

Working Towards a Synergistic Operating Model for Westmead Research Hub Biobanks

Xin Maggie Wang,^{2,3} Gayathri St George,^{1,2} James Linton,¹ Naomi Douglas,² Jane Carpenter,^{2,3} Li Ma,² Usman Jawaid,² Adam Robinson^{2,4}, Christine Clarke,^{2,3} Judith Heads²

¹Westmead Research Hub, Sydney, NSW, Australia; ²Westmead Institute for Medical Research, Sydney, NSW, Australia; ³The University of Sydney, Sydney, NSW, Australia; ⁴The Australian Breast Cancer Tissue Bank, Sydney, NSW, Australia



Introduction

The Westmead Research Hub (WRH) in Western Sydney is a partnership between New South Wales state government health organisations, medical research institutes and the University of Sydney. Illustrative of the many translational research projects based at Westmead, the WRH precinct hosts close to thirty biobanks, including biobanks with national and international scale and recognition. Though collectively representing a major resource for research at both Westmead and further afield, each of these biobanks was established and has been operating autonomously without any central support. The WRH acknowledged the value and importance of this resource and foresaw the potential for cost and other shared service improvements that could be brought about by collaboration and central support. In 2017, a questionnaire study was designed and conducted over the course of the year in order to define the current status of all WRH biobanks, to elucidate common biobanking functions that could be consolidated. Results from the questionnaire indicated a significant capacity for WRH biobanks to synergise their activities with other biobanks in the precinct, and three main areas where biobanks would benefit from central services were highlighted: IT support, staff support and infrastructure support. Following on from the questionnaire study, and informed by its outcomes, the next stage of the project is currently underway. This year, a pilot project was initiated at the Westmead Institute for Medical Research (WIMR) to develop and launch central services that will enable biobanks to work towards a synergistic operating model.

A Questionnaire Study of Westmead Research Hub Biobanks

To determine optimal ways in which WRH biobanks could benefit from central facilities and services, it was first necessary to gain information about their current operations. As phase 1 of a larger project (Figure 1), the WRH appointed a part-time (0.4 FTE) project officer from February to December 2017 to conduct a questionnaire study of all biobanks operating in the precinct. A detailed questionnaire was developed to discover the main activities of WRH biobanks, where they are placed in a biobank life-cycle, and areas of synergy where central services could offer benefits of economies-of-scale.



Figure 2: Location of 28 biobanks on the Westmead Research Hub campus

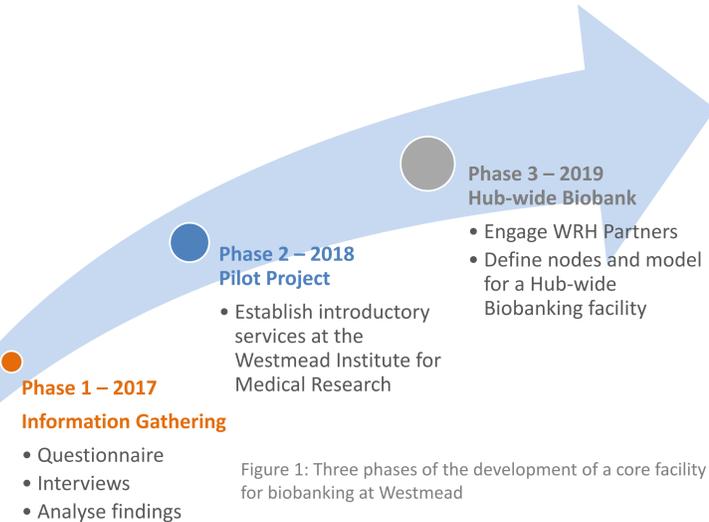


Figure 1: Three phases of the development of a core facility for biobanking at Westmead

A Powerful Resource for Translational Research

The questionnaire study identified 33 biobanks on the WRH campus of which 28 participated (Figure 2). Results from the questionnaire illustrated the major resource for medical research that the WRH biobanks collectively represent:

- The biospecimen and data collections held in the WRH biobanks show a **wide range of clinically important samples**.
- A particular strength was shown in cancer and microbial collections, which make up 39% of WRH biobanks. (Figure 3).
- Most (78%) biobanks with donor consent obtain **consent for unspecified future research**
- Most (72%) biobanks make their samples available for research through **open and collaborative access**.

