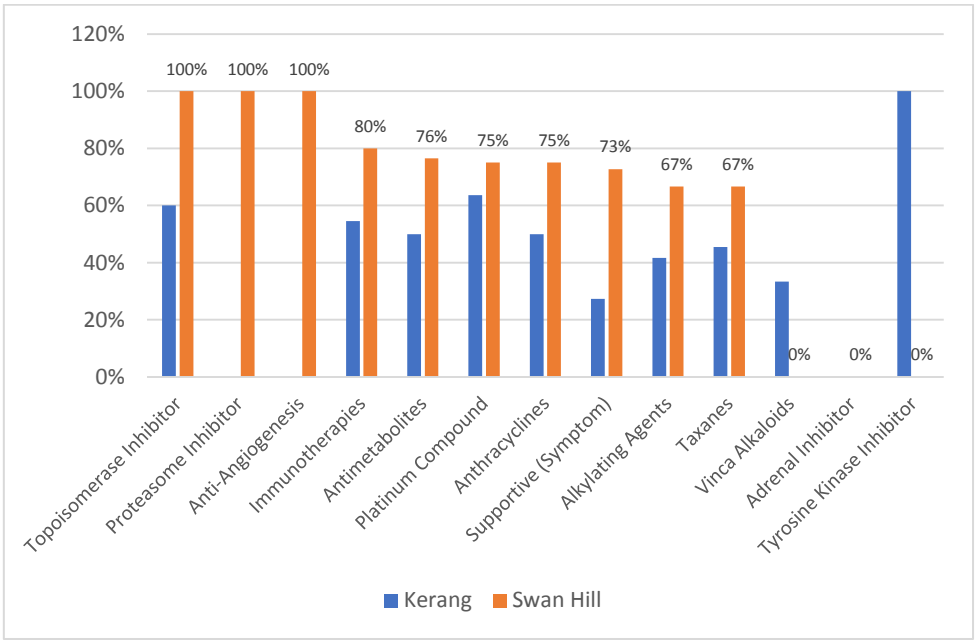
Figure 5. Treatment intention at C1 in the subregional service, 2016-2017



6. Drug classes for C1

Figure 6 provides a breakdown of the drug classes administered at C1 in the subregional sites. Variation exists between the subregional services and the volume of treatments administered as C1 therapy. SHDH was notably administering more C1 services, including taxanes 80% and some biologic agents (including immunotherapies 67%).

Figure 6. *Drug classes administered as C1 at subregional sites*



7. *Completeness of information*

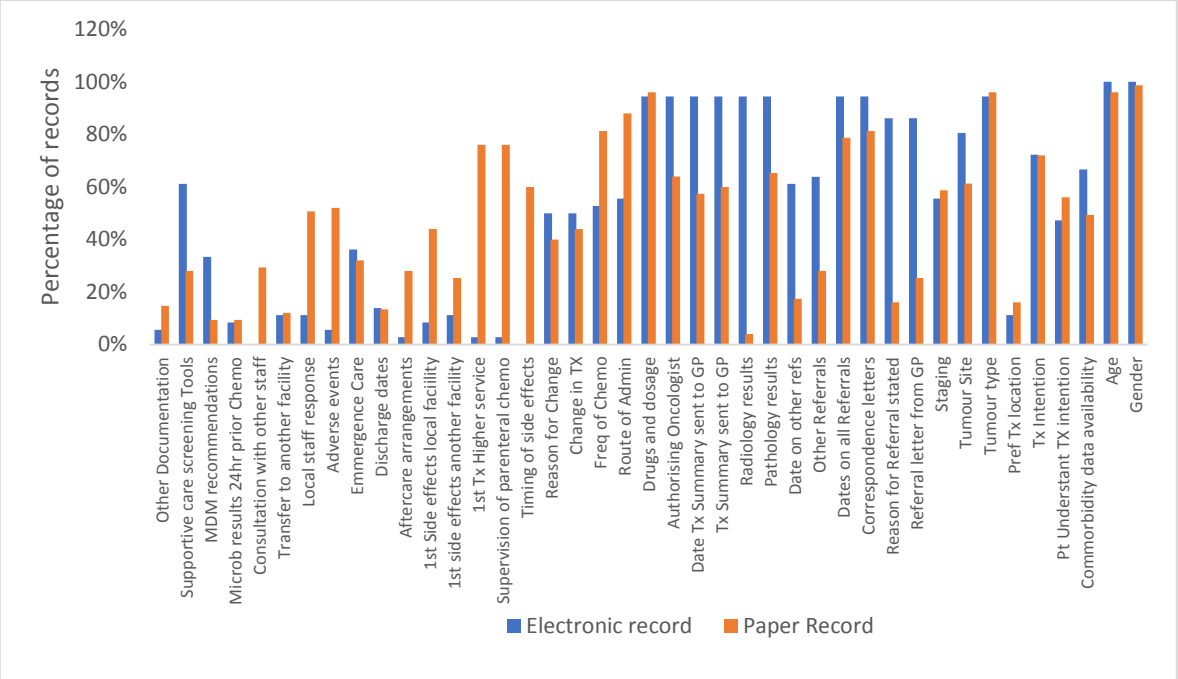
Table 1 outlines the identified gaps in information in the medical record:

