Psycho-Oncology

WILEY

ORIGINAL ARTICLE OPEN ACCESS

Prostate Cancer Specialist Nursing Program: A Social Return on Investment Analysis Value for Money of the Prostate Cancer Specialist Nursing Program

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Received: 19 December 2024 | **Revised:** 5 May 2025 | **Accepted:** 6 May 2025

Funding: This study was supported by Prostate Cancer Foundation of Australia.

Keywords: caregivers | cost-benefit analysis | decision making | prostate cancer specialist nursing | prostatic neoplasms | quality of healthcare | quality of life | survivorship | telenursing

ABSTRACT

Background: In Australia, Prostate cancer (PCa) has a high survival rate (96%) meaning men with PCa may live with the impact of the disease for many years, even decades. The Prostate Cancer Foundation of Australia (PCFA) manages two Prostate Cancer Specialist Nursing (PCSN) programs: (1) A health service-based program and (2) A telenursing service. There is a paucity of economic evidence regarding the benefits of these programs so Social Return on Investment (SROI) methodology was used to determine social value and return on investment.

Methods: A SROI economic evaluation model was developed in consultation with the PCSN team augmented with published evidence to identify the costs and outcomes, and estimate the benefits associated with the delivery of the PCSN program over 2 years. Attribution, dead weight loss and discounting were calculated and sensitivity analyses were conducted to test the rigour of the model.

Results: The value generated by the PCSN programs over the 2-year period resulted in a SROI ratio of 1:1.62 for the health service-based PCSN program, indicating that for every dollar invested, a return of AUD $1.62 was obtained. The SROI ratios for the Telenursing program and the combined programs were 1:2.34 and 1:1.65, respectively.

Conclusion: Our study provides evidence that further expansion of the PCSN program is likely to have a positive return on investment and benefit the 250,000 men currently living with PCa in Australia. Findings such as these are important in informing cancer care policy and funding decisions.

1 | Background

Prostate cancer (PCa) is the most commonly diagnosed cancer in Australian men with an estimated incidence in 2024 of 26,400 [1]. PCa has a 5 year survival rate (2016–2020) of 96% [1, 2]. Over 80% of men with PCa have stage I (localised) or stage II (locally advanced) disease at diagnosis, which can mean dealing with its impact on their quality of life and that of their partners, families and carers for many years. While men with stage III or IV cancer at diagnosis may not survive as long, their supportive care needs may be more complex. Despite high survival rates, men dealing with PCa do not live well [3, 4]. The challenges for all men with PCa are extensive, encompassing physical symptoms such as urinary, bowel and sexual dysfunction, nausea, peripheral neuropathy, metabolic changes, musculoskeletal decrements and the subsequent increased risk of falls and

fractures, as well as psychological effects such as depression, anxiety, and social and financial distress [5–7]. Compared to the general population, men with PCa undergoing active surveillance are twice as likely to experience depression and three times more likely to experience anxiety [8]. Further, men with PCa have a 70% increased risk of suicide [9].

In 2012, the Prostate Cancer Foundation of Australia (PCFA) established the Prostate Cancer Specialist Nursing (PCSN) program to improve the quality of care for men with PCa, appointing 12 PCSNs funded by community organisations [5]. In 2013, the Commonwealth government funded an additional 15 PCSNs for 2014–2017 and expanded by a further 14 nurses to a total of 29 for 2018–2020. In 2020, the PCFA received a further 3 years of funding for the existing 29 nurses and funding to expand this number to at least 63 by the end of 2022/2023. These nurses are based in all states and territories and work in health services in both the public and private sectors [10]. In this program, PCSNs play an integral role in local healthcare teams, conduct interactions face-to-face and via video link, telephone and email. In March 2021, a separate centralised PCa specialised telenursing service commenced where PCSNs, located in PCFA offices, conduct interactions via phone and email with people (including partners, family members and other individuals) who seek support from PCFA directly [5].

PCSNs play an important and varied role as an ongoing primary point of contact, providing vital psychological and physical support for men with PCa and their families. Their specialist training enables them to provide evidence-informed information about diagnosis and treatments, screen for distress, offer guidance on how to deal with the effects of treatment, and facilitate further support tailored to individual needs. They assist with accessing other services in acute care settings and signposting to local community supports. PCSNs provide expert survivorship care and coordination from diagnosis, through treatment, and the years that follow where many men still experience debilitating side-effects. The PCSN role continues to expand with nurse-led survivorship care and post-treatment surveillance programs operating in many health-services [5].

Previous evaluations conducted by PCFA showed that provision of specialist nursing services for prostate cancer (PCa) patients during and after treatment have demonstrated efficacy in mitigating consequences of the disease [10, 11] However, there is a lack of robust economic evidence regarding the benefits of such services. The aim of this economic evaluation was to provide evidence to assess the value for money of the PCSN and Telenursing programs. A social return on investment (SROI) framework was employed to determine the costs of the PCSN program relative to its benefits for men with PCa and their families for the 2 financial years July 2020–June 2021 and July 2021–June 2022 following on from the final evaluation conducted for 2017–2020 [11]. Data used in this analysis was provided by PCFA and was process data with no patient identifiers (costs, locations and number of patients only). All interview and survey results used were sourced from previous evaluations [10, 11]. There were no human participants, so ethics approval was not required for this analysis.

