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A Cost Analysis for the Implementation of a Dementia Patient and Carer Public Advisory Board for Health Research

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Abstract

Background

Patient and Public Involvement (PPI) in research is increasingly commonplace. While financial constraints are cited as barriers to PPI, there is limited understanding of the factors that drive costs. This work aimed to 1) understand comprehensively a PPI Board's costs and cost drivers, 2) identify cost-saving opportunities, and 3) serve as a costing template to help others develop a PPI Board.

Methods

A cost analysis was conducted to identify the time and salary requirements (considered the main cost drivers) needed to design, implement, maintain and evaluate the PPI Board within a 4-year timeframe. This analysis involved determining 1) the stages of the project, 2) the activities of each stage, 3) the timeframe, 4) the required positions, and 5) the costs.

Results

The Board's one-year cost was Australian dollars (AUD) $150,229 (43% design, 21% implementation, 19% operation, 17% evaluation). Although the distribution of hours allocated per position is consistent with the distribution of costs, the distribution per stage differs. While the head researcher position allocated the highest proportion of hours (and costs) to design (67%) and implementation (46%), the research assistant allocated the highest proportion to operations (53%). The Board members accounted for the lowest proportion of the total hours (5%).

Conclusions

PPI is resource-intensive; therefore, opportunities to allocate resources more efficiently through sustainable PPI models. In this way, a deep level of PPI from the start of this project would not only make it more financially efficient but, even more critically, enhance and ensure community engagement.

PLAIN ENGLISH SUMMARY

Involving patients and members of the public in research helps ensure that studies address the needs and priorities of the people they are designed to benefit. Although this type of involvement is becoming more common, many research teams worry about the costs, and there is little information about what makes these activities expensive.

This study looked at the time and costs involved in creating and running a Patient and Public Involvement (PPI) Board over four years. We examined every stage of the process—from planning and setting up the Board to running meetings and evaluating its impact—to identify the main cost drivers and opportunities to use resources more efficiently.

We found that running the Board did cost approximately AUD $150,000 per year. Most of the costs occurred during the planning and set-up phase, while ongoing operations and evaluation accounted for smaller proportions. Researchers spent most of their time planning and establishing the Board, whereas research assistants spent more time supporting its day-to-day activities. Board members themselves contributed only a small proportion of the total time required.

Our findings show that meaningful patient and public involvement requires a significant investment of time and resources. However, involving patients and community members from the beginning of a project may make this process more efficient in the long term while also strengthening community engagement and improving the relevance of research.

BACKGROUND

Public involvement in health service research represents a shift from the traditional approach in which research is conducted "to," "for," or "about" members of the public, to one where research is conducted collaboratively "with," or "by"

public research partners[1–3]. Terminology used for public involvement in research varies across countries. In Australia, it may be referred to as “consumer and community involvement”; in Canada, as “patient-oriented research” or “patient and public engagement”; and in the UK, as “patient and public involvement” (PPI)[2,4,5]. Henceforth, the term PPI will be used. In PPI, researchers and public partners combine their disciplinary and experiential knowledge to set research priorities, develop research materials, collect data, and disseminate findings[6–10]. PPI is associated with beneficial impacts on research, including higher-quality, more user-relevant findings and recommendations, better researchers' understanding of community research needs, and greater accountability and transparency[2,5,8,10,11].

Governments and other funding bodies increasingly stipulate the inclusion of meaningful public involvement in health research proposals because of these associated benefits[6,12,13]. Due to this widespread mandate for public involvement, combined with the public funding and the resource-intensive nature of meaningful involvement, there has been an increased focus on evaluating PPI’s impact to ensure transparency and to justify this significant investment[14].

While a full cost-benefit analysis of PPI is an attractive notion, the scarcity of high-quality input (cost)[14,15] and output (impact) evidence[11,12,16] presently makes this challenging. While cost analysis should be theoretically straightforward because expenses are recorded within research budgets, the actual cost of PPI is rarely reported[15]. To the authors’ knowledge, only two peer-reviewed articles—both from the UK—have reported on cost or PPI budgeting in any detail[24,25]. Costs are likely reported to funding bodies but are rarely shared in the literature.

Understanding PPI costs, cost drivers, and how funds are allocated (and why) is important. Significant sums of money are ‘wasted’ in research annually[17,18] and while there is no current evidence, it is a reasonable assumption that waste is also present in PPI initiatives[5,19], mostly due to a lack of evidence and siloed efforts, hinder our understanding of the cost of PPI and how to budget for it[20,21]. Tools exist for PPI cost prediction and budgeting, but their use and effectiveness are not well-documented[22]. Furthermore, high cost and cost uncertainty are often cited as barriers to implementing public involvement; thus, budget reporting and transparency could resolve much of the cost ambiguity, which may hamper meaningful involvement efforts[3,9,11,21,23,24].

Based on the importance of the topic and the scarcity of detailed cost reporting in the literature and elsewhere[14,15], we undertook a cost analysis of a PPI research initiative developed at The University of Queensland (UQ). This project, the Evaluating Quality Care (eQC), was funded by the National Health and Medical Research Council of Australia (NHMRC) (APP1140459) and aimed to improve the quality of hospital care for people living with dementia[25]. Central to this project was the formation of the eQC Patient and Carer Advisory Board (the Board herein), an advisory body comprising people living with dementia or other cognitive impairments or conditions, as well as their care partners. The Board was formed to collaborate with researchers to ‘embed partnerships between lived experience experts and researchers at every level of planning, delivery, monitoring and evaluation of research, translation and policy undertaking by the research group.

The Board, which averaged seven members over its four-year operational period, met with researchers every second month. They called for updates on research progress, provided input on ongoing projects, and collaborated on the conception, design, conduct, analysis, and dissemination of eQC research projects, all while offering feedback on other initiatives and working closely with PhD students throughout their studies. Meetings also served to share information on external opportunities relating to dementia, aged care, and health service research for both members and researchers. The Board also called to facilitate co-authorship of publications between researchers and Board members, which necessitated deeper public involvement. Including reading time, members contributed approximately 32 hours per year to the project, with some members contributing additional hours to specific projects and tasks individually. Member time was remunerated at rates recommended by Health Consumers Queensland[26], an hourly rate equivalent to that of the UK’s National Institute for Health and Care Research[26].

As mentioned above, despite the benefits of PPI, financial constraints are cited as barriers to its implementation. However, there is a lack of understanding of its cost and the factors that influence expenses. The work reported here aimed to address the knowledge gap regarding the time and monetary costs of running a successful and impactful PPI board within a health research project. The work had the following objectives:

1. To provide a comprehensive understanding of the PPI Board costs and cost drivers.
2. To identify cost-saving opportunities to improve the financial efficiency of the Board.
3. To serve as a costing template for other organisations to help them develop a PPI Board.