Item	KDHS (n=37 records 2016-2017)	SHDH (n=38 records 2016-2017)
No GP referral	78%	71%
No radiology report	97%	95%
First treatment was at the site	59%	74%
No side effects reported	92%	58%
No pathology information	27%	71%
Discharge date not reported	81%	92%
No treatment outcomes recorded	70%	42%
No MDM recommendations recorded	97%	84%
No supportive care screening tool in record	97%	47%

8. *Information in different forms of medical record*

Figure 7 provides an overview of the information found in the medical record (electronic and paper) over the audit period. Of note are the data sources that relate to the prescribing (drug charts, correspondence and pathology and imaging results) this information was readily available to the regional service via the electronic record. However found less frequently in the paper-based medical record at the subregional site.

Figure 7. *Information found in the medical record at subregional sites, 2016-2017*



Part C: Further interviews

Additional interviews identified the following clarity:

1. Patients and treatments

Patients are deemed suitable for treatment at the subregional services based on:

a. *Workforce factors*
   - At the discretion of the oncologist in liaison with the oncology nurses at subregional sites once discussed by referral phone call or in person.
   - Based on the complexity of care relative to the nurse's skills and confidence (see c.)

b. *Patient factors*
   - Patient preference - All those eligible should to be offered choice to be treated at KDHS and SHDH with the right to opt for treatment elsewhere.
   - Patient risk assessment (see c.)

c. *Treatment considerations*
   - Treatment type (relatively low risk for complication and hypersensitivity)
   - Tumour type and pathology
   - Intention of treatment (see b.)
   - *Low risk chemotherapy* treatments include some which are of moderate risk for hypersensitivity taxanes, R-CHOP and vesicants such as anthracyclines, some biologic agents (including immunotherapy (MAB) and supportive therapies for the common cancers and some low to moderate stage haematological cancers.
   - Agreed regimens for administration at the subregional outreach services are outlined in Appendix 1.
   - Administration of low risk clinical treatments is possible in the first Cycle (C1) at subregional services where this will ease the pressure/ burden of scheduling on the Regional Cancer Centre and promote earlier treatment for patients.

d. *Special Considerations - treatments that have higher risk for hypersensitivity*
   - C1 of treatments associated with hypersensitivity, such as taxanes and biologic agents including rituximab to assess adverse drug reaction risk are excluded from administration at subregional sites unless by negotiation between lead medical oncologist and subregional nurses.
   - Subsequent doses are administered in the subregional location under supervision by the outreach provider team.
   - Table 3 outlines a range of special conditions for administration of clinical treatments that have higher risk for hypersensitivities or are deemed as more complex and labour intensive preparation for oncology nurses.
   - For patients requiring Central Venous access device as the route of chemotherapy administration, this procedure of PICC or PORT insertion is coordinated at the regional site before the patient is transferred back to the subregional service.