2 | Methods

SROI methodology developed from cost-benefit analysis (CBA) and social value calculation. Compared to CBA, which is based on neoclassical welfare economics, it utilises a 'bottom up' approach providing a framework that measures and accounts for a much broader concept of value than can be captured in purely financial terms. In this way, SROI can generate more complete evidence of impact and a better basis for decision making [12]. It is stakeholder focused and aims to understand what changes (i.e., the impact), and how that impact is measured and valued using an evidence-based, transparent and valid approach [12]. SROI can be viewed as a localised CBA to calculate value for a given population or group of stakeholders rather than the whole of society as for CBA [13]. Given that SROI recognises the role of prior heuristics, it may also better reflect the costs and benefits of public health interventions [13]. Evidence to inform the SROI was obtained via a pragmatic search of the literature, data from previous evaluation reports and close consultation with PCSN stakeholders. We followed SROI guidelines and best practice recommendations for the economic evaluation of psychosocial care in cancer [12, 14]. As shown in Figure 1 below, there are six fundamental stages to a SROI [12].

2.1 | Stage 1: Establish Scope and Identify Stakeholders

The SROI analysis encompassed two financial years (2020/21 and 2020/22) due to the impact of Coronavirus Disease (COVID) in relation to: (1) Changes in service modalities and uptake; and (2) Capacity to recruit the required number of nurses due to nursing shortages. Comparison to earlier analyses or impact on future years may be less meaningful as a result of these factors. Therefore, the counterfactual, or the comparator representing what would happen without the PCSN program, was usual care, in this case, no supportive care outside usual hospital funded nursing care.

Stakeholders involved in the PCSN program were identified as PCa patients and their partners, carers or families; PCSNs and multi-disciplinary team [MDT] members. We also consulted previous evaluations and incorporated the results from pre-existing MDT interviews [11] because time constraints did not permit collection of new data.

2.2 | Stage 2: Map Outcomes

An impact map was developed from discussions with stakeholders and the literature to ensure we captured all potential outcomes, both positive and negative (Supporting Information S1: Appendices 1A and 1B). The impact map (Supporting Information S1: Appendix 1A) sets out the process from the inputs, activities, outputs and outcomes through to the benefits or impact of the PCSN programs.

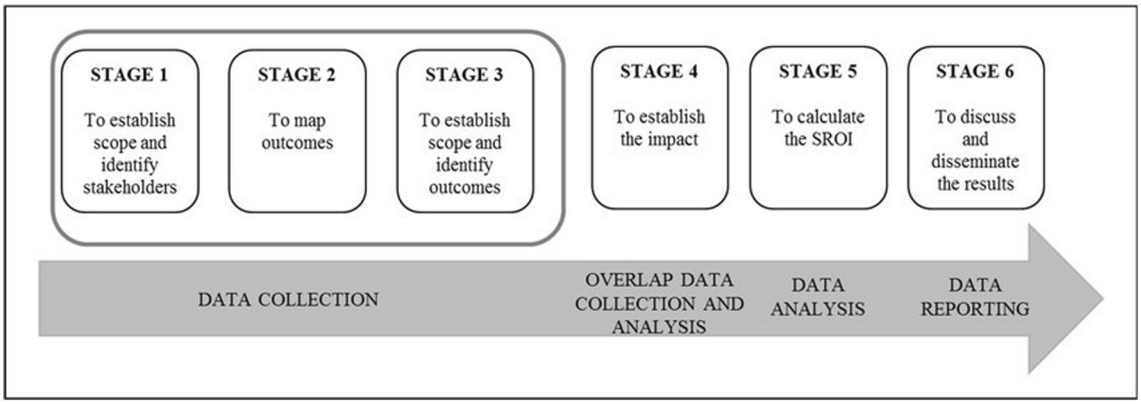

FIGURE 1 | Social Return on Investment (SROI) framework stages [12].

2.3 | Stage 3: Establish Scope and Identify Indicators of Outcomes

Cost and outcome data were accessed from the PCSN program activity database, individual PCSN Annual Service Reports, Telenursing call and service-user data and PCFA performance reports. We also used results from existing MDT and patient interviews [11] and the UTS Evaluation of the PCSN Program [10]. Evidence to support identifying, measuring and valuing the benefits of the PCSN program were drawn from the literature where there was no available outcome data. The highest quality evidence, preferably from Australian sources, was prioritised where possible. How these outcomes and their indicators are used to establish impact are described in Stage 4 below.

2.4 | Stage 4: Establishing the Impact

Financial proxies are used to estimate the social value of the change caused by the PCSN program. Only benefits that are directly attributable to the intervention for the period of time over which they are anticipated to last are included. Assumptions were therefore made to ensure that only these benefits are counted. Considerations such as attribution, deadweight loss, discounting and drop-off are required adjustments to the calculation of impact [12] (Table 1).

2.4.1 | Costs

A comprehensive costing was conducted which included operating costs to run the programs and the total set-up costs for the Telenursing service, which were annuitized 5 years from initiation in the financial year 2020/2021. The flow on costs of referrals to other providers were included and based on allied health appointments. We assumed that the most likely PCSN referral would be for psychological support and that 50% of men would be referred direct to a local health service psychologist (Medical Benefits Schedule (MBS) Item 1098) and 50% to a GP for a Mental Health Treatment Plan (MBS Item 2700) with an allied mental health provider (MBS Item 80,100) and would attend five visits per year [15]. Project costs funded from general taxation (grants) were subject to a deadweight cost of taxation equal to 5%. Infrastructure costs for consultation or workspace were not included because, where they did exist, they often included access to a computer and desk only in a shared administration space (PCSN communication) and were not considered to be a cost driver [11].

2.4.2 | Qualitative or Intangible Benefits of the PCSN Program

Intangible benefits of the PCSN and Telenursing programs (those that could not be monetised) were also captured and described based on the expert opinion of PCSN stakeholders supported by evidence from the literature (Supporting Information S1: Appendix 2).

2.5 | Stage 5: Calculating the Impact

Methods used to calculate each of the monetised benefits from the evidence collected in stages 2 and 3 are described below. The same benefits were monetised, where relevant, for the Telenursing program to determine a separate SROI. A combined SROI of both PCFA programs (PCSN and Telenursing) was also calculated (Table 2).

