The development of a rural breast reconstruction service: patient reported outcomes and benefits

Gunness P[1], Hamilton S[1], Capstick R[1], Masters J[1], Toma R[1]
1 – Warrnambool Plastic and Reconstructive Surgery

Introduction

Access to breast reconstruction is key in providing women with an emotional and psychological recovery after a mastectomy.(1-3) In 2021, 13% of all new cancer diagnosis in Australia was breast cancer, with mastectomy being one of the recommended treatments of choice.(4) In 2016, 40% of Australian women diagnosed with a breast cancer underwent a mastectomy; out of those, only 18% have undergone a breast reconstruction.(5, 6) However, studies have shown that if given the choice, around 50% of women will elect to undergo a breast reconstruction.(7)

To be able to make an informed decision about a breast reconstruction, the conversation between the surgeon and the patient needs to start in the preoperative period. Access to that conversation depends on several factors including the availability of reconstructive services.(8) Geographical barriers play a large role in preventing women having access to this conversation with reconstructive surgeons, hence having access to a breast reconstruction.(8, 9) Moreover, women seem to be reluctant to travel more than 20 miles to access specialist care for a breast reconstruction.(10) Studies carried out internationally have shown that rural patients do not undergo breast reconstructions as readily as their metropolitan counterparts.(11) The Australian Access to Breast Reconstruction Collaborative Group published a position statements in 2021 stating *"That all women in Australia requiring mastectomy for the management of their breast cancer have timely access to breast reconstruction regardless of geographical location or financial circumstance.(12)"* However, the current Australian data from the Australian Bureau of statistics show that we are not meeting this goal as the rates of breast reconstruction in Metropolitan Melbourne was 35% compared to 7.3% in the rest of Victoria in 2013. (13)

This study aims to build on the current data surrounding rural breast reconstruction through analysing a single rural breast reconstructive services impact on community living in a Modified Monash Model 3 region. The primary outcome is to demonstrate to what extent having a rural breast reconstructive unit improves access to a breast reconstruction services for women living in a rural area. Alongside this we explore concurrent benefits, including financial, emotional, and psychological well-being. The rural reconstructive service being analysed was established in 2012 and has been key in providing essential reconstructive care to patients living in that community. Secondarily this study informs rural health providers the benefits for patients and rural health organisations of developing and maintain a rural breast reconstructive service.

Methods

Prior to the commencement of the study, ethics approval was obtained through the local ethics review board (reference number: 1964).

A retrospective analysis was undertaken for all patients who presented for to a single rural (Modified Monash Model 3) breast reconstruction service in Victoria, Australia. Patients were identified though the medical record database kept by the health information services. Sixty-

four patients had undergone any form of breast reconstruction with this single service between 2017 and 2021.To evaluate the direct patient impact of having a rural breast reconstruction service, two metrics were chosen:

- Patient reported outcomes.
- Economic benefits.

Patient reported outcomes

Patient reported outcomes were recorded through phone interviews conducted by the research team. All the 64 patients who have undergone a breast reconstruction with this service, were contacted and interviewed using a standardised questionnaire utilising Likert scale (see figure 1). Participants were initially contacted via phone and verbal consent with obtained by the research team. A maximum of 5 phone calls were conducted to reach potential subjects; if the patient could not be reached successfully after these five phone calls they were deemed as loss to follow up. To be included in the study participants had to have undergone any form of breast reconstruction within the above time periods at the single service following a mastectomy. Participants were excluded if no contact information was available on the medical record. A quantitative analysis was then performed.

Figure 1: Patient Questionnaire

1. How many operations did you undergo during your breast reconstruction? (n)

2. Are you planned to have any further breast operations for reconstructive purposes?

3. Are you happy with your result?

(Standardised Likert scale)
1 – Very dissatisfied
2 – Dissatisfied
3 – Unsure
4 – Satisfied
5 – Very satisfied

4. How do you rate your overall breast reconstructive experience?

(Standardised Likert scale)
1 – Very dissatisfied
2 – Dissatisfied
3 – Unsure
4 – Satisfied
5 – Very satisfied

5. Would you have had a breast reconstruction if it meant travelling to nearest alternative centre?

(Standardised Likert scale)
1 – Would not consider
2 – Might or might not consider
3 – Definitely consider

6. Do you value having a breast reconstructive service in your community?

(Standardised Likert scale)
1 – strongly disagree
2 – Disagree
3 – Somewhat disagree
4 – Neither agree or disagree
5 – Somewhat agree
6 – Agree
7 – Strongly agree

Economic benefits

A quantitative analysis was performed comparing the economic cost for the patient to have their breast reconstruction completed at a rural location as opposed to a metropolitan centre. The alternative tertiary referral centre was metropolitan Melbourne. The total economic cost was calculated based on travel and accommodation costs, and productivity loss for a single support person.