METHODS

Study Design:

To achieve the proposed objectives, a **Cost Analysis** was employed to identify the time and salary requirements (considered the main cost drivers) required per activity in each of the eQC Project's PPI stages: design, implementation, operation, and evaluation, within a 4-year timeframe.

The analysis followed the principles of the **Time-Driven Activity-Based (TDABC)** costing approach. This detailed cost-accounting method is increasingly used in healthcare to evaluate costs, based on the principle of bottom-up allocation of resources to processes on a cost-per-unit-time basis[27]. It is a well-described model in health economics developed by Stephen R. Anderson and Robert S. Kaplan[28] that has been successfully applied in the health field[29].

An underlying assumption is the provision of infrastructure (buildings), office equipment, basic services (electricity, internet connectivity, water, etc.), and technology equipment (hardware and software); therefore, the cost analysis did not include these elements. This most closely approximates the cost that other organisations would incur to implement a PPI board.

Cost Analysis Steps:

The cost analysis of the setup and maintenance of the PPI Board considered the following steps, definitions, and assumptions:

Step 1: Determining the stages of the project.

The first step was to define the four stages for setting up and maintaining the PPI Board's functions: design, implementation, operation, and evaluation and monitoring.

- **Design**: It covers the project design, including the Board's purpose and function, ethics, and the grant application process.
- **Implementation**: It covers the recruitment of the Chair and Board members and the operationalisation of the Board's "terms of reference," which set out the Board's structure and governance.
- **Operation**: It covers the Board's operations, including ordinary and extraordinary meetings, administrative and financial management, research duties, and community management.
- **Evaluation & Monitoring**: It involves analysing the Board results and outcomes to assess their effectiveness and impact on the proposed goals.

Step 2: Determining the activities of each stage.

The second step was to define the critical activities for each stage, shown below in Table 1

Table 1
Activities for each stage

Stage	Activities
Design	Project design development
	Grant application and allocation
Implementation	Plan the Selection and Recruitment process for board members
	Opening the requisition for the Chairperson
	Screening the Chair applicants
	Interviewing Board member candidates
	Selection and appointment of Board Members
	Elaboration of terms of reference
Operation	Attendance at general and extraordinary board meetings
	Attendance at working group meetings
	Community management
	Administrative management
	Financial management
	Research duties
Evaluation & Monitoring	Rolling evaluation
	Costing analysis

Step 3: Determining the timeframe for each stage and the activities

It was necessary to estimate a timeframe to outline the activities for each stage in the previous step. The analysis spanned 18 months for design, followed by 18 months for implementation, and concurrently 12 months for operation and 12 months for evaluation (see Fig. 1).

Step 4: Determining the required positions.

To accomplish the activities already defined, it was necessary to allocate Board members and professional positions according to specific profiles, the required hours per position, and the total period for which each position was assigned, based on the duration of each stage or activity. The roles and activities of the Board positions were based on the PPI Board's Terms of Reference (see Tables 2 and 3).

Table 2
Positions and role descriptions

Position	UQ Level	Role Description
Board Chairperson	N/A	The Board Chairperson is the head of the Board who presides over the meeting and directs discussion around a jointly developed agenda. The Chairperson acts as a facilitator, ensuring all members are equally heard, and advocates on behalf of members to address any conflicts between members and/or researchers. This is only one position, appointed as part of the recruitment and selection process.
Board Members	N/A	Board members were people living with dementia or past/present carers for a person living with dementia, who served as representatives of this community, providing experiential expertise and perspectives on research approaches, methodology, and dissemination. These roles were appointed during the recruitment and selection process. The total number of members was seven (The chairperson is also a member of the Board).
Head Researcher	Academic staff Level D1	The Head Researcher will lead, manage, and deliver high-profile research work. The Head Researcher ensures that all research objectives are met and can support and guide fellow team members as required.
Research Adviser	Academic staff Level D1	The Adviser oversees research and offers guidance on research-related matters.
Research Manager	Academic staff Level B3	The Research Manager leads the execution of research projects by drafting proposals, selecting methods, working with and supervising teams, collaborating with other stakeholders, managing budgets, and presenting findings.
Research Assistant	Professional staff Level 5.1	The Research Assistant is the primary point of contact for the Board and the project team. The Research Assistant supports each stage of the research project by conducting literature searches, managing and analysing data, and handling administrative and document-related tasks.

Table 3
Key activities and actions (items) per stage and positions

Stages	Activities	Position	Actions or Items
Design	Project design development	Head Researcher	Documents preparation
		Research Adviser	Documents preparation
	Grant application	Head Researcher	Documents preparation
		Research Adviser	Documents preparation
	Grant allocation	Head Researcher	Documents preparation
		Research Adviser	Documents preparation
Implementation	Selection and Recruitment Process Planning	Head Researcher	Documents preparation
	Opening the requisition for the Chair	Head Researcher	Documents preparation
			Dissemination and Communication
	Screening the Chair applicants	Head Researcher	Screening and Selection
			Dissemination and Communication
	Interviewing Board member candidates	Head Researcher	Interview preparation and performance
		Research Adviser	Interviews performance
		Board Chairperson	Interviews performance
	Selection and Appointment of Members	Head Researcher	Documents preparation
			Dissemination and Communication
		Board Chairperson	Dissemination and Communication
	Elaboration of terms of reference	Head Researcher	Meeting attendance
			Documents preparation
		Board Chairperson	Meeting attendance
			Documents preparation
		Board Members	Meeting attendance
			Documents preparation
Operation	Attendance at general board meetings	Head Researcher	Meeting attendance
		Research Manager	Meeting attendance
		Research Assistant	Meeting attendance
		Board Chairperson	Agenda preparation
			Meeting attendance

Stages	Activities	Position	Actions or Items
			Reading/input
		Board Members	Meeting attendance
			Reading/input
	Attendance at working group meetings	Head Researcher	Meeting attendance
		Research Manager	Meeting attendance
		Research Assistant	Meeting attendance
		Board Chairperson	Meeting attendance
			Reading/input
		Board Members	Meeting attendance
			Reading/input
	Community management	Research Assistant	Board website design
			Board website content maintenance
	Administrative management	Research Assistant	Agenda and schedule preparation
			Documents preparation
			Dissemination and Communication
	Financial management	Research Assistant	Funds search and allocation
			Documents preparation
			Dissemination and Communication
	Research duties	Board Members	Grant reviews
		Board Members	Additional document review
		Head Researcher	Document preparation
		Research Manager	Document preparation
		Research Assistant	Dissemination and Communication
Monitoring & Evaluation	Rolling evaluation	Research Assistant	Documents preparation
		Research Assistant	Dissemination and Communication
	Costing analysis	Research Manager	Documentation and info support
		Research Assistant	Documentation and info support
		Collaborator	Analysis

Step 5: Determining the costs

The costs were determined based on the total estimated hours per action, allocated to activities performed by different positions at each project stage (third step), and projected over a specific period (fourth step). Finally, the costs were calculated based on the hourly remuneration for each position. The Board Members' position costs were calculated based on the Health Consumers Queensland Remuneration and Reimbursement of Consumers guideline rate at the time (AUD$212.00 for activities up to four hours)[26]. For the UQ staff position, these were based on the Costing and Pricing Tool in the UQ Budgets for Research Projects guideline.