2.5.1 | Benefit 1: Health Related Quality of Life Measured in Quality Adjusted Life Years

Despite high levels of patient satisfaction with the PCSN service [10], no quality of life outcome data was collected for the purposes of this analysis. However, a recent randomised control trial (RCT) conducted in the UK evaluated the feasibility of a nurse-led psycho-educational intervention of personalised care for men after PCa treatment, similar to the PCSN program [16]. Health-related quality of life (HRQoL) was measured using the EuroQoL instrument EQ-5D-5L. Results of the EQ-5D are expressed as a utility score, a preference value placed on a health state ranging from 1 for perfect health to 0 for death. The resulting utility score can then be used to calculate quality-adjusted life years (QALYs), where the utility represents the quality adjustment which is calculated over 'life years' or the amount of time spent in that health state. In comparison to the control group, the men receiving the nurse led psycho-educational intervention experienced a mean quality adjusted life year (QALY) gain of 0.019 over

TABLE 1 | Adjustments to the impact: Attribution, deadweight, discounting, Drop-off.

Attribution	Attribution is expressed as a percentage and is used to account for factors other than the PCSN program that contribute to the impact of the program [12]. Consultation was conducted with PCSNs and it was determined that 95% of the benefit for patients and families could be attributed to the PCSN program because there was no other program that offered prostate cancer specific specialised supportive care. Sensitivity analyses explored the impact on the SROI of 100% and 90% attribution (Supporting Information S1: Appendix 2).
Deadweight loss	Dead weight loss (DWL) refers to the lost tax revenue from project costs that are funded by general taxation, e.g., welfare payments made to people with PCa and their carers or government services provided via the public health system, grants and programs. The assessment of dead weight determines whether changes that have occurred would have occurred anyway, in the absence of the intervention or program [12]. The best practice method is to compare the program outcomes for stakeholders to a control group or a comparison group that can be matched to stakeholders. The proportion of what would have happened anyway is subtracted from the overall estimated outcome. While willingness to seek psychosocial support amongst men with PCa can range from 10% to 17%, uptake tends to be much lower 3%–9% [53, 54]. Given that psychosocial support is only one aspect of the program and that PCSNs provide such a specialised service, we thus assumed that 5% of men would have sought psychosocial or supportive care elsewhere without the PCSN program. Hence project costs funded from general taxation in this analysis are subject to a deadweight cost of taxation equal to 5%
Discounting	Discounting is based on the notion that individuals would prefer to receive money or the benefits now rather than in the future [12]. In other words, $1 in a years' time is worth less than today. A discount rate of 5% at the middle of the year is applied to reduce the value of future costs and benefits in the present day. Sensitivity analyses explored the impact on the SROI of varying the discount rate to1.5%, 3% and 7% (Supporting Information S1: Appendix 2).
Drop-off	Drop-off accounts for a reduction in impact in future years and is unlikely in this instance given the short time frame of the analysis [12]. Drop-off could occur where another service is implemented which patients perceive to be superior to or more easily accessible than the PCSN program, or where there is dissatisfaction with the service, for example. Drop-off is unlikely given the incidence of PCa, the increasing number of new diagnoses, the high rates of satisfaction with the PCSN program [10] and the lack of other such specialised interventions and was therefore not included in the analysis.

9 months [16]. We used this 9-month gain as the proxy measure of HRQoL for 1 year of the PCSN program.

To calculate the base case benefit, this QALY gain was multiplied by the number of newly diagnosed men (when men tend to see specialist nurses more frequently). This population choice is conservative, reflecting the minimum number of individual patient contacts with a PCSN. This number is then multiplied by the mean value of a QALY, from a range estimated by Huang et al. [17]. This study used Australian population-level data and a wellbeing measurement of life satisfaction as an indicator of 'experienced utility' to determine the mean willingness to pay per QALY gained.

2.5.2 | Benefit 2: Reduced Emergency Department (ED) Presentations and Hospitalisations

Without access to a PCSN, when a patient experiences a concerning reaction to treatment, they are most likely to seek help from an emergency department (ED), particularly given the limited access to primary care and specialist oncology and urology providers. Access to the PCSN program thus has the potential to reduce the number of ED presentations and hospitalisations, particularly in the first year after diagnosis when side effects of treatment manifest and patients may not recognise the seriousness of a symptom, delay seeking assessment and treatment or exacerbate their condition in some other way due to a lack of knowledge about their health situation [18]. ED use by people with cancer can have a negative effect on the ED (increased wait times), the health system (unnecessary costs) and the patient (exposure to infection or treatment by staff not experienced in cancer care). Numerous studies have suggested that 30%–60% of ED visits among people with cancer are preventable [19–24].

Members of the MDT estimated that PCSNs reduced ED presentations by 60% [11]. The Bureau of Health Information (BHI), NSW [18] used historical data linking cancer registry, ED and hospital databases to describe how people with cancer use

hospital EDs. This study showed there were approximately 0.26 ED presentations per patient with PCa in the first year after diagnosis. The cost of an ED presentation was calculated using the Independent Hospital and Aged Care Pricing Authority (IHACPA) national weighted activity unit (NWAU) calculator for ED neoplasm complexity B 1790B [25, 26]. Evidence from Whitney et al. [27] used California Cancer Registry data linked with administrative inpatient data for 2009–2012 to show that in the year after cancer diagnosis, the median length of stay (LOS) for an unplanned hospitalisation was 3 days. Unplanned hospitalisations were chosen to exclude treatment related hospitalisations such as radiation therapy or chemotherapy and to include diagnoses common amongst hospitalised PCa patients such as complications of a medical device or care, cardiovascular disease and infections that can occur as a result of treatment. The proportion of ED presentations for people with cancer which end as admissions was sourced from the Australian Institute of Health and Welfare (AIHW) [28]. To cost hospitalisation arising from those ED presentations, we used the Independent Hospitals and Aged Care Pricing Authority (IHACPA) National Weighted Activity Unit (NWAU) calculator with the following characteristics: 3 days LOS, 65 yo, Charlson score 2, male, NSW, inner regional residential; inner regional treatment, male, reproductive system disorder, minor complexity (M64 B), HAC10 medical complication [25, 26]. We then calculated the weighted average cost of ED presentations and hospitalisations.