Table 3. *Special conditions for the administration of cycles of oncology clinical treatment in subregional sites*

Drug Class/ regime	Regional service	Subregional sites 1 and 2	Note
Taxanes	C1 & 2	C 3 and subsequent cycles	Higher risk not anaphylactoid
Rituximab	C1	C2 and subsequent cycles	
Carboplatin	C9 and subsequent cycle	C1-8	Higher risk for hypersensitivity after cycle 8
Folfurinox	C1	C 2 and subsequent cycles	Complex/ Labour intensive for nursing
All other treatment regimes	Commence C 1 in subregional		At the discretion of Med. Oncologist and subregional nurses

C1 is cycle 1, C2 is cycle 2

e. *Exclusion criteria*

- Drug classes that possess a short shelf life span
- Specific tumours such as AML, and some Lymphomas (more likely to treat in regional service because of risk of tumour lysis (requires Monitoring post chemo)
- Treatments requiring complex and increased monitoring post administration (preference for onsite Oncologist supervision)
- Some concurrent treatments that need to be delivered over numerous days requiring combined chemo and radiotherapy (i.e. 5FU)
- Treatments that require inpatient stay

f. *Flexibility in clinical treatments*

- Considered in negotiation between outreach provider and subregional services if staff skills and confidence increases. Administration of treatment for Drug class of Taxanes and R-CHOP can to be performed on visiting clinic days for outreach providers
- Whereby timing/ scheduling of patients at the regional sites is sub-optimal and timely access to treatment at subregional sites is possible and safe.
- Outreach oncologists reported that "excluding drug classes with higher risk for hypersensitivity i.e. Taxanes and rituximab (that should be given at regional unless otherwise negotiated with oncology nurses), that there was no reason why all other clinical treatments could not be administered as C1 at the subregional service through negotiation".

2. Exact staffing expected and their skills

The outreach providers' expectations were that each subregional service has a minimum of two registered nurses with oncology experience for administration and supervision, to enable back up for leave, particularly unplanned sick leave and support in the instance of an emergency. Two RNs onsite support the checking of drugs (one requires competency in oncology nursing the second RN does not need to be oncology trained).

Specific nursing skills to include are:

a. Competence in cannulation
b. Monitoring and supervision for chemotherapy administration. Baseline observations recorded 5 mins for taxanes then, 15 minutely thereafter. Direct

15 minute observation for Taxanes and anthracyclines. Vesicants require constant supervision for the duration of the infusion (normally between 2-10mins).

c. Managing emergency protocols for the management for adverse reactions or anaphylaxis
d. Activating medical back up or emergency care at subregional services for hypersensitivity reaction or FN.

The specific competencies and professional up-skilling for cancer nurses across the region need to be reviewed in light of these requirements

Other staff required

a. Managerial supervision to ensure skills to oversee and supervise an oncology service.
b. Emergency services, equipped with accessible protocols for adverse reactions, febrile neutropenia, hypersensitivities and awareness of immunotherapy side effects and management
c. GP services including a local GPs with an interest in cancer to be a coordinator for the town, with visiting rights and capacity to follow up between visits
d. Same day pathology service (results within 24-48 hours)
e. Onsite pharmacy or community pharmacy to liaise with for drug doses, checks etc.
f. Receptionists and cleaners trained in ADAC

3. The communication between sites

An agreed communication and information management plan for referrals, follow up and urgent cases. The flow of information between oncology outreach and subregional services including telehealth, e prescribing, MedTech and other IT record systems is to be subject to a separate ongoing body of work.

4. Available infrastructure to future proof units

The sites noted that the service framework for subregional oncology needed to consider the current and future growth of service infrastructure such as space, chairs and staff.

5. Fitting in around the oncologists main practice

Discussion with oncology staff revealed an open-ness to pilot video-consultation aspects of the service and to consider travel options by plane to SHDH as part of ongoing service planning.

6. Workforce planning

The interviews also identified other key project areas to progress are in workforce planning

7. The agreed costings for sustainable service

Need to consider

- Staff time at subregion
- Staff time from regional site to attend clinical and administration time
- Staff time form regional site to between visits
- Revenue from treatment to sub-regional health service
- Executive/ senior staff time to oversee and monitor

Informing the components of a Memorandum of Understanding (MOU)

Based on the information the elements for a service framework and MOU are:

1. The services involved

Identifying information – including hospitals party to this MOU, and process for any potential extension or change of the sites visited.

2. Staff and workforce planning

Core staffing and pool of workers for the outreach and subregional oncology services (including clinical supervision, medical, nursing, emergency, pharmacy): required qualifications needs to be defined.

Workforce planning expectations within each unit or as part of networked planning - to build up a flexible pool of workers for appropriately shared rosters and safety high quality service beyond current staffing (future proofing arrangements).

3. The clinical infrastructure

Clinical equipment and facilities, pharmacy and pharmaceuticals, pathology, rural GP services and supportive care.