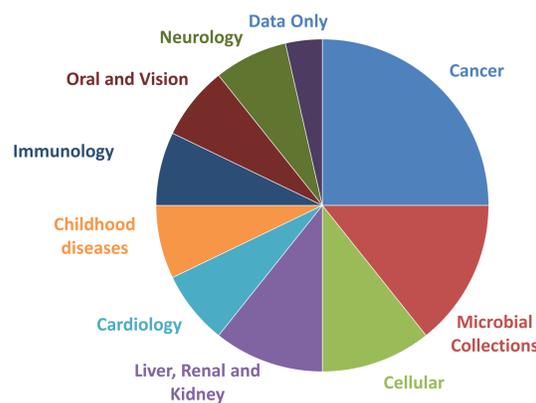


Figure 3: The distribution of type of sample collected in the Westmead Research Hub.

Opportunities for a Synergistic Operating Model

The questionnaire was tailored to determine ways in which central support could facilitate the activities of the WRH biobanks. Three main areas of synergy were identified:

- IT support** (50% of biobanks)
IT was the most frequently mentioned area of support needed. Specific requests included: custom-built databases; linkage of patient data to sample collections; and maintenance and upgrades for existing databases.
- Staff support** (39% of biobanks)
Many of the biobanks requested additional personnel to help with biobank activities, including: sample collection and processing; data collection and data entry; coordination of sample transport; centralised specimen reception and handling; dispatch to research projects; and pathologist input.
- Infrastructure support** (18% of biobanks)
The biobanks requested a range of infrastructure support, including: more freezer space; back-up storage; quality assurance for stored samples; and automated blood processing.

The majority of biobanks are also interested in:

- Data linkage projects (64%)
- Obtaining templates for SOPs and data sets (61%)
- A coordinated effort to obtain discounts on lab consumables (85%)

Addressing Challenges and Opportunity Costs through Integration

With each biobank operating as an individual resource there are significant opportunity costs from duplication of efforts. The questionnaire highlighted that the funding base for WRH biobanks is inherently unstable, with the majority of biobanks (64%) obtaining funding from external peer-reviewed grants. One of the main driving principles of the project is that a centralised service-model biobank will enhance sustainability by enabling existing biobanks to benefit from economies-of-scale. The questionnaire also found that **most biobanks (71%) have the capacity to synergise** with other biobanks on the precinct.



Figure 4: Stages of the WIMR Biobank Pilot Project

The WIMR Pilot Project - Dedicated Biobanking Infrastructure

Leading on from the results of the questionnaire study, the Westmead Institute for Medical Research (WIMR) initiated and funded a 1 year pilot project to launch a service-model biobank as part of its existing Scientific Platforms. In February 2018, the project commenced with a new team recruited to establish and run the service. The project was divided into four main overlapping stages (Figure 4).