The final calculation of the benefit from reduced ED presentations and hospitalisations is as follows: The number of at diagnosis patient contacts multiplied by ED presentations, the weighted cost of ED presentations and resulting hospitalisations and the impact of the PCSN program [11].

2.5.3 | Benefit 3: Reduced Travel Costs

The greatest benefit from savings in travel is for those men living in regional areas who would normally travel into a hospital or clinic should they have a concern in relation to their disease or treatment symptoms. Non face-to-face patient initiated contacts with PCSNs in regional areas were therefore used as a proxy measure to determine this benefit by multiplying the costs of travel [29] by a mean return distance to see a PCSN. Most regional patients (93%) were located in MM2 or MM3 classified regions so the more conservative distance (MM2) was chosen for our benefit calculation [30]. MM2 regions are defined as within 20 km road distance of a town with a population greater than 50,000. This figure was then multiplied by the non face-to-face contacts (e.g., email, phone, mail) for 2020/21 and 2021/22. COVID had a considerable impact on the way patients used healthcare services in these 2 years with potential for enduring change.

2.5.4 | Benefit 4: Improved Productivity Losses due to Reductions in Time Spent Travelling

Men with PCa (or their partners or carers) are often still participating in the workforce when diagnosed and may continue to do so whilst undergoing treatment. Based on data from an Australian study of PCa [31], we used the number of patient-initiated contacts from regional areas (MM2-MM7) multiplied by the percentage of men with PCa who were employed fulltime [31], multiplied by the median hourly wage for an Australian male [32]. We allowed one hour of travel time (40 kms including parking time for the round trip) in a MM2 location. Using marital status data from Wu et al. [33], we assumed 84% of men with PCa were married and that 85% of wives, partners or carers would accompany the men to a medical practitioner or hospital (PCSN expert opinion). We then included the productivity losses of these carers by multiplying the percentage of carers (women aged 65 and over) employed fulltime [34] using the median hourly wage for women [32]. We acknowledge that not all carers will be women or a person of that age, however, the difference in the hourly rate is minimal; would not impact the SROI result and is the more conservative option. We added the benefit from the reduction in productivity losses for men and women.

2.5.5 | Benefit 5: Reductions in Clinical Consulting Time

According to the results of the MDT survey [11], because PCSNs addressed routine questions like treatment options, side effects, pain, psycho-social issues, etc., the time a clinician spent with a patient was significantly reduced (58%). Managers and MDT colleagues reported PCSNs enhanced the experience of clinicians and other healthcare providers, improved the efficiency of care provision and optimised pathways and outcomes for patients [10].

For the base case, we assumed that a patient [at diagnosis contacts] had at least one initial and one follow up appointment over the year following diagnosis [35] and calculated the cost using the MBS (MBS Items 132 & 133) [15]. We also included planned PCSN appointments for tumour marker (prostate specific antigen) surveillance based on a conservative estimate of numbers from centres where PCSNs provide this service (normally conducted by a clinician) (PCSN program data). To determine the benefit of reductions in clinical consulting time, patient contacts and PSA surveillance planned review appointments were multiplied by the reduction in clinician time spent with a patient due to the PCSN impact [11].

2.5.6 | Benefit 6: Reductions in Nurse Practitioner Coordination Time

We assumed that a PCSN providing care to a PCa patient would reduce the time an advanced practice nurse/nurse practitioner would spend coordinating the care of that patient. A study by Collinson et al. [36] captured the hours of nurse practitioner coordination time (n = 4 h) saved by a nurse cancer care coordinator program over 1 year in New Zealand. The number of at diagnosis patient contacts is multiplied by the hourly rate paid to an advanced practice nurse/nurse practitioner (second year level) for those 4 hours [37].

2.5.7 | Benefit 7: Reductions in Missed Appointments

Patient no-shows for medical appointments are common and have a negative impact on patient outcomes, prevent others from accessing care and result in suboptimal use of resources [38]. Contact with a PCSN has the potential to reduce the number of missed appointments for a patient with PCa through the development of a relationship of trust and the provision of assistance to patients and their carers to overcome barriers to medical care and facilitate access and compliance. A study conducted at a US PCa clinic demonstrated that the services of a patient navigator resulted in a 36.7% reduction in missed appointments (13.9% vs. 8.8%) [39]. Using this study as a proxy [39], we multiplied the control/pre-intervention rate of missed appointments (13.9%) by the reduction in missed appointments (64%) from the MDT survey [11]. We assumed, conservatively, that a patient had at least one initial and one follow up specialist appointment over the year following diagnosis [35] and calculated the cost of missing at least one appointment as the mean cost of one initial appointment and one follow up appointment (MBS Items 132 & 133) [15]. The impact of the PCSN service on the reduction in missed appointments is calculated by multiplying the number of at diagnosis contacts and patient-initiated contacts by the percentage of patients who miss at least one appointment and the mean cost of a specialist initial appointment and a follow up appointment.

2.6 | Sensitivity Analyses

Sensitivity analyses were conducted by varying certain model inputs and assumptions to test the logic of the model. We tested parameter uncertainty to show the robustness of the SROI model in relation to discount rate (5% base rate), attribution (95% base rate), emergency department and hospitalisation costing rates, PCSN impact assumptions, a 50% increase in patient contacts (patient-initiated contacts), willingness-to-pay threshold assumptions, PCSN impact assumptions regarding reductions in clinical consultation time and reductions in missed appointments.