4. The outreach clinic

Number of outreach visits, mode transport, location of visits, mobile equipment, frequency and conditions of variance of this allowed for term of contract (e.g. replace a clinic by video-consultation if agreed by all parties in writing).

Attending team, roles and responsibilities and after-hours support by visiting team.

5. Referral protocol

Clear delineation of patients/pathology/conditions eligible and excluded from treatment in subregional sites, in liaison with the consulting oncologist, with appropriate flexibility and other conditions or context provided for making these decisions.

6. Communication and information transfer

The verbal, written information and its transfer between all relevant staff at various sites and GPs in the community. This includes transfer of: - initial and subsequent referral, pharmacy drug charts treatment summaries, treatment changes, discharge summaries, treatment information - pathology, radiology, MDM recommendations, drug charts, emergency and adverse events and their outcomes.

7. Skills and scope of practice

Basic and advanced training expected of staff over the term of the SLA, including any ongoing professional development activities staff should participate in fit to the scope of the service provided and planned into the future.

8. Real-time professional support arrangements

Process for subregional staff accessing networked real-time professional support in the event of needing support for a complex situation (inclusive of oncologists, subregional oncology nurses, emergency staff, rural GPs).

9. Emergency care arrangements

Risk management protocols and emergency care practices (in oncology clinic, emergency – (GP and hospital), and pharmacy).

Local medical oversight of the subregional clinic's day to day operations defined.

10. Strategy, Clinical Governance & Quality of service

Safety – activities and standard clinical practices to manage and report adverse events, safe disposal of anticancer agents

Clinical governance framework for the subregional unit, as agreed.

Quality improvement in subregional unit, including expectation of benchmarking and quality improvement cycles. Involvement of outreach oncologist in quality improvement.

11. Costing and income flow

Current and potential revenue streams:

- WIESS
- WASE
- Small regional health service block funding
- TIER 2
- MBS
- Private health insurance
- RWAV (not currently utilised)
- Co-payments (not currently utilised)
- WIESS sharing (not currently utilised)
- NGOs (not currently utilised)
- Regional pooled funds e.g. education funds

Specific responsibility of costings for:

- Who will be remunerated (bill) and how much and infrastructure cost for travel
- For outreach oncologist (s), other outreach team members time &/or clinical services and backfill
- Oncology nurses to attend outreach clinics and back fill
- Educational support time
- Professional training required
- Real time support for staff in subregional sites
- Video consultation/ Telehealth
- Professional development costs

- Cost or benefits of flow on of patients to regional cancer centre
- Pharmacy
- Emergency services back up at subregional sites
- Supportive care services

Discussion

This project uniquely applied participatory action planning as a way of building shared understanding and a collaborated consensus about parameters for an optimal and feasible outreach supported, nurse-led sub-regional oncology service. The approach to the planning helped to promote engagement and to garner support for the implementation of the MOU. By giving multiple stakeholders the chance to reflect on how the current service was running and ways it could be improved, provided a unique chance for staff and managers to step back from the flurry of service delivery and engage with each other and consider how they could best maintain and enhance the services for the communities in question. The questions asked as part of the service mapping were practical in nature and linked with optimal practice (OCPs) and quality frameworks, easy for staff and service managers to provide feedback about.

The resulting MOU and the participatory action planning process used to achieve this, is thought to be a strong model for applying to other services. To a large extent the tools, including the logic model could provide strong guidance for commencing quality improvement in other sub-regional service models. Each element of service mapping and file auditing could be judiciously applied as needed, but it is considered that the regular meetings between services including face to face data collection were important for relationship building and therefore acceptance of the final framework. The project identified the range of treatments considered relevant and safe for administering in a sub-regional site, whereby these could be somewhat tailored and a full file audit may not be justifiable (in terms of resources).