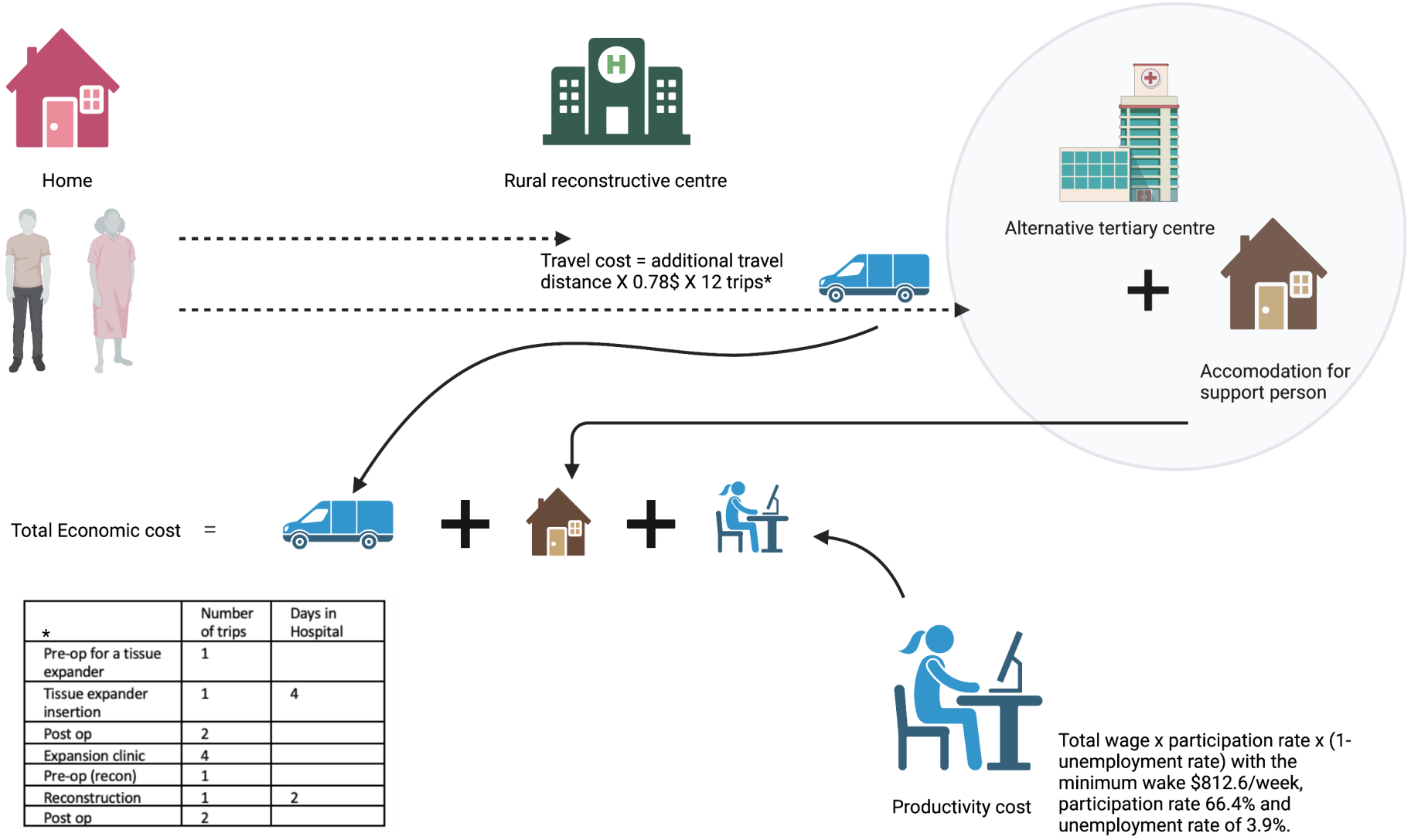
For each patient, the additional travel distance was calculated from their home address to the rural centre, compared with their home address to the alternative centre. The estimated travel cost incurred by a patient was calculated by using the average travel cost per km, obtained from the Australian Tax Office on the 30$^{th\ of}$ June 2022 ($ 0.78/km). A minimum of 12 trips to the breast reconstructive unit was estimated and is detailed as below. This was calculated based on a tissue expander to implant reconstruction only, as this was the most common form of reconstruction in the data set. The values were summated to obtain the final travel cost that would have been incurred by patients to travel to the alternative reconstruction service.