3 | Results

3.1 | Calculating the SROI

The results of the SROI analysis of the PCSN programs are presented in Table 2. The net present value of the effects is calculated by adding all the monetised benefits of the PCSN program and subtracting the costs. The SROI is calculated by dividing the total monetised benefits of the PCSN program by the costs. There was a strong positive return on investment (Table 2).

The largest benefit of the PCSN programs and the strongest driver of the SROI model is HRQoL valued at over $25 million for the 2 years of the analysis. Other important benefits of the PCSN program that contributed to the positive return on investment (ROI) were reductions in ED presentations and hospitalisations, clinical consult times and advanced practice nurse/nurse practitioner coordination time. Where data did not exist to monetise outcomes, a number of qualitative or intangible benefits of the PCSN program are briefly described in Supporting Information S1: Appendix 2 based on patient perspectives from the 2019 patient survey [1], PCSN expert opinion and evidence from the literature.

3.2 | Telenursing Program Results

The same methods used for the PCSN SROI analysis were used to calculate the SROI for the PCFA Telenursing program using telenursing specific cost and outcome data. The cost of set up was also included and depreciated over 5 years. This solely telenursing program where PCSNs provide telephone and email support to callers is funded by PCFA and delivered centrally from the national PCFA office. Despite smaller numbers and the later commencement of the program, the low costs of telenursing contributed to a ROI of 1:2.34 for the 2 financial years of the analysis 2020–2022 (Table 2).

A breakdown of the monetary value of each benefit, assumptions and sources of evidence for the PCSN and Telenursing programs is shown in Table 3 below.

3.3 | Sensitivity Analyses

3.3.1 | Sensitivity Analysis 1—Discount Rate

We varied the discount rate applied to the model using discount rates commonly used in SROI and cost benefit analyses (Table 4). There was little impact on the net social benefit or return on investment, even if a 7% discount rate were applied.

3.3.2 | Sensitivity Analysis 2—Attribution

The base case rate of the proportion of the benefit attributable to the PCSN program is 95% per cent because there is no other service that provides specialised care to prostate cancer patients. However, it is possible that PCa patients may access supportive

TABLE 2 | Results SROI PCSN programs (2022 AUD).

	PCSN program	Telenursing program	PCSN & telenursing combined
Net present value costs	$23,751,34	$1,022,292	$24,773,640
Net present value benefits	$38,385,133	$2,391,995	$40,777,128
Net present value effects (benefits—costs)	$14,633,785	$1,369,703	$16,003,488
SROI (benefits/costs)	**1.62**	**2.34**	**1.65**

TABLE 3 | Monetised benefits, assumptions & sources of evidence: PCSN program and telenursing service (2022 AUD).

Value of monetised benefits 2020–2022	Assumptions	Sources of evidence
B1 HRQoL PCSN program: $25,238,242 Telenursing service: $1,655,765	PCSN contact improves HRQoL Using at diagnosis contacts, PCSN contact contributes to 0.019 QALY gain over 12 months x WTP for a QALY	Stanciu et al. 2018 trial of personalised care after treatment—prostate cancer: A randomised feasibility trial of a nurse led psycho-educational intervention. (QALY gain 0.019) Huang et al. 2018 life satisfaction, QALYs and the monetary value of health. WTP for QALY $54 500 (unadjusted)
B2 reduced ED presentations and hospitalisations PCSN program: $5,957,604 Telenursing service: $331,867	PCSN contact reduces avoidable ED presentations and consequent hospitalisations Using at diagnosis contacts: Mean LOS 3 days (PCa); ED presentations (PCa) patients in first year and 28% and 29% admitted to hospital NWAU calculator input (3 days LOS, 65 yo, Charlson score 2, male, NSW, inner regional residential; major city treatment, male reproductive system disorder minor complexity (M64 B), HAC10 medical complication) 60% reduction in ED presentations ED neoplasms complexity B 1790B: $1105; $1187	Deloitte access economics 2020 MDT survey: 60% reduction in ED presentations Bureau of health information 2014 The health Insight Series: Emergency department utilisation by people with cancer 0.26 ED presentations per PCa patient in the first year of diagnosis Independent hospitals and aged care Pricing Authority (IHACPA) NWAU calculator 2021 & 2022. Cost of ED presentation and hospitalisation Whitney et al. 2018 unplanned hospitalisation among individuals with cancer in the year after diagnosis Mean LOS Australian Institute of health and welfare (AIHW) 2023 emergency department care activity Percent ED presentations admitted to hospital
B3 reduced travel costs PCSN program: $258,451 Telenursing service: $23,386	PCSN phone call, email and mail responses reduce travel costs, particularly for those from regional areas who would have had to travel into a town or city centre to access a hospital or clinic. Using patient-initiated contacts from regional areas (MM2-MM7); 40 km return trip to hospital or clinic; based on MM2 regional location definition—20 km to centre of region ATO cents per kilometre method of calculating travel cost	Department of health and aged care 2022 modified Monash model Regions and distances (MM1-MM7) ATO 2023 cents per kilometre method. Income and deductions for business 0.72c/km
B4 reduced productivity losses PCSN program: $209,479 Telenursing service: $19,122	PCSN phone call, email and mail responses reduce productivity losses associated with travel to a hospital or clinic from regional areas for both patients and accompanying partners or carers. Using patient-initiated contacts from regional areas (MM2-MM7); 40 km return trip to hospital or clinic (1 hour) as for B5 Percent patients employed fulltime; median hourly wage for men ($38.80); percent married/partnered (90%); percent partners employed fulltime (17.5%); percent who accompany partner to hospital or clinic (75%); median hourly wage for women ($35.70)	Gordon et al. 2017 financial toxicity: A Potential side effect of prostate cancer treatment among Australian men 38% patients employed FT Wu et al. 2020 social connectedness and mortality after prostate cancer diagnosis: A Prospective cohort study 84% of patients married or defacto Australian Institute of health and welfare (AIHW) 2021 Older australians: Employment and work 35% partners/carers employed FT Australian Bureau of Statistics (ABS) 2022 Employee Earnings August 2022 Hourly earnings PCSN team expert opinion 85% of wives or partners accompany patient to medical appointments