An interesting output of the project was the identification of two elements that need to be pursued as further discrete projects:

1. Training and Professional development – The subregional oncology units both had issues with maintaining sufficient staff. There would be great benefit from engaging in workforce planning for sub-regional oncology services to optimise attraction and retention of nurses. Also, specific competency-based learning for the work that these staff do is important to define so that their initial training, annual up-skilling and real-time support is built into the service framework, adapted to their practice context. This project identified that subregional oncology nurses practice in relatively isolated conditions (no peer support down the corridor) whereby they need skills to work across a broad range of treatments with clinical courage. However they have other skills that nurses in the Cancer Centre may not need (including knowing when to refer patients on, when to get more help, how to manage critical situations whilst support is being organised).
2. Communication – The project identified the complexity of information management involved in optimal delivery of timely sub-regional oncology services. Whilst the communication requirements were denoted as part of the MOU, there were a number of communication infrastructure systems and processes, which were beyond the scope of this project to resolve. A new discrete project is needed to explore how to increase the availability of real-time information for subregional site decision making and inevitably, patient

safety. This includes e-prescribing and Med Tech information systems and use of video consultations.

In addition to the above projects, the planning process identified that more work could be done with services and the state government to determine optimal allocations of different types of funding.

Tier 2 allocations do not meet activity (widespread issue in Victoria), the small regional block funding was not modelled on high complexity services such as was shown to be provided within subregional oncology. The WIESS volumes may not be sufficient to accommodate this and the additional costs associated with distance and outreach arrangements need to be accounted for. Also, a range of new therapies will increase the burden on the subregional services and is useful to understand how this may impact throughput at the subregional sites with limited number of chairs available.

With respect to complexity of treatment, the MOU provides some parameters and how emergencies should be managed. However, both subregional sites were not fully aware of the total volume of C1 treatments occurring at their service proportion to the regional. The MOU delineates the need for C1 treatments to be underpinned by clear and consistent process to minimise risk for adverse reactions and engaged medical backup immediately prior to administering treatments that posed a medium risk (identifying taxane drugs and rituximab). Given the emergency staff and models differ over time and between sites, clear protocols and information sharing about oncology patients with emergency and urgent care settings and minimum requirements of training for emergency staff are a central concern.

Conclusion

The project has provided useful information on appropriate components for an outreach-supported nurse-led subregional oncology service. The tools used in the project, the components of the framework and the resulting governance delineated in the MOU are likely to optimise safe and high quality nurse-led outreach oncology support subregional outreach services.

Glossary of Terms

CVAD	Central venous access device
GP	General Practitioner
FN	Febrile Neutropenia
MABS	Monoclonal antibodies (a type of immunotherapy)
MDM	Multidisciplinary Meeting
PICC	Peripherally inserted central catheter
PORT	A self-sealing injection port which is surgically placed under the skin of the chest wall. The catheter is tunnelled under the skin to the vein (usually Internal jugular vein [2]
RIPEN	Rural and Isolated practice endorsed registered nurse
RN	Registered Nurse
MOU	Memorandum of Understanding
Tier 2	Is a classification system for non-admitted care[3]
VHIMS	Victorian Health Incident Management System
VMO	Visiting Medical Officer
WEIS	Weighted inlier equivalent separations (Activity based case mix funding policy for public hospitals)

[2] Royal Children's Hospital, Melbourne. Central Venous Access Device Management: Policies and Procedures.
[3] www.ihpa.gov.au Independent Australian Hospital Pricing Authority.

Appendix 1. List of Anti-cancer treatments that are appropriate to be administered at KDHS & SHDH.

TREATMENTS	LENGTH OF TIME (MINS) 2013	LENGTH OF TIME (MINS) EVIQ	NOTES	INPATIENT/VACS
ABRAXANE	90	45		INPATIENT
ABRAXANE/GEM	120	N/A	D1	INPATIENT
ABVD –	180	180		INPATIENT
AC – ADRIAMYCIN, CYCLOPHOSPHAMIDE	120	120		INPATIENT
ACLASTA	45	30		VACS
ADRIAMYCIN	45	30		INPATIENT
AVASTIN	120		C1	INPATIENT
AVASTIN	90		C2	INPATIENT
AVASTIN	60		C3 >	INPATIENT
Avelumab		N/A	Given every 2 weeks 10mg/kg	INPATIENT
Atezolizumab	60	N/A	60mins then 30mins thereafter 3 weekly	INPATIENT
BAXTER OFF	15	30		INPATIENT
BLOOD TRANSFUSION	120	N/A		INPATIENT
BLOOD TEST	15	N/A		VACS
CABAZITAXEL	90	90		INPATIENT
CAELYX(1MG/MIN)	120	60 TO 180	C1 1mg/min	INPATIENT
CAELYX(1MG/MIN)	90	60 TO 180	C2 >	INPATIENT
CARBO 5FU (CAI)	90	90		INPATIENT
CARBO ETOP	120	150	D1	INPATIENT
	60	90	D2 AND D3	INPATIENT
CARBO GEM	120	120	D1	INPATIENT
	60	60	D8	INPATIENT
CARBO PEMETREXED	120	120		INPATIENT
CARBO TAXOL	270	300	3 WEEKLY	INPATIENT
	150	150	WEEKLY	INPATIENT
CARBO TAXOTERE	150	150		INPATIENT
CARBOPLATIN	60	90		INPATIENT
CETUXIMAB	150	120	C1	INPATIENT
	90		C2	INPATIENT
CHOP	150	150		INPATIENT
CHOP-R	360	480	C1	INPATIENT
CHOP-R	240	240 TO 360	C2 >	INPATIENT
	60		ETOP D2 TO D5 AND D30 TO D33	INPATIENT
CISPLATIN/VINORELBINE	300	300		INPATIENT
CISPLATIN 5FU (CAI)	240	240		INPATIENT