RESULTS

The costs and cost drivers of this project's PPI efforts were examined in terms of the PPI Board's total costs. The second analysis examined the distribution of costs by stage and project activities, then by stages and staffing required. Lastly, the distribution of hours across stages and required staffing positions was reviewed to identify any efficiencies and inefficiencies.

All values are presented in Australian dollars (AUD). Even though costs may vary between countries, the key takeaways on costing PPI activities will still hold across settings.

The PPI Board costing results will be presented by project stage, activity, position, and total cost. Once the stages and activities of the PPI Board were mapped out, the hours of work were determined and costed.

The costing was calculated using Microsoft Excel sheets with dynamic formulas, creating a template that allows for easy adjustments in cost calculations.

• PPI Board Total Costs

The total cost for the PPI Board, covering 18 months of design, 18 months of implementation, 12 months of operation, and 12 months of evaluation, was $150,229. Figure 2 below shows that the design stage accounts for the highest proportion of costs ($64,080 = 43%), followed by implementation ($31,158 = 21%), operation ($28,762 = 19%), and Evaluation ($26,228 = 17%).

• PPI Board Distribution of Costs by Stages and Activities

Table 4 shows a breakdown of costs by activity for each stage.

Table 4
PPI Board Distribution of Costs by Stages and Activities

Stages	Activities	$ by activity	% by stage	% from total	$ by stage	%
Design	Project design development	$ 21,360	33%	14%	$ 64,080	43%
	Ethics application process	$ 21,360	33%	14%		
	Grant application process	$ 21,360	33%	14%		
Implementation	Recruitment and Selection	$ 16,810	**54%**	11%	$ 31,158	21%
	Elaboration of terms of reference	$ 14,348	46%	10%		
Operation	Attendance at general board meetings	$ 12,873	**45%**	9%	$ 28,763	19%
	Attendance at working meetings	$ 4,246	15%	3%		
	Community management	$ 876	3%	1%		
	Administrative management	$ 3,504	12%	2%		
	Financial management	$ 584	2%	0.4%		
	Research duties	$ 6,680	23%	4%		
Monitoring & Evaluation	Rolling evaluation	$ 514	2%	0%	$ 26,228	17%
	Costing analysis	$ 25,714	**98%**	17%		
Total					**$ 150,229**	

During the design, all activities incurred the same costs, each accounting for 33%. However, in the implementation stage, the recruitment and selection of Board members accounted for the highest cost at 54%. In the operation stage, attendance at general meetings accounted for 45% of costs; in the evaluation stage, the cost analysis constituted a significant 98%.

• PPI Board Distribution of Costs by Stages and Positions

Table 5 shows that the Head Researcher accounts for the largest share of total costs (39%), followed by the Research Adviser (19%) and the Research Assistant (13%).

Table 5
PPI Board Distribution of Costs by Stages and Positions

Position	Costs by Stages and Activities								Total	%
	Design	%	Implementation	%	Operation	%	Monitoring & Evaluation	%		
Head Researcher	$42,048	66%	$14,308	46%	$2,628	9%	$0	0%	$58,984	**39%**
Research Adviser	$22,032	34%	$7,038	23%	$0	0%	$0	0%	$29,070	**19%**
Research Assistant	$0	0%	$0	0%	$9,928	35%	$9,782	37%	$19,710	**13%**
Board Members	$0	0%	$7,524	24%	$11,112	39%	$0	0%	$18,636	12%
Research Manager	$0	0%	$0	0%	$3,108	11%	$11,766	45%	$14,874	10%
Board Chairperson	$0	0%	$2,288	7%	$1,987	7%	$0	0%	$4,275	3%
Collaborator	$0	0%	$0	0%	$0	0%	$4,680	18%	$4,680	3%
Total	$64,080		$31,158		$28,763		$26,228		**$150,229**	
%	43%		21%		19%		17%			

These results differ slightly from the stage-by-stage analysis (see Fig. 3). The Head Researcher accounts for the largest share of the design and implementation costs (66% and 46%, respectively), while the Board members are the highest-cost in the operational stage (39%) and the Research Manager in the evaluation stage (45%).

The high percentage of the costs during the design and implementation stages was allocated to the Head Researcher. During the Operation stage, the Board members assumed their roles and explained the increased costs allocated to this position. On the other hand, in the monitoring stage, costs are more evenly distributed between the research manager (45%) and the research assistant (37%), as the duties of this stage are allocated mainly to these positions.

• PPI Board Distribution of Hours by Stages and Positions

The total hours expended on the PPI Board, considering 18 months for design, 18 months for implementation, 1 year for operation, and 1 year for evaluation, totalled 1,119 hours.

The distribution of hours allocated to each position across the four project stages (Table 3) is consistent with the cost analysis presented earlier. The largest proportion of total time was required by the head researcher (36%), followed by the research adviser (17%) and the research assistant (13%), as shown in Table 6.

Table 6
PPI Board Distribution of Hours by Stages and Positions

Position	Hours by Stages and Positions								Total	%
	Design	%	Implementation	%	Operation	%	Monitoring & Evaluation	%		
Head Researcher	288	67%	98	46%	18	7%	0	0%	404	**36%**
Research Adviser	144	33%	46	21%	0	0%	0	0%	190	**17%**
Research Assistant	0	0%	0	0%	136	53%	6	3%	142	**13%**
Research Manager	0	0%	0	0%	28	11%	106	49%	134	12%
Board Chairperson	0	0%	46	21%	39	15%	0	0%	85	8%
Collaborator	0	0%	0	0%	0	0%	104	48%	104	9%
Board Members	0	0%	24	11%	36	14%	0	0%	60	5%
Total	432		214		257		216		**1119**	
%	39%		19%		23%		19%			

While the Head Researcher spent the highest proportion of time in the design (67%) and implementation (46%) stages (Fig. 4), the Research Assistant spent the highest proportion of hours during operation (53%). In the evaluation stage, the Research Manager and the collaborator spent the most hours, directly related to performing the cost analysis of the Board's efforts. No time was allocated to Board members during the design and evaluation phases, even for the Board Chairperson. Only 11% and 14% of the time are allocated to the implementation and operation stages, respectively.