(Continues)

TABLE 3 | (Continued)

Value of monetised benefits 2020–2022	Assumptions	Sources of evidence
B5 reductions in clinical consulting time PCSN program: $6,783,505 Telenursing service: $394,154	PCSN reduces clinician workload or contact time with patient. Using at diagnosis contacts with PCSN	Deloitte access economics MDT survey—58% reduction in consultation time Gordon et al. 2016 economic modelling of health services for PCa No. Of appointments per year ($n = 2$) MBS Item 132 referred consultant physician in speciality (initial) $283.20 MBS Item 133 consultant physician follow-up $141.80 2 urology visits (1 initial & 1 follow up)
B6 reductions in nurse practitioner time-coordination PCSN program: $4,168,758 Telenursing service: $273,493	PCSN doing care coordination, so reducing hours of coordination conducted by advanced practice nurse or nurse practitioner (4 h) Using at diagnosis contacts with PCSN to account for 4 h per patient not contacts per year	Collinson et al. 2013 cancer care coordinators: What are they and what will they cost? 4 h per patient per year Fair work Commission nurses Award 2020 MA000034 Pay rates nurse practitioner 2nd year $42.76 ($1624.90 weekly)
B7 reductions in missed appointments PCSN program: $1,092,708 Telenursing service: $55,255	PCSN checking that patients are attending appointments Using at diagnosis and patient-initiated contacts to capture more than initial appointments 13.9% of PCa patients miss at least one appointment; mean cost of 1 initial and 1 follow up specialist appointment.	Dobbs et al. Helping men find their way: Improving prostate cancer clinic Attendance via patient navigation 13.9% missed appointments pre-intervention MBS Item 132 referred consultant physician in speciality (initial) $283.20 MBS Item 133 consultant physician follow-up $141.80 Mean cost of 1 initial and 1 follow up appointments for one missed appointment each year

Abbreviations: ATO, Australian Tax Office; ED, emergency department; FT, full time; HRQOL, health related quality of life; LOS, length of stay; MBS, Medical Benefits Schedule; MDT, multidisciplinary team; NWAU, National Weighted Activity Unit; PCa, prostate cancer; PCSN, prostate cancer specialist nurse; QALY, quality adjusted life year; WTP, willingness to pay.

care they find useful from other sources. We tested this assumption at 100% and 90% attribution to benefit in the sensitivity analyses, which had a small impact on the resulting ROI (Table 5).

3.3.3 | Sensitivity Analysis 3—Willingness-To-Pay (WTP) Threshold

To test the robustness of the model with regard to HRQoL, we used the lower and upper limits of the WTP threshold [17]. The ROI increased and decreased considerably because HRQoL is the main driver of the model, but the return on investment remained positive even for the lower assumptions (Table 6).

3.3.4 | Sensitivity Analysis 4—Reductions in ED Presentations and Hospitalisations

The survey of MDT members suggested that the PSCN program results in a 60% reduction in ED presentations [11]. We tested the uncertainty of this claim firstly by varying the impact of the PCSN program to 30%, a 50 per cent reduction. This had a small impact, reducing the overall ROI to 1.51. Secondly, we varied the baseline analysis by increasing the cost of an ED presentation for neoplasm complexity (B 1790B) and a LOS in hospital of 3 days for a minor complexity reproductive disorder (M64 B) to a LOS in hospital of 6 days for a major complexity reproductive disorder (M64 A) [25, 26]. There was a more noticeable increase in the ROI (1.62) when the reason for presenting at ED is more serious (major vs. minor complexity) and the cost of treatment is increased by 24%–28% as in the example used for this analysis (Table 7). Using patient-initiated (arguably a more accurate representation of ED presentations) rather than at diagnosis contacts with the PCSN (a 50% increase in patient numbers) as the population had a similar impact, increasing the ROI to 1.70.

3.3.5 | Sensitivity Analysis 5—Reductions in Clinical Consulting Time

The survey of MDT members suggests that the PSCN program results in a 58% reduction in clinical consultation time [11]. We tested the uncertainty of this claim by varying the impact of the PCSN program to 30%, an almost 50 per cent reduction. This reduced the ROI, considerably, to 1.49 (Table 8).

TABLE 4 | Sensitivity analysis 1—Discount rate assumptions (2022 AUD).

Discount rate PCSN	1.50%	3%	5% (baseline)	7%
NPV effects	$15,465,061	$15,099,203	**$14,633,784**	$14,192,287
SROI	1.62	1.62	**1.62**	1.62
Discount rate PCSN & telehealth				
NPV Effects	$16,924,091	$16,518,861	**$16,003,487**	$15,514,743
SROI	1.65	1.65	**1.65**	1.65
Discount rate telehealth				
NPV Effects	$1,459,030	$1,419,658	**$1,369,703**	$1,322,456
SROI	2.34	2.34	**2.34**	2.34

Note: The bold values indicate the baseline result without any sensitivity adjustment.

TABLE 5 | Sensitivity analysis 2—Attribution assumptions (2022 AUD).

Attribution PCSN	100%	95% (baseline)	90%
NPV effects	$16,654,054	**$14,633,784**	$12,613,514
SROI	1.70	**1.62**	1.53
Attribution PCSN & telenursing			
NPV Effects	$18,149,652	**$16,003,487**	$13,857,323
SROI	1.73	**1.65**	1.56
Attribution telenursing			
NPV Effects	$1,495,597	**$1,369,703**	$1,243,809
SROI	2.46	**2.34**	2.22

Note: The bold values indicate the baseline result without any sensitivity adjustment.