TREATMENTS	LENGTH OF TIME (MINS) 2013	LENGTH OF TIME (MINS) EVIQ	NOTES	INPATIENT/VACS
CISPLATIN GEMCITABINE	300	300	D1	INPATIENT
	60	60	D8 AND D15	INPATIENT
CISPLATIN PEMETREXED	240	240		INPATIENT
CYCLOPHOSPHAMIDE	90	N/A		INPATIENT
DE GRAMMONT- 5fu	45	N/A		INPATIENT
DENOSUMAB	15	S/C		VACS
DOCETAXEL	90	90		INPATIENT
ECF - Epirubicin, Cyclophosphamide, 5fu	270	270	D1	INPATIENT
	45	30	D8 AND D15	INPATIENT
ECX – Epirubicin, Cyclophosphamide, xeloda	270	270		INPATIENT
EDUCATION	45	N/A		INPATIENT
FC-R Fludarabine, cyclophosphamide and rituximab	180	N/A	C2 >	INPATIENT
FEC – 5FU Epirubicin and cyclophosphamide	120	120		INPATIENT
FOLFIRI AVASTIN	250		C1	INPATIENT
	225		C2	INPATIENT
	200		C3	INPATIENT
FOLFIRI	165			INPATIENT
FOLFOX	210	240		INPATIENT
FOLFOX AVASTIN	300		D1	INPATIENT
	270		D2	INPATIENT
	240		D3	INPATIENT
GEMCITABINE	60	60		INPATIENT
HERCEPTIN	180	150	C1 LOADING (inc 60 min obs)	INPATIENT
	60	60	C2 onwards	INPATIENT
Ipilumumab	60	60	4 cycles only	INPATIENT
INTRAGRAM/OCTOGAM	180	N/A		INPATIENT
IRINOTECAN	120	N/A		INPATIENT
MAGNESIUM IV	60	N/A	PER BAG (10 MMOL)	INPATIENT
MELPHELAN	45	N/A		INPATIENT
MITOMYCIN IV	45	30		INPATIENT
MITOXANTRONE	45	30		INPATIENT
MOD. ROSWELL PARK	30	30		INPATIENT
Nivolumab	60	90	2 weekly	
PACLITAXEL	210	N/A	3 WEEKLY	INPATIENT
	90	90	WEEKLY	INPATIENT

TREATMENTS	LENGTH OF TIME (MINS) 2013	LENGTH OF TIME (MINS) EVIQ	NOTES	INPATIENT/VACS
PANITUMUMAB	90	N/A		INPATIENT
PEGFILGRASTIM	15	S/C		VACS
Pembrolizumab	30	60	3 weekly	INPATIENT
PEMETREXED	30	30		INPATIENT
PICC FLUSH/DRESSING	20	N/A		VACS
PORT FLUSH	15	N/A		VACS
RITUXIMAB	300	240 TO 360	C1 in Bendigo	INPATIENT
	120	120	C2 RAPID INFUSION	INPATIENT
SANDOSTATIN	20	S/C		VACS
TAC –Docetaxel, Adriamycin and Cyclophosphamide	165	180		INPATIENT
TC –Docetaxel and cyclphosphamide	120	150		INPATIENT
TCH – Taxotere, carboplatin, Herceptin	180		C2>	INPATIENT
TOPOTECAN	60	60		INPATIENT
VELCADE	45		INCLUDE PHARMACY PREP TIME	INPATIENT
VINORELBINE	45	60		INPATIENT
XELOX/AVAstin	120		D1	INPATIENT
XELOX/AVAstin	90		D2	INPATIENT
XELOX/AVAstin	60		D3 onwards	INPATIENT
XELOX – xeloda and oxaliplatin	180	180 TO 240		INPATIENT
ZOLADEX	20	S/C		VACS
ZOMETA	45	30		INPATIENT