The accommodation cost for the support person was calculated based on the average cost of a hotel room within 1km from the chosen health service, which was $142 on the 30th of June 2022. This was then multiplied by the number of days the patient would have spent in hospital and the number of trips to the hospital; to obtain the total accommodation cost that would have been incurred by the support person.

Productivity loss was calculated using the Human Capital Approach.
Productivity loss = total wage x participation rate x (1-unemployment rate) with the minimum wake $812.6/week, participation rate 66.4% and unemployment rate of 3.9%.

The figure below (figure 2) shows the detailed explanation for the number of trips to and days spent at the hospital.

Figure 2: Total Economic Cost Calculation



*	Number of trips	Days in Hospital
Pre-op for a tissue expander	1	
Tissue expander insertion	1	4
Post op	2	
Expansion clinic	4	
Pre-op (recon)	1	
Reconstruction	1	2
Post op	2	

Results

Patient reported outcomes:

Thirty-eight participants were included in this arm of the study and eight were lost to follow up. Thirty-one were immediate reconstructions, with 13 free flaps performed and the remainder undergoing alloplastic reconstructions.

Twenty-nine of the 30 participants who completed the questionnaire strongly valued having a rural breast reconstruction service, with only 30% stating they would consider undergoing a reconstruction if required to travel to the closest metropolitan centre. Patient satisfaction rates were also high, with just one participant being dissatisfied with the service (see figures 3,4,5 and 6).

Figure 2: Are you happy with your result?

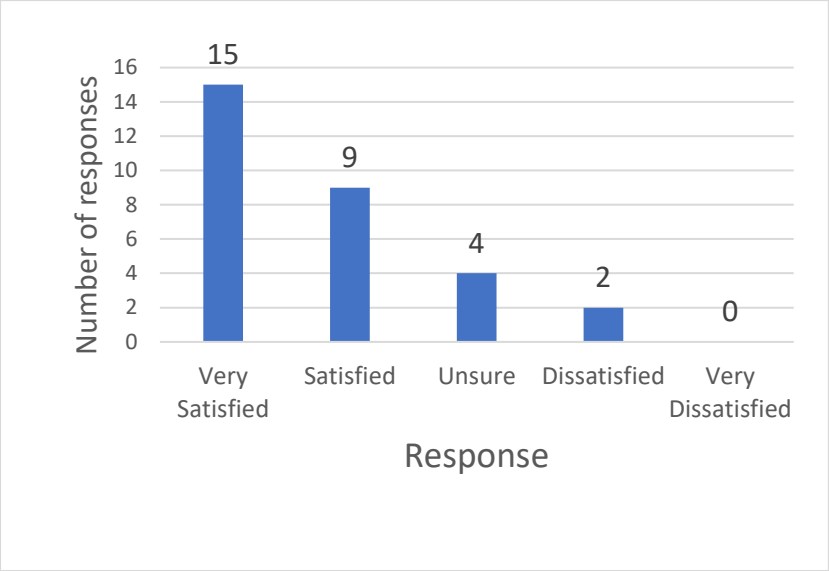


Figure 4: How would you rate your overall breast reconstructive experience?

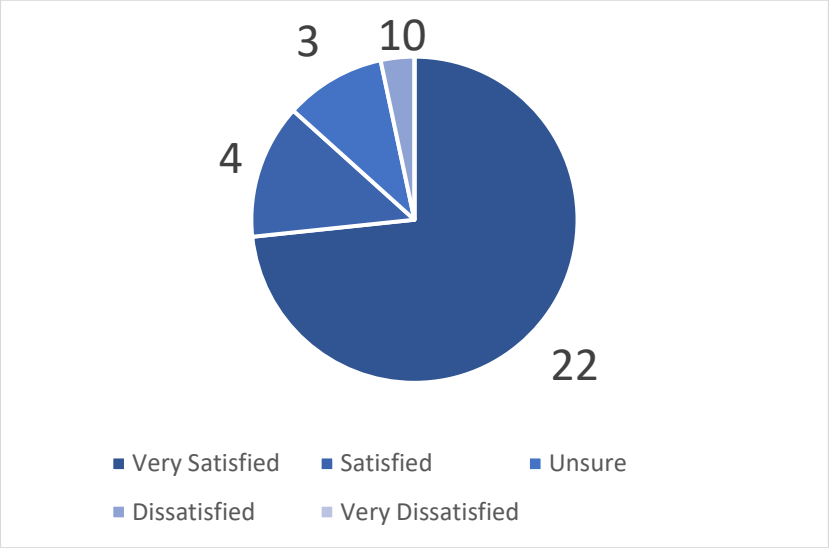


Figure 5: Do you value having a breast reconstructive service in your community?