TABLE 6 | Sensitivity analysis 3—Willingness-to-pay (WTP) assumptions (2022 AUD).

WTP PCSN	Huang et al. 2019 ($42000–$67000) $54,500 per QALY (wellbeing) (baseline)	Huang et al. 2019 upper limit $67,000 per QALY	Huang et al. 2019 lower limit $42,000 per QALY
NPV effects	**$14,633,784**	$18,861,751	$ 9,550,468
SROI	**1.62**	1.77	1.40
WTP PCSN & telenursing			
NPV Effects	**$16,003,487**	$21,417,116	$10,589,858
SROI	**1.65**	1.86	1.43
WTP telenursing			
NPV Effects	**$1,369,703**	$1,700,016	$1,039,390
SROI	**2.34**	2.66	2.02

Note: The bold values indicate the baseline result without any sensitivity adjustment.

3.3.6 | Sensitivity Analysis 6—Reductions in Missed Appointments

MDT members estimated that PCSNs reduced missed appointments by 64% [11] (2). We tested the robustness of this estimate by using the per cent reduction (36.7%) in missed appointments achieved by the employment of a patient navigator in a US study of men with PCa [39]. This reduction in impact had little effect on the SROI result (Table 9).

3.4 | Intangible Benefits of the PCSN Program

In addition to the monetised benefits described above, participation in the PCSN program resulted in a number of intangible benefits for patients, their partners and families, PCSNs and other healthcare providers. Dunn, Green et al. [40] identified six PCa survivorship domains in their essentials framework and the PCSN program impacts each of these: (i) Health promotion and advocacy; (ii) Shared management, (iii) Vigilance, (iv) Personal

TABLE 7 | Sensitivity analysis 4—ED and hospitalisation assumptions (2022 AUD).

ED & hospitalisation PCSN	LOS 3 days + minor complications (baseline)	LOS 6 days + major complications	Reduced PCSN impact (30%)	Patient initiated contacts with PCSN
NPV effects	**$14,633,784**	$16,011,880	$12,019,791	$16,567,550
SROI	**1.62**	1.67	1.51	1.70
ED & hospitalisation PCSN & telenursing				
NPV Effects	**$16,003,487**	$17,461,441	$13,285,531	$17,937,253
SROI	**1.65**	1.70	1.54	1.72
ED & hospitalisation telenursing				
NPV Effects	**$1,369,703**	$ 1,449,561	$ 1,265,740	$1,664,949
SROI	**2.34**	2.42	2.24	2.63

Note: The bold values indicate the baseline result without any sensitivity adjustment.

TABLE 8 | Sensitivity analysis 5—Reductions in clinical consulting time assumptions (2022 AUD).

Reduction in clinical consulting time PSCN	Reductions in clinical consulting time (58% MDT) (baseline)	Reductions in clinical consulting time (30%)
NPV effects	**$14,633,784**	$11,756,090
SROI	**1.62**	1.49
Reduction in clinical consulting time PCSN & telenursing		
NPV Effects	**$16,003,487**	$12,960,289
SROI	**1.65**	1.52
Reduction in clinical consulting time telenursing		
NPV Effects	**$1,369,703**	$1,204,199
SROI	**2.34**	2.18

Note: The bold values indicate the baseline result without any sensitivity adjustment.

TABLE 9 | Sensitivity analysis 6—Reductions in missed appointment assumptions (2022 AUD).

Reductions in missed appointments PCSN	Reductions in missed appointments (64% MDT) (baseline)	Reductions in missed appointments (36.7% Dobbs et al. 2020)
NPV effects	**$14,633,784**	$14,223,675
SROI	**1.62**	1.60
Reduction in clinical consulting time PCSN & telenursing		
NPV Effects	**$16,003,487**	$15,572,905
SROI	**1.65**	1.63
Reduction in clinical consulting time telenursing		
NPV Effects	**$1,369,703**	$ 1,349,230
SROI	**2.34**	2.32

Note: The bold values indicate the baseline result without any sensitivity adjustment.

agency, (v) care coordination, (vi) Evidence-based survivorship interventions. The intangible benefits of the PCSN program not monetised in the SROI analysis are described in detail under each of these six survivorship domains in Supporting Information S1: Appendix 2. Of particular impact is the advocacy the PCSNs provide on behalf of the patient with MDTs and in relation to health care and support services, which not only positively impacts a patient's distress, confidence, resilience and QoL [11], but can also improve long term survival rates and reduce risk of death [41]. The knowledge of PCa provided by the PCSN and active engagement with patients, showing interest in their opinions and encouraging their participation in care decisions helps patients feel more in control of their situation. Empowering patients to have greater personal agency leads to better treatment adherence and overall management of the disease through improved self-esteem, satisfaction and self-respect [42, 43]. Not all benefits accrue solely to patients, the PCSN program extends its benefits to health practitioners in the MDT and hospital or clinic and the patient's family via support of, or referral to, other interventions such as psychosocial care,

intimate relationship counselling, exercise and nutrition, peer support groups and financial assistance. PCSNs also report benefits from their involvement in the program [10].

4 | Discussion

This SROI analysis assessed the impact of the PCSN program on PCa patients, their families and the health system. This conservative analysis generated a strong positive return on investment (1.62:1), demonstrating the successful implementation of the PCSN program, despite inclusion of only a proportion of the population actually receiving the services of a PCSN. For 2020/21 and 2021/22, 'at diagnosis' patients, the most commonly used population in the analysis, represented around 40% of all non-review patient contacts and less than 20% of all patient contacts with a PCSN. It is likely that the numbers of men accessing the program are higher, but we have no way of accurately estimating this. For this reason, our analysis underestimates the true value of the PCSN program. We conducted a sensitivity analysis for one benefit (reduced ED presentations and hospitalisations) using patient-initiated contacts rather than at diagnosis contacts (approx. 50% increase in patient numbers) which increased the ROI from 1.62 to 1.70. As patient numbers are a strong driver of the model, it is likely that an increase in numbers of men accessing the PCSN program across all seven monetised benefits would have a considerable impact on the overall ROI. The largest drivers of the model were patient numbers, HRQoL, reduced ED presentations and hospitalisations, reduced clinical consulting time and advanced practice nurse/nurse practitioner time.