It is notable that the hours invested do not translate directly into comparable costs due to differences in hourly rates across positions. For example, the research assistant spent the highest proportion of hours in the operational stage at 53%, but this is not reflected in the cost proportion (35%) due to the position's low hourly rate. The Board Chairperson and Research Advisory each accounted for 21% of the hours during the Implementation stage, but the costs differed significantly at 7% and 23%, respectively.

The results showed that board members accounted for a low proportion of total hours and costs; specifically, for members, this was no more than 5% of time and 12% of costs, and for the Chairperson, 8% of time and 3% of costs.

DISCUSSION

This study aimed to provide a comprehensive understanding of our PPI Board's costs and cost drivers, identify cost-saving opportunities to improve financial efficiency, and serve as a costing template for other organisations to estimate PPI setup and ongoing financial tracking budgets. The cost analysis of PPI-specific activities in the eQC project revealed that the primary cost drivers of public involvement are stage- and staff-related, rather than remuneration for public partners' expenses and time. The findings are supported by the literature arguing that PPI is resource-intensive[21,22,30,31], but add nuance to the distribution of these resources across the project. Detailed and itemised costs provide avenues for investigating cost-savings that can increase efficiency without compromising high-quality, well-supported, and meaningful public involvement.

Regarding **stage-related costs**, the total cost for the PPI Board over the defined 48-month period was approximately AUD 150K. While the Operation stage—where the bulk of actual public involvement usually occurs—cost a relatively modest AUD 29K for one year, the Design and Implementation stages consumed the largest dollar amounts at AUD 64K and AUD 31K, respectively. This challenged our presumption that the operation would represent the most resource-intensive stage.

In terms of **staff-related costs**, our analysis revealed that staff time was the primary driver of PPI-specific costs, rather than member remuneration. The Head Researcher and the Research Advisor—both experienced senior staff—accounted for the largest share of PPI expenses, at 56% (AUD 88K). In stark contrast, the remuneration of Board members (including the Chairperson) accounted for only 15% (AUD 23K). For one operational year, the remuneration costs for seven members totalled around AUD 13K. For the same period, the two junior positions, Research Manager and Research Assistant, represented the same costs (AUD 13K). The analysis shows that for every hour of public member-time, there are significant support-related staff expenses to consider.

Considering staff and stage costs together, the concentration of expense in design and implementation directly reflects the extensive involvement of senior academics who designed the overall study and its PPI component. As the project progressed and matured into its operational stage, PPI time involvement of senior staff decreased from 100% during the Design stage to 67% in the Implementation stage and settled at 9% during the operational stage. Concurrently, the time investment of junior research staff increased as staff were recruited and settled into their roles, with a gradual 'trading' of responsibility to the research manager and research assistant, who took over tasks previously completed solely by the head researcher.

Notably, many PPI costs are 'hidden.' Research by Evans and colleagues[15] noted an underbudgeting trend in four PPI case studies in which they compared a two-week 'snapshot' of expenses as a 'representative average' and compared these snapshots' expected costs as estimated in the project grants. The authors describe public support activities by research staff as the significant drivers of this cost differential, noting that these staff hours often need to be taken from elsewhere in budgets[15]. Sometimes these support activities are rolled into their existing job descriptions and are not actively budgeted for[21,23,32]. For this reason, in addition to staff time spent explicitly in meetings and members' remuneration, we considered the time spent on support for these activities. These hidden costs outlined in previous literature[21,32,33] represent the vital support and administrative activities, facilitating relationships, creating documentation, and supporting public partners' capacity to contribute meaningfully to a project, being crucial for any PPI effort[21,32,34,35].

Unfortunately, when resources become constrained and research activities and public support become competing priorities, it is reasonable to assume that support is sacrificed. Well-meaning but inadequately supported PPI could easily lapse into tokenism or, at the very least, reduce the beneficial impact on the research process and negatively affect relationships between researchers and the very communities that stand to benefit[23,36,37]. Lack of support, communication, and accessibility efforts are frequently cited by public partners and researchers as barriers to meaningful involvement[10,12,21,36,38,39,40]. Thus, we advocate that reducing such investment in the name of cost-saving should not be undertaken lightly; we instead argue for efficiency.

Staff utilisation across the different stages of the project is an area where **cost efficiency** can be increased without compromising the quality of public involvement. In future work, we would likely focus on supporting junior staff inclusion and exploring ways to reduce the monetary impact of design and implementation and pivot more quickly to the operational stage.

The most salient **cost driver** revealed by this analysis was senior staff utilisation during design and implementation. While we acknowledge that senior staff involvement is crucial in the early stages, there are still tasks junior research staff can take on effectively without compromising research quality or community relationships[15,41,42]. Importantly, we do not argue that senior research staff withdraw completely from PPI support; rather, that strategic 'phasing in' of junior staff can improve cost-effectiveness and yield potential benefits for researchers at all levels. Early transfer of appropriate responsibilities to

junior staff reduces opportunity costs incurred when senior researchers divert attention to 'lower-level' administrative duties, thereby allowing them to focus on tasks better suited to their experience. Junior staff also benefit, since engaging in essential community support responsibilities provides formative professional experience with potentially lasting career impacts[15,23,32,34,39,43].

As noted, public partners' remuneration accounts for a fraction of staff costs; thus, there is a financial case for the early involvement of the public as well. In our own project, public partners were introduced late in the process, which is inconsistent with the ideal PPI model. They should be involved in the project from the outset and thus have a greater presence in research decision-making[42,44,45]. The National Institute for Health and Care Research, UK, in the "Going the extra mile" report, recommends that PPI must be involved in all stages of the research process, including priority setting, defining research outcomes, selecting research methodology, participant recruitment, interpretation of findings, and dissemination of results[46]. PPI studies indicate that involving public partners, senior academics, and junior researchers together from the early stages of design represents a strong signal of organisational commitment to PPI members[47]. A deep level of PPI from the outset would not only make it more financially efficient but, more critically, enhance and ensure community engagement.

An enduring advisory group accessible to all researchers within the organisation is a practical means of reducing the time and costs of design and implementation from individual project budgets.

A model outlined by De Simoni and colleagues[21], broadly termed a 'PPI ecosystem model', follows the general concept of an enduring advisory body, but key differences enhance its flexibility for both researchers and public partners. Much like an organisation-attached advisory body, core PPI staff provide support, drawing on a large network of public partners with diverse demographics, expertise, and experiences. When public involvement is necessary for a given research activity of any scale, the PPI team provide coordination and support, connecting appropriate members' experience and expertise with the researcher's needs.[21]

To build up robust, stable, affordable and sustainable PPI initiatives, it is crucial to integrate those initiatives as part of the research infrastructure of organisations, such as health services or universities[43,46]. Integration would not only encourage more efficient and transparent financial management but also foster a more profound commitment from the public, as greater institutional buy-in demonstrates recognition that public contribution is valued because member time, effort, and needs are being effectively supported[43,46].