TREATMENTS	LENGTH OF TIME (MINS) 2013	LENGTH OF TIME (MINS) EVIQ	NOTES	INPATIENT/VACS
ABRAXANE	90	45		INPATIENT
ABRAXANE/GEM	120	N/A	D1	INPATIENT
ABVD –	180	180		INPATIENT
AC – ADRIAMYCIN, CYCLOPHOSPHAMIDE	120	120		INPATIENT
ACLASTA	45	30		VACS
ADRIAMYCIN	45	30		INPATIENT
AVASTIN	120		C1	INPATIENT
AVASTIN	90		C2	INPATIENT
AVASTIN	60		C3 >	INPATIENT
Avelumab		N/A	Given every 2 weeks 10mg/kg	INPATIENT
Atezolizumab	60	N/A	60mins then 30mins thereafter 3 weekly	INPATIENT
BAXTER OFF	15	30		INPATIENT
BLOOD TRANSFUSION	120	N/A		INPATIENT
BLOOD TEST	15	N/A		VACS
CABAZITAXEL	90	90		INPATIENT
CAELYX(1MG/MIN)	120	60 TO 180	C1 1mg/min	INPATIENT
CAELYX(1MG/MIN)	90	60 TO 180	C2 >	INPATIENT
CARBO 5FU (CAI)	90	90		INPATIENT
CARBO ETOP	120	150	D1	INPATIENT
	60	90	D2 AND D3	INPATIENT
CARBO GEM	120	120	D1	INPATIENT
	60	60	D8	INPATIENT
CARBO PEMETREXED	120	120		INPATIENT
CARBO TAXOL	270	300	3 WEEKLY	INPATIENT
	150	150	WEEKLY	INPATIENT
CARBO TAXOTERE	150	150		INPATIENT
CARBOPLATIN	60	90		INPATIENT
CETUXIMAB	150	120	C1	INPATIENT
	90		C2	INPATIENT
CHOP	150	150		INPATIENT
CHOP-R	360	480	C1	INPATIENT
CHOP-R	240	240 TO 360	C2 >	INPATIENT
	60		ETOP D2 TO D5 AND D30 TO D33	INPATIENT
CISPLATIN/VINORELBINE	300	300		INPATIENT
CISPLATIN 5FU (CAI)	240	240		INPATIENT

TREATMENTS	LENGTH OF TIME (MINS) 2013	LENGTH OF TIME (MINS) EVIQ	NOTES	INPATIENT/VACS
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	60	60	D8 AND D15	INPATIENT
CISPLATIN PEMETREXED	240	240		INPATIENT
CYCLOPHOSPHAMIDE	90	N/A		INPATIENT
DE GRAMMONT- 5fu	45	N/A		INPATIENT
DENOSUMAB	15	S/C		VACS
DOCETAXEL	90	90		INPATIENT
ECF - Epirubicin, Cyclophosphamide, 5fu	270	270	D1	INPATIENT
	45	30	D8 AND D15	INPATIENT
ECX – Epirubicin, Cyclophosphamide, xeloda	270	270		INPATIENT
EDUCATION	45	N/A		INPATIENT
FC-R Fludarabine, cyclophosphamide and rituximab	180	N/A	C2 >	INPATIENT
FEC – 5FU Epirubicin and cyclophosphamide	120	120		INPATIENT
FOLFIRI AVASTIN	250		C1	INPATIENT
	225		C2	INPATIENT
	200		C3	INPATIENT
FOLFIRI	165			INPATIENT
FOLFOX	210	240		INPATIENT
FOLFOX AVASTIN	300		D1	INPATIENT
	270		D2	INPATIENT
	240		D3	INPATIENT
GEMCITABINE	60	60		INPATIENT
HERCEPTIN	180	150	C1 LOADING (inc 60 min obs)	INPATIENT
	60	60	C2 onwards	INPATIENT
Ipilumumab	60	60	4 cycles only	INPATIENT
INTRAGRAM/OCTOGAM	180	N/A		INPATIENT
IRINOTECAN	120	N/A		INPATIENT
MAGNESIUM IV	60	N/A	PER BAG (10 MMOL)	INPATIENT
MELPHELAN	45	N/A		INPATIENT
MITOMYCIN IV	45	30		INPATIENT
MITOXANTRONE	45	30		INPATIENT
MOD. ROSWELL PARK	30	30		INPATIENT
Nivolumab	60	90	2 weekly	
PACLITAXEL	210	N/A	3 WEEKLY	INPATIENT
	90	90	WEEKLY	INPATIENT