Where benefits could not be monetised, a brief qualitative assessment of the benefits for patients and healthcare providers (including PCSNs) was provided which showed high levels of satisfaction amongst all stakeholders and the reach of PCSNs across all six PCa survivorship domains [40] (Supporting Information S1: Appendix 2). Such outcomes demonstrate the potential for a much higher ROI should more robust data be captured that would enable these benefits to be monetised.

4.1 | Implications

While SROI analysis provides a pragmatic approach to determining the social and economic value of public health interventions like the PCSN programs and has strong translational impact, SROI methodology in health economics is relatively new and sometimes lacks the acceptance afforded welfare economics-based CBA. However, economists are increasingly recognising the relevance of an approach that better reflects the broader social value of public health interventions. [13]. In late 2023, the results of this analysis contributed to the decision by Federal government to invest a further $35.4 million over 4 years to 2026–27 [44]. This conservative analysis provides sound evidence of the impact and value for money of the PCSN program and should be instrumental in supporting further policy decisions to extend the program beyond the current funding to 2026–27. Another SROI analysis of supportive care in cancer also demonstrated a strong return on investment [45] and the authors made the pertinent point that SROI methodology aligns with the tenets of value based healthcare, where costs, outcomes and patient and clinician experience inform service delivery change to contribute to a greater return on investment [45].

While few studies have examined the value for money of supportive care services for cancer survivors [45, 46], there is growing interest in the use of SROI methodology to evaluate public health and social services. However, until recently, evaluations were often conducted by external consultants, reported in the grey literature, lacked robust financial evaluations, tended to have high ROI results and low methodological quality [47]. One systematic review of physical activity programs reported ROI results ranging from $1.7 to $124 for every dollar invested with 2 thirds reporting results $4:1 or higher [48], while another for interventions targeting people with mental health problems reported ROI results from £0.79 to £28 per pound invested with only 3 of 42 studies published in academic journals [49]. Such reviews recognise the important place of SROI analysis in determining the value for money of public health interventions but have also highlighted the need for improved methodological rigour via greater involvement of academics, innovation in methods and peer review publication [47, 48].

When compared to such studies, including analyses of vehicle modification for drivers with disability [50], art activities or peer support for people with dementia [51, 52], and mental health and wellbeing interventions [49], our result is indeed conservative. Our analysis is robust and the methodology transparent, making a strong contribution to the burgeoning academic literature in SROI.

4.2 | Limitations

There are a number of limitations for this economic evaluation arising mainly from the lack of patient level data that impacts modelling assumptions and the generalisability of findings.

4.2.1 | Data Limitations Impacting Modelling Assumptions

Most of the data collected for the PCSN programs is activity-based data focussing on patient-related consultations. Therefore, there were no individual patient identifiers, so numbers of patients when calculating monetised benefits were based on patient contacts with PCSNs, not individual patients. The number or contacts included for each benefit were based on those which would most accurately reflect patient numbers. A conservative approach was applied in all instances. For example, where there was no individual patient data, we chose 'at diagnosis' patient numbers, despite the fact that many of these patients would have further contact with a PCSN in the years following diagnosis. Patient-initiated contacts (a 50% increase in numbers compared to at diagnosis contacts) were included only to calculate reductions in missed appointments. Given that patient numbers are a significant driver of the model,

the inclusion of more patients would likely have impacted on the resulting SROI. An example is shown in the sensitivity analysis (SA4) for the benefit reduced ED presentations and hospitalisations where the impact of that 50% increase in numbers increased the overall ROI from 1.62 to 1.70 (Supporting Information S1: Appendix 2). This suggests a considerable impact if such increases in numbers were calculated for all benefits.

MDT member perspectives were based on the 2019 MDT survey outcomes which were used to value the impacts of the PCSN program on patient and health service outcomes and monetise the benefits [11]. Similarly, patient and PCSN perspectives reported in the qualitative benefits section of this report were either based on a survey conducted with patients [10], discussions with PCSNs or on the literature for similar PCSN programs in Australia or like countries (NZ, UK, US).

4.2.2 | Data Limitations Impacting Generalisability of Findings

Evidence to support identifying, measuring and valuing the benefits of the PCSN program was drawn from the literature where there was no available outcome data. The highest quality evidence drawn from Australian sources and a population of PCa patients, was prioritised where possible (Table 2).

In conducting the SROI analysis, we followed SROI guidelines and best practice recommendations for the economic evaluation of psychosocial care in cancer [12, 14]. Sensitivity analyses were conducted to test parameter uncertainty and demonstrate the robustness of the model.

5 | Conclusion

This SROI analysis demonstrates the potential for the PCSN program to impact the health outcomes and quality of life of men with PCa in an efficient and cost-effective manner, impacting cancer care policy and funding decisions. Routine collection of patient level data to capture individual patient contacts and HRQoL outcomes would likely yield a higher ROI than the conservative analysis reported here, as it is this data that drives the ROI. Demographic data to identify populations not accessing PCSN programs would also support the development and implementation of strategies to improve equity and access.

Acknowledgements

Open access publishing facilitated by The University of Queensland, as part of the Wiley - The University of Queensland agreement via the Council of Australian University Librarians.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data sharing is not applicable to this article as no new data were generated during the current study.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.