The cost analysis provided in this work has yielded valuable insights into PPI costs, but our method has **limitations** that affect our results, and the conclusions should be considered in context. Most importantly, the retrospective nature of the analysis introduces considerable uncertainty, particularly in design-phase estimates. The implementation, operation, and evaluation stages all benefited from extensive records of payments and staff hours, whereas the design-phase calculations were based on estimates. Project-specific and PPI-specific design activities could not be reliably differentiated; therefore, we estimated them somewhat liberally. While this impacts absolute cost estimates, the central finding that senior staff time constituted the predominant cost factor remains valid. Our primary aims – to understand cost drivers, identify opportunities, and develop a template and methodology – were well served, despite unavoidable inaccuracies in absolute cost estimations.

A further limitation is context dependency. The research agenda, the available resourcing, the desired 'level' of public involvement, the support required by members, and the nature of involvement activities will not necessarily generalise across all PPI. Readers should therefore carefully consider how our particular example compares to their research context when applying our conclusions.

To the authors' knowledge, this study presents the first *post hoc* analysis of itemised, detailed PPI costs. As **strengths**, this study demonstrates that the Time-Driven Activity-Based costing approach is a very practical methodology for performing

retrospective cost analysis. However, we acknowledge (and emphasise) that prospective and ongoing cost analysis will yield far more accurate estimates and should be pursued wherever possible.

Another key strength of our methodology was our comprehensive breakdown of costs by position, stage, and activity, as well as the inclusion of all staff time, which illuminates the specific financial impact of incorporating PPI throughout the project. While the absolute cost of our PPI effort is of limited utility to other researchers due to contextual factors, our cost distribution insights demonstrate that for every dollar spent on public partner time, more is spent in support.

As **future directions**, the claims presented in this paper warrant substantiation from more rigorous cost analyses built (preferably prospectively) upon more complete records in a variety of contexts. A larger pool of reliable and valid economic analyses would not only allow comparisons between PPI projects and PPI models but also enable prospective and retrospective comparisons, which could be used to create better tools for predicting and tracking costs. The methodology presented could also be used in currently operating PPIs to track projected versus actual spending and illuminate areas of inefficiency where solutions can be implemented in real time. We therefore encourage other researchers and public partners to implement, adapt, and refine our costing methodology, thereby enhancing its utility while producing more evidence for PPI cost drivers.

Furthermore, we propose establishing formal mechanisms for disseminating cost-related data, whether through academic publications or accessible funding organisation databases.

CONCLUSIONS

In this study, we demonstrated that the primary driver of PPI-specific costs was staff-related rather than public compensation. Our analysis supports arguments in the literature that PPI is resource-intensive and highlights how resources could be allocated more efficiently through sustainable PPI models, strategic staffing, and reforms to funding allocation for public involvement.

This work revealed that the absence of PPI representatives and junior researchers at the project's outset leads to higher costs and, more importantly, some inconsistencies with the PPI model, which requires public involvement from the outset of any project.

A greater understanding of how to optimise the use of limited public funding for PPI research is a practical and ethical goal that could lead to more impactful, patient-relevant health service delivery. In this way, a deep level of PPI from the start of this project would not only make it more financially efficient but, even more critically, enhance and ensure community engagement.

ABBREVIATIONS

- AUD: Australian dollars
- eQC: Evaluating Quality Care
- K: 1,000 (in finance and business)
- NHMRC: National Health and Medical Research Council of Australia
- PPI: Patient and Public Involvement
- UQ: The University of Queensland
- TDABC: Time-Driven Activity-Based

DECLARATIONS

Ethics approval and consent to participate:

Not applicable

Consent for publication

Not applicable

Competing interests:

The authors declare that they have no competing interests.

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Author Contribution

- Concept and design: Vasquez, Bailey and Prudon- Acquisition of data: Vasquez, Bailey and Prudon- Analysis and interpretation of data: Vasquez, Bailey and Prudon- Drafting of the manuscript: Vasquez, Bailey and Prudon- Critical revision for important intellectual content: Thompson, Martin-Khan and Gray - Administrative, technical, or logistic support: Bailey and Prudon

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Availability of data and materials

Not applicable

REFERENCES

1. Thompson J. Whither or wither public involvement in dementia research in Australia. Australian J Dement Care. 2022;11(3):26–30.
2. Staley K, Buckland SA, Hayes H, Tarpey M. The missing links': understanding how context and mechanism influence the impact of public involvement in research. Health Expect Dec. 2014;17(6):755–64. 10.1111/hex.12017.
3. Fox G, Lalu MM, Sabloff T, et al. Recognizing patient partner contributions to health research: a systematic review of reported practices. Res Involv Engagem Sep. 2023;9(1):80. 10.1186/s40900-023-00488-5.
4. Babatunde S, Ahmed S, Santana MJ, Nielssen I, Zelinsky S, Ambasta A. Working together in health research: a mixed-methods patient engagement evaluation. Res Involv Engagem Aug. 2023;1(1):62. 10.1186/s40900-023-00475-w.
5. Miller CL, Mott K, Cousins M, et al. Integrating consumer engagement in health and medical research - an Australian framework. Health Res Policy Syst Feb. 2017;10(1):9. 10.1186/s12961-017-0171-2.
6. Ferra F, Drewelow E, Klein O, et al. Implementation and evaluation of participatory advisory boards in mental health research: a research protocol of the 'PART-Beirat' project. Res Involv Engagem Dec. 2023;6(1):112. 10.1186/s40900-023-00522-6.