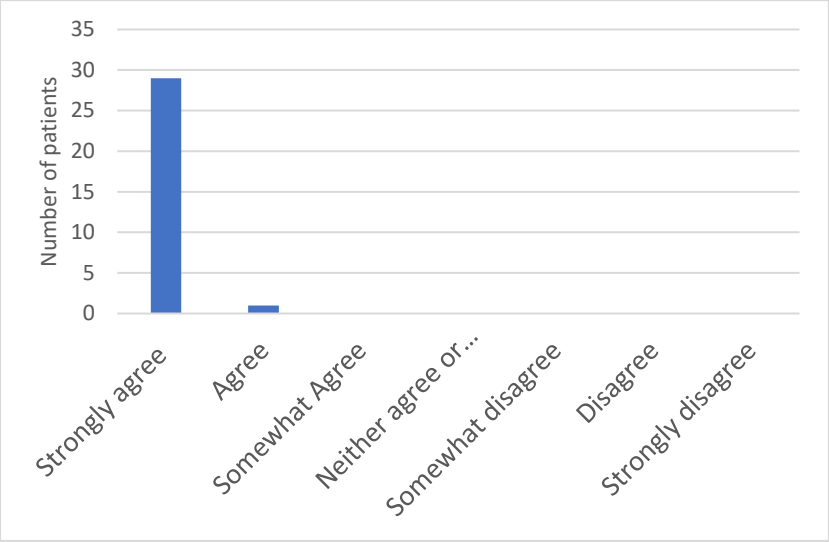
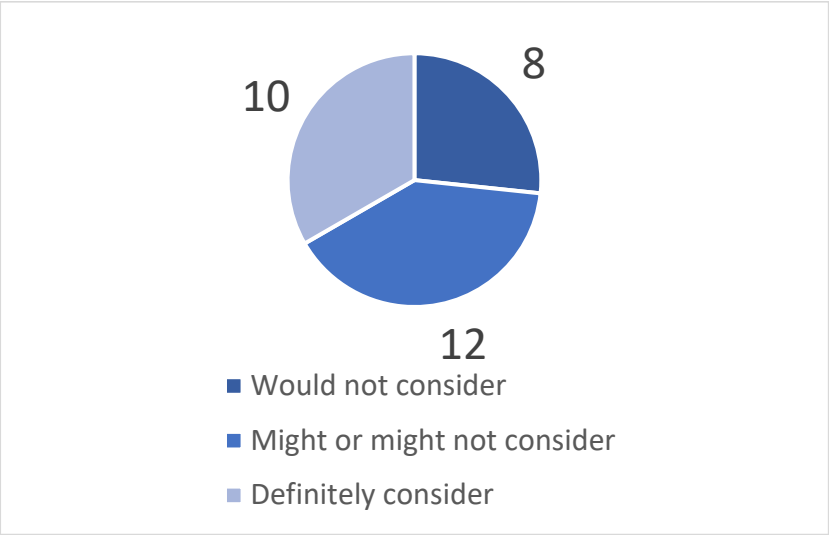


Figure 6: Would you have had a breast reconstruction if it meant travelling to the nearest alternative centre?



<u>Economic benefits:</u>

The total cost saved by attending a rural breast reconstruction unit rather than the nearest tertiary centre over the study period was $542,526. This included 64 patients, each traveling with one support person. The average saving for each patient was $8,478. On average, each patient's travel requirements reduced by 2,800km by attending a rural breast reconstruction unit compared to the closest metropolitan centre, saving $6,688 on travel costs alone.