Biobank Processing Services and Storage Facility

SERVICE	DESCRIPTION	INTERNAL	EXTERNAL ACADEMICS	COMMERCIAL
Specimen Receipt ^{1,2}	Biobank staff pick-up from clinical collection point on campus	\$16.50 / donor	\$25.00 / donor	\$50.00 / donor
	Delivered to WIMR by courier	\$12.50 / donor	\$18.75 / donor	\$37.50 / donor
	Delivered to Biobank lab in person	\$4.20 / donor	\$6.30 / donor	\$12.60 / donor
Blood Processing	Blood fraction aliquots: whole blood / plasma / buffy coat / serum	\$2.50 / vial	\$4.55 / vial	\$9.10 / vial
	Blood spot card	\$5.00 / card	\$8.50 / card	\$17.00 / card
Histology Services	Cryosectioning	\$50 / hour	\$75 / hour	\$150 / hour
	Tissue microarray (TMA) construction	\$50 / hour	\$75 / hour	\$150 / hour
	FFPE sectioning (first slides)	\$10.00 / slide	\$15.00 / slide	\$30.00 / slide
	FFPE sectioning (subsequent slides)	\$3.50 / slide	\$5.70 / slide	\$11.40 / slide
DNA Extraction	Blood - Manual	\$12.50 / sample	\$29.60 / sample	\$59.20 / sample

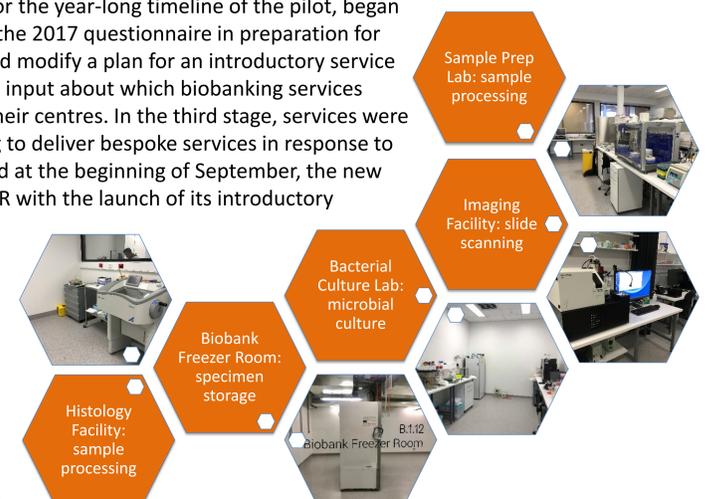
FACILITY / SERVICE	DESCRIPTION	INTERNAL
-80 Freezer	SBS box format - 1 tray (≤ 7 boxes)	\$120.00 / tray / year
	SBS box format - 1 rack (≤ 42 boxes)	\$400.00 / rack / year
	2" box format - 1 tray (≤ 5 boxes)	\$120.00 / tray / year
	2" box format - 1 rack (≤ 25 boxes)	\$400.00 / rack / year
Controlled ambient	Slide cabinet - 1 drawer (≤ 380 slides)	\$25 / drawer / year
	FFPE blocks - 1 drawer (≤ 280 blocks)	\$20 / drawer / year
Storage services ³	Blood spot cards - 1 box (≤ 100 cards)	\$5 / box / year
	Specimen storage and inventory update	\$12.50 / ¼ hour
Shipping	Specimen retrieval and inventory update	\$12.50 / ¼ hour
	Coordination of dispatch by courier	\$12.50 / ¼ hour + courier charge

Figure 5: The introductory fee schedule for the Westmead Biobank was announced at the beginning of September

During the initial planning phase, the project team set out tasks for the year-long timeline of the pilot, began researching infrastructure requirements, and reviewed results of the 2017 questionnaire in preparation for user consultation. The user consultation phase aimed to refine and modify a plan for an introductory service offering. Meetings with WIMR Centre Directors gathered valuable input about which biobanking services would be of most value to biobanks and research groups within their centres. In the third stage, services were developed through working with individual biobanks, and starting to deliver bespoke services in response to several requests. This initiated a phased launch during August, and at the beginning of September, the new facility 'Westmead Biobank' was officially announced within WIMR with the launch of its introductory services and fee schedule (Figure 5).

Summary

Based on the findings of a Westmead Research Hub-wide questionnaire, dedicated biobanking infrastructure is under development, with the objective to achieve synergies in biobanking service delivery, and to ensure that the strengths in translational research embodied in WRH biobanks can be exploited.



Contact: Judith Heads
Westmead.biobank@Sydney.edu.au