7. Example of PAG formation and eval in primary practice (Newton et al 2015).pdf>.
8. Greenhalgh T, Hinton L, Finlay T, et al. Frameworks for supporting patient and public involvement in research: Systematic review and co-design pilot. Health Expect Aug. 2019;22(4):785–801. 10.1111/hex.12888.
9. Anderst A, Conroy K, Fairbrother G, Hallam L, McPhail A, Taylor V. Engaging consumers in health research: a narrative review. Aust Health Rev Sep. 2020;44(5):806–13. 10.1071/AH19202.
10. Karlsson AW, Kragh-Sorensen A, Borgesen K, et al. Roles, outcomes, and enablers within research partnerships: A rapid review of the literature on patient and public involvement and engagement in health research. Res Involv Engagem Jun. 2023;15(1):43. 10.1186/s40900-023-00448-z.
11. Brett J, Staniszewska S, Mockford C, et al. Mapping the impact of patient and public involvement on health and social care research: a systematic review. Health Expect Oct. 2014;17(5):637–50. 10.1111/j.1369-7625.2012.00795.x.
12. Russell J, Fudge N, Greenhalgh T. The impact of public involvement in health research: what are we measuring? Why are we measuring it? Should we stop measuring it? Res Involv Engagem. 2020;6:63. 10.1186/s40900-020-00239-w.
13. Staniszewska S, Brett J, Simera I, et al. GRIPP2 reporting checklists: tools to improve reporting of patient and public involvement in research. BMJ Aug 2. 2017;358:j3453. 10.1136/bmj.j3453.
14. Lloyd N, Kenny A, Hyett N. Evaluating health service outcomes of public involvement in health service design in high-income countries: a systematic review. BMC Health Serv Res Apr. 2021;20(1):364. 10.1186/s12913-021-06319-1.
15. Evans D, Coad J, Cottrell K et al. Public involvement in research: assessing impact through a realist evaluation. *Health Services and Delivery Research*. 2014;2(36)Health Services and Delivery Research. 10.3310/hsdr02360
16. Gordon B, Van De Griend KM, Scharp VL, Ellis H, Nies MA. Community Engagement in Research: An Updated Systematic Review of Quantitative Engagement Measurement Scales for Health Studies. Eval Health Prof Dec. 2023;46(4):291–308. 10.1177/01632787231203346.
17. Chalmers I, Glasziou P. Avoidable waste in the production and reporting of research evidence. Lancet Jul. 2009;4(9683):86–9. 10.1016/S0140-6736(09)60329-9.
18. Townsend R, Duffy JMN, Khalil A. Increasing value and reducing research waste in obstetrics: towards woman-centered research. Ultrasound Obstet Gynecol Feb. 2020;55(2):151–6. 10.1002/uog.20294.
19. Slattery P, Saeri AK, Bragge P. Research co-design in health: a rapid overview of reviews. Health Res Policy Syst Feb. 2020;11(1):17. 10.1186/s12961-020-0528-9.
20. Aiyegbusi OL, McMullan C, Hughes SE, et al. Considerations for patient and public involvement and engagement in health research. Nat Med Aug. 2023;29(8):1922–9. 10.1038/s41591-023-02445-x.
21. De Simoni A, Jackson T, Inglis Humphrey W, et al. Patient and public involvement in research: the need for budgeting PPI staff costs in funding applications. Res Involv Engagem Mar. 2023;25(1):16. 10.1186/s40900-023-00424-7.
22. Lloyd N, Hyett N, Kenny A. Barriers and Enablers to Evaluating Outcomes From Public Involvement in Health Service Design: An Interpretive Description. Qual Health Res Sep. 2023;33(11):983–94. 10.1177/10497323231191048.
23. Jackson T, Pinnock H, Liew SM, et al. Patient and public involvement in research: from tokenistic box ticking to valued team members. BMC Med Apr. 2020;13(1):79. 10.1186/s12916-020-01544-7.
24. Tritter JQ. Revolution or evolution: the challenges of conceptualizing patient and public involvement in a consumerist world. Health Expect Sep. 2009;12(3):275–87. 10.1111/j.1369-7625.2009.00564.x.
25. Martin-Khan M, Prudon P, Xiong B et al. *Final Report - evaluating Quality of Care (eQC) NHMRC Boosting Dementia Grant 2018–2023*. 2024.
26. Queensland HC. August,. Health Consumers Queensland, Recruiting: Paying Consumers. Accessed 2025. https://www.hcq.org.au/paying-consumers/
27. Shankar PR, Parikh KR, Heilbrun ME, et al. Cost Implications of Oral Contrast Administration in the Emergency Department: A Time-Driven Activity-Based Costing Analysis. J Am Coll Radiol Jan. 2019;16(1):30–8. 10.1016/j.jacr.2018.07.021.

28. Kaplan RS, Anderson SR. Time-driven activity-based costing: a simpler and more powerful path to higher profits. Harvard Business School Press; 2007.
29. Yu YR, Abbas PI, Smith CM, et al. Time-driven activity-based costing to identify opportunities for cost reduction in pediatric appendectomy. J Pediatr Surg Dec. 2016;51(12):1962–6. 10.1016/j.jpedsurg.2016.09.019.
30. Redman S, Greenhalgh T, Adedokun L, Staniszewska S, Denegri S. Co-production of Knowledge Collection Steering C. Co-production of knowledge: the future. BMJ Feb. 2021;16:372:n434. 10.1136/bmj.n434.
31. Baines RL, Regan de Bere S. Optimizing patient and public involvement (PPI): Identifying its essential and desirable principles using a systematic review and modified Delphi methodology. Health Expect Feb. 2017;21(1):327–35. 10.1111/hex.12618.
32. Wilson P, Mathie E, Keenan J, et al. ReseArch with Patient and Public invOlvement: a RealisT evaluation - the RAPPORT study. Health Servicess Delivery Res. 2015;3(38). 10.3310/hsdr03380. Health Services and Delivery Research.
33. Blanchfield BB, Demehin AA, Cummings CT, Ferris TG, Meyer GS. The Cost of Quality: An Academic Health Center's Annual Costs for Its Quality and Patient Safety Infrastructure. Jt Comm J Qual Patient Saf Oct. 2018;44(10):583–9. 10.1016/j.jcjq.2018.03.012.
34. Staley K. Changing what researchers 'think and do': Is this how involvement impacts on research? Res All. 2017;1(1). 10.18546/rfa.01.1.13.
35. Staley K, Barron D. Learning as an outcome of involvement in research: what are the implications for practice, reporting and evaluation? Res Involv Engagem. 2019;5:14. 10.1186/s40900-019-0147-1.
36. Birch R, Simons G, Wahamaa H, et al. Development and formative evaluation of patient research partner involvement in a multi-disciplinary European translational research project. Res Involv Engagem. 2020;6:6. 10.1186/s40900-020-0178-7.
37. Domecq JP, Prutsky G, Elraiyah T, et al. Patient engagement in research: a systematic review. BMC Health Serv Res. 2014;14(89). 10.1186/1472-6963-14-89.
38. Modigh A, Sampaio F, Moberg L, Fredriksson M. The impact of patient and public involvement in health research versus healthcare: A scoping review of reviews. Health Policy Sep. 2021;125(9):1208–21. 10.1016/j.healthpol.2021.07.008.
39. Brett J, Staniszewska S, Mockford C, et al. A systematic review of the impact of patient and public involvement on service users, researchers and communities. Patient. 2014;7(4):387–95. 10.1007/s40271-014-0065-0.
40. Liabo K, Boddy K, Bortoli S, et al. Public involvement in health research: what does 'good' look like in practice? Res Involv Engagem. 2020;6:11. 10.1186/s40900-020-0183-x.
41. Easley J, Wassersug R, Matthias S, et al. Patient Engagement in Health Research: Perspectives from Patient Participants. Curr Oncol Feb. 2023;26(3):2770–80. 10.3390/curroncol30030210.
42. de Wit MP, Elberse JE, Broerse JE, Abma TA. Do not forget the professional–the value of the FIRST model for guiding the structural involvement of patients in rheumatology research. Health Expect Aug. 2015;18(4):489–503. 10.1111/hex.12048.
43. Turner G, Aiyegbusi OL, Price G, Skrybant M, Calvert M. Moving beyond project-specific patient and public involvement in research. J R Soc Med Jan. 2020;113(1):16–23. 10.1177/0141076819890551.
44. Blackburn S, McLachlan S, Jowett S, et al. The extent, quality and impact of patient and public involvement in primary care research: a mixed methods study. Res Involv Engagem. 2018;4:16. 10.1186/s40900-018-0100-8.
45. Boivin A, L'Esperance A, Gauvin FP, et al. Patient and public engagement in research and health system decision making: A systematic review of evaluation tools. Health Expect Dec. 2018;21(6):1075–84. 10.1111/hex.12804.
46. National Institute for Health and Care Research. *Going the extra mile: Improving the nation's health and wellbeing through public involvement in research*. 2024.
47. Jinks C, Carter P, Rhodes C, et al. Patient and public involvement in primary care research - an example of ensuring its sustainability. Res Involv Engagem. 2016;2:1. 10.1186/s40900-016-0015-1.