Discussion

In 2021, about 6.5% of Australians live in a MM 3 region; yet, in Victoria, this is the sole plastic and reconstructive unit that offers specialist breast reconstructive service in a MM3 region; outlining the complexity in accessing affordable and high quality care for women in these communities. (14)

The result of the questionnaire clearly shows that geographic location greatly impacts a woman's decision of having a breast reconstruction. While a breast reconstruction is an essential component of the recovery from a breast cancer(15), only 30% of respondents would choose to travel for it; hence strongly supporting the need of have a breast reconstructive unit in a regional community.
Patient satisfaction levels were high; indicating that a rural breast reconstructive service can provide a high quality level of care; improving the quality-of-life of women who have undergone a mastectomy. This is comparable to tertiary centres in Metropolitan Melbourne.(15)

There is a considerable economic impact on women who must travel to a metropolitan hospital for a breast reconstruction. The majority of patient living a MM3 region in Australia are categorised as the lowest IRSAD (Index of Relative Socio-economic Advantage and Disadvantage) deciles and hence, would be significantly burdened with these economic costs.(14) The travel cost calculations do not take into consideration any subsequent reconstruction required and assume a smooth journey for the patient with no complications. Hence the economic impact may be more significant than estimated in this study.

Conclusion:
Overall, patient value having a breast reconstruction service in a rural community and acknowledge the difficulty of receiving the same surgery in Metropolitan Melbourne. The direct economic benefit to the patients is also clear, improving access to a breast reconstruction and strengthening the health service delivery.

1. Oh DD, Flitcroft K, Brennan ME, Spillane AJ. Patterns and outcomes of breast reconstruction in older women – A systematic review of the literature. European Journal of Surgical Oncology (EJSO). 2016;42(5):604-15.
2. McCarthy CM, Hamill JB, Kim HM, Qi J, Wilkins E, Pusic AL. Impact of Bilateral Prophylactic Mastectomy and Immediate Reconstruction on Health-Related Quality of Life in Women at High Risk for Breast Carcinoma: Results of the Mastectomy Reconstruction Outcomes Consortium Study. Ann Surg Oncol. 2017;24(9):2502-8.
3. Atisha D, Alderman AK, Lowery JC, Kuhn LE, Davis J, Wilkins EG. Prospective analysis of long-term psychosocial outcomes in breast reconstruction: two-year postoperative results from the Michigan Breast Reconstruction Outcomes Study. Ann Surg. 2008;247(6):1019-28.
4. Australia C. Breast cancer in Australia statistics.
5. Flitcroft K, Brennan M, Costa D, Spillane A. Documenting patterns of breast reconstruction in Australia: The national picture. Breast. 2016;30:47-53.
6. Cancer Australia. Cancer Australia Statement – Influencing best practice in breast cancer. Surry Hills NCA, 2016.
7. Brennan ME, Spillane AJ. Uptake and predictors of post-mastectomy reconstruction in women with breast malignancy--systematic review. Eur J Surg Oncol. 2013;39(6):527-41.
8. Bhat D, Heiman AJ, Talwar AA, Dunne M, Amanjee K, Ricci JA. Access to Breast Cancer Treatment and Reconstruction in Rural Populations: Do Women Have a Choice? J Surg Res. 2020;254:223-31.
9. Youl P, Philpot S, Moore J, Theile DE. Population-based picture of breast reconstruction in Queensland, Australia. ANZ J Surg. 2021;91(4):695-700.

10. Roughton MC, DiEgidio P, Zhou L, Stitzenberg K, Meyer AM. Distance to a Plastic Surgeon and Type of Insurance Plan Are Independently Predictive of Postmastectomy Breast Reconstruction. Plast Reconstr Surg. 2016;138(2):203e-11e.
11. Retrouvey H, Solaja O, Gagliardi AR, Webster F, Zhong T. Barriers of Access to Breast Reconstruction: A Systematic Review. Plast Reconstr Surg. 2019;143(3):465e-76e.
12. Group AAtBRC. Position Statement on Access to Post-mastectomy Breast Reconstruction
Information and Services in Australia. 2021.
13. Flitcroft KL, Brennan ME, Costa DSJ, Spillane AJ. Regional variation in immediate breast reconstruction in Australia. BJS Open. 2017;1(4):114-21.
14. Versace VL, Skinner TC, Bourke L, Harvey P, Barnett T. National analysis of the Modified Monash Model, population distribution and a socio-economic index to inform rural health workforce planning. Australian Journal of Rural Health. 2021;29(5):801-10.
15. Ng SK, Hare RM, Kuang RJ, Smith KM, Brown BJ, Hunter-Smith DJ. Breast Reconstruction Post Mastectomy: Patient Satisfaction and Decision Making. Annals of Plastic Surgery. 2016;76(6).