TREATMENTS	LENGTH OF TIME (MINS) 2013	LENGTH OF TIME (MINS) EVIQ	NOTES	INPATIENT/VACS
PANITUMUMAB	90	N/A		INPATIENT
PEGFILGRASTIM	15	S/C		VACS
Pembrolizumab	30	60	3 weekly	INPATIENT
PEMETREXED	30	30		INPATIENT
PICC FLUSH/DRESSING	20	N/A		VACS
PORT FLUSH	15	N/A		VACS
RITUXIMAB	300	240 TO 360	C1 in Bendigo	INPATIENT
	120	120	C2 RAPID INFUSION	INPATIENT
SANDOSTATIN	20	S/C		VACS
TAC –Docetaxel, Adriamycin and Cyclophosphamide	165	180		INPATIENT
TC –Docetaxel and cyclphosphamide	120	150		INPATIENT
TCH – Taxotere, carboplatin, Herceptin	180		C2>	INPATIENT
TOPOTECAN	60	60		INPATIENT
VELCADE	45		INCLUDE PHARMACY PREP TIME	INPATIENT
VINORELBINE	45	60		INPATIENT
XELOX/AVAstin	120		D1	INPATIENT
XELOX/AVAstin	90		D2	INPATIENT
XELOX/AVAstin	60		D3 onwards	INPATIENT
XELOX – xeloda and oxaliplatin	180	180 TO 240		INPATIENT
ZOLADEX	20	S/C		VACS
ZOMETA	45	30		INPATIENT

Appendix 2. Table of Drug regimes and combination used at the sub-regional sites for management of malignancy.

Drug Regimen/ combination	Kerang	Swan Hill	Total
5- Flourouracil	0	1	1
Abraxane	1	0	1
Abraxane and Gemcitabine	0	2	2
AC and Capecitabine	0	1	1
AC and Paclitaxel	1	1	2
AC and Paclitaxel and Trastuzumab	0	1	1
AC and Trastuzumab	1	0	1
BCG	0	3	3
Bendamustine and Rituximab	1	0	1
Capecitabine & Lapatinib	1	0	1
Carboplatin and 5-flourourail	0	1	1
Carboplatin and Pemetrexed	1	0	1
Cetuximab	0	1	1
CHOP-R	2	0	2
Cisplatin and Vincristine	1	0	1
Docetaxel	1	0	1
EP/PE	2	0	2
FOLFIRI and Cetuximab	1	0	1
FOLFIRI and Panitumumab	1	0	1
FOLFOX	4	3	7
FOLFOX and capecitabine and Avastin	0	1	1
FOLFOX and Panitumumab	0	1	1
FOLFOX without Oxaliplatin	1	0	1
GemCap	1	0	1
GemCarbo	1	3	4
GemCarbo and Nivolumab	0	1	1
GemCarbo and Paclitaxel	0	1	1
Gemcitabine	1	1	2
Gemcitabine and Bevacizumab	0	1	1
Intragam	0	1	1
None	3	0	3
Paclitaxel	0	3	3
Paclitaxel and Cyclophosphamide	1	0	1
PC (Carbo Taxol)	2	0	2
Pembrolizumab	0	1	1
R-CHEP	1	1	2
Rituximab	0	2	2
Rituximab and Bendamustine	0	1	1
Rituximab and Vincristine	0	1	1
Supportive	1	3	4
Taxol/Carbo and Docetaxel- Abiraterone acetate	0	1	1
TC	3	0	3
TC and AC and Trastuzumab	1	0	1
TC and Trastuzumab	1	0	1
Trastuzumab	2	0	2
TRIAL	0	1	1
Total	**37**	**38**	**75**

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