Figures

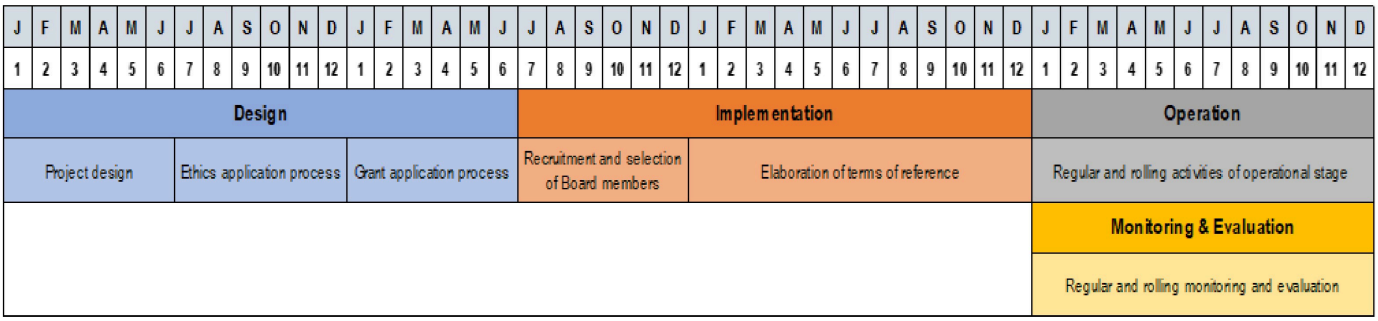

Figure 1

Timeline

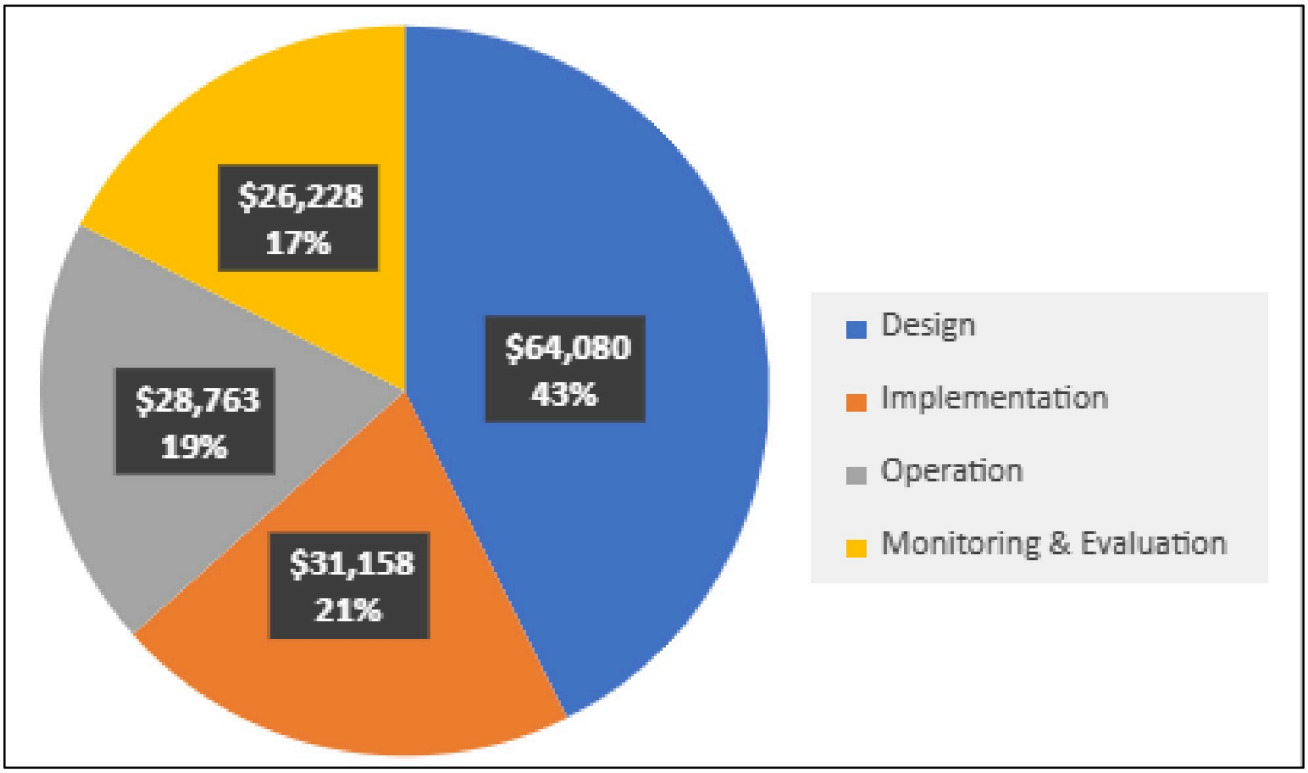

Figure 2

PPI Board Distribution of Costs by Project's Stages

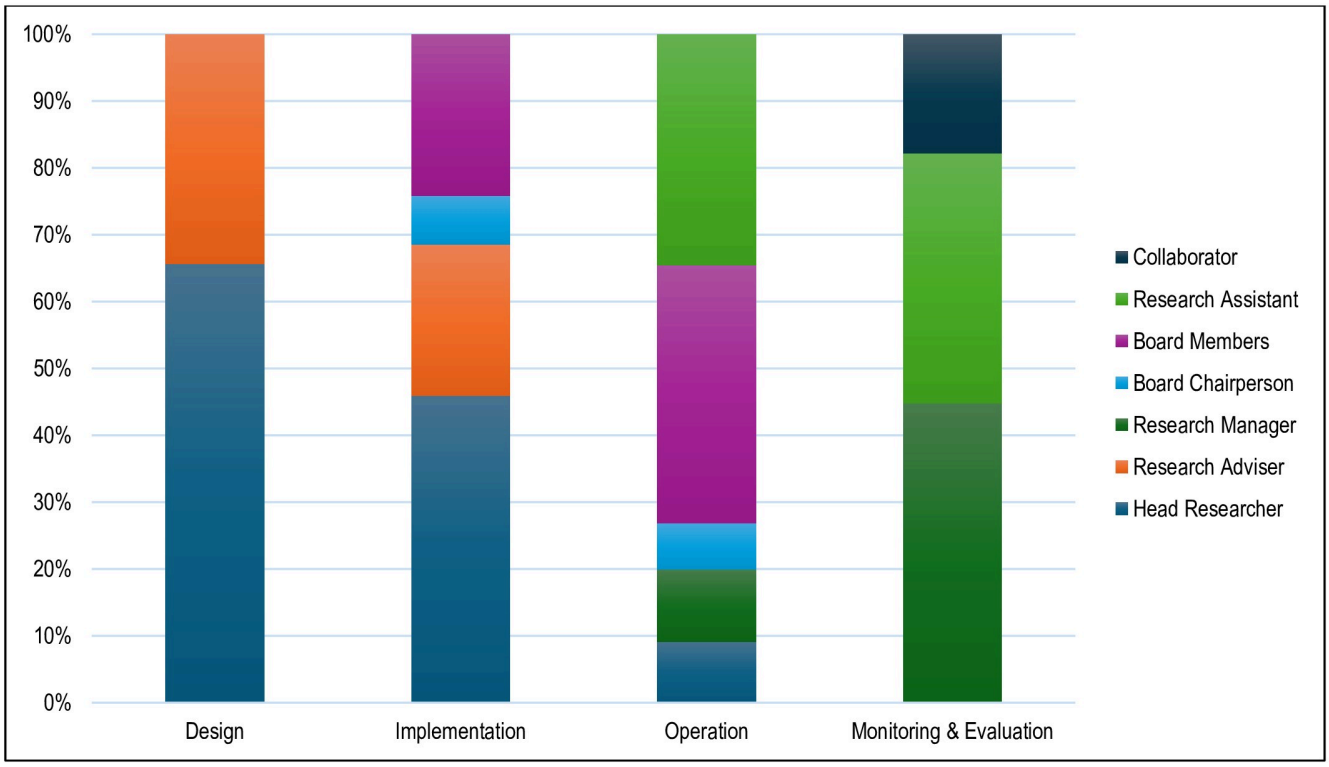

Figure 3

Distribution of Costs by Stages and Positions

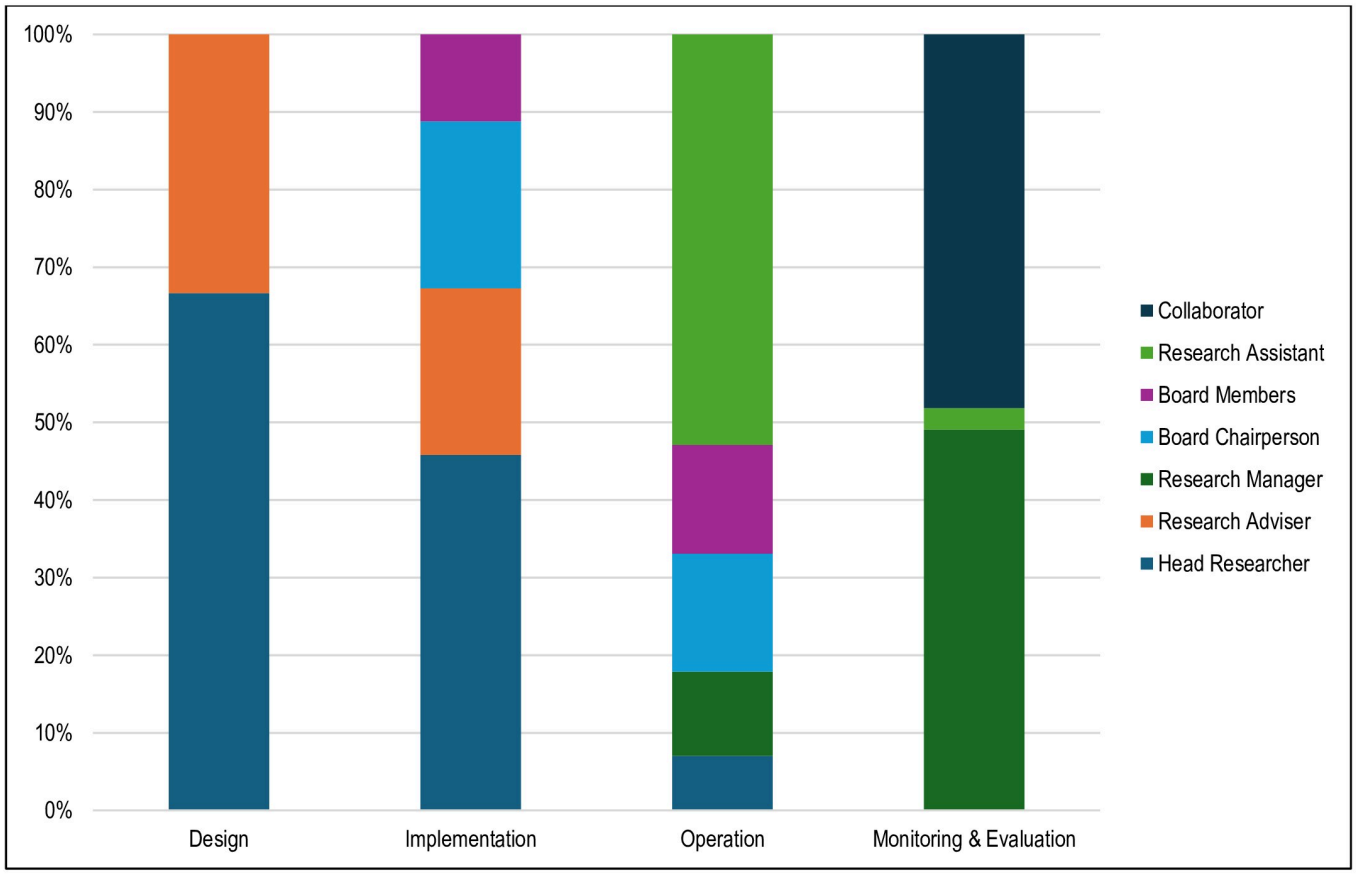

Figure 4

Distribution of time by Stage and Position