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Does the Implementation of a Model of Care Improve the Value for Money of Mental Health Services in Prisons?

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ABSTRACT

Background: There is little research into appropriate measures of value for money in prison mental health services.

Aims: To develop and evaluate an accountability framework for an enhanced Prison Model of Care for people with serious mental illness in five New Zealand prisons. A key objective was to identify people with such illnesses who were missing from existing caseloads.

Methods: A generic public sector accountability framework was modified to provide measures of value for money around efficiency in its three component criteria of effectiveness and economy using a pre/post design, allowing measurement of flows between successive stages of this prison healthcare model. Measures were arranged into common dimensions around outcomes, outputs, inputs and costs, varied across the stages. The framework was populated with data collected from five prisons for the pre- and post-implementation periods.

Results: Improvements in the three criteria were generally obtained across all five areas of service delivery but especially in the screening, assessment, intervention and reintegration stages. Since these three criteria are major components of value for money, they provide evidence for improvement in value for money of the mental health services in these prisons. Other desired operational changes achieved were a threefold increase in the nurse to doctor ratio at the triage stage and slight increase in doctor to nurse ratio at the treatment stage. Overall, the implementation of this model of care achieved an increase in the size of caseload from 6.1% to 7.3% of the prison muster, equivalent to an increase in caseload of 21%.

Conclusions: This accountability framework confirmed the value for money of the Prison Model of Care for severe mental illness, highlighting areas of good performance as well as areas requiring further development. The framework also provides measures that can be used as key performance indicators in ongoing monitoring.

1 | Introduction

Mental health services in prisons have two common problems: poor access rates for persons with serious mental illness and few agreed measures of successful care delivery to prisoners in need of treatment for such illness (Forrester et al. 2018; Simpson and Jones 2018; Simpson et al. 2013). Development of an integrating model of care that can be evaluated against service requirements is a pressing need for mental health services in correctional settings. Value for money must be demonstrable in order to enhance advocacy for adequate services. For instance, the UK Health and Social Care Act 2012 made it compulsory for health services to be put out to tender, requiring services to operate effectively and provide 'value for money'. The New Zealand

Ministry of Health adopted a similar policy direction, outlining a commissioning framework for mental health and addiction services whereby procurement will be 'based on results' and 'best value for money', but how can this be shown?

Value for money has been interpreted in several different ways, but a common approach is to define it in terms of economy, efficiency and effectiveness (the three E's), occasionally supplemented with cost-effectiveness (Banke-Thomas et al. 2017). These, in turn, refer to relationships between different elements of cost-input-output-outcome processes, which in turn form part of a broader cost-benefit structure. Figure 1 shows a simple example of this process where economy reflects cost management of inputs, efficiency how well outputs are produced by inputs and effectiveness how well outcomes are achieved by outputs. Cost-effectiveness focuses on how much it costs to achieve outcomes and cost-benefit provides an overall evaluation.

Pillai et al. (2016) note that New Zealand prison mental health service caseloads of just over 5% of the prisoner population, were significantly below international expectations of 10%–15% of prison populations. The New Zealand Prison Model of Care was developed in 2011 as an inter-regional initiative to improve consistency and quality of delivery of mental health care and treatment by health services into prisons (in-reach care). This model divided the care pathway into five steps (Figure 2): screening, referral, assessment, treatment and release planning (McKenna et al. 2014), thus adding screening and release planning to an earlier model; this later became the basis of the STAIR framework (Forrester et al. 2018; Simpson et al. 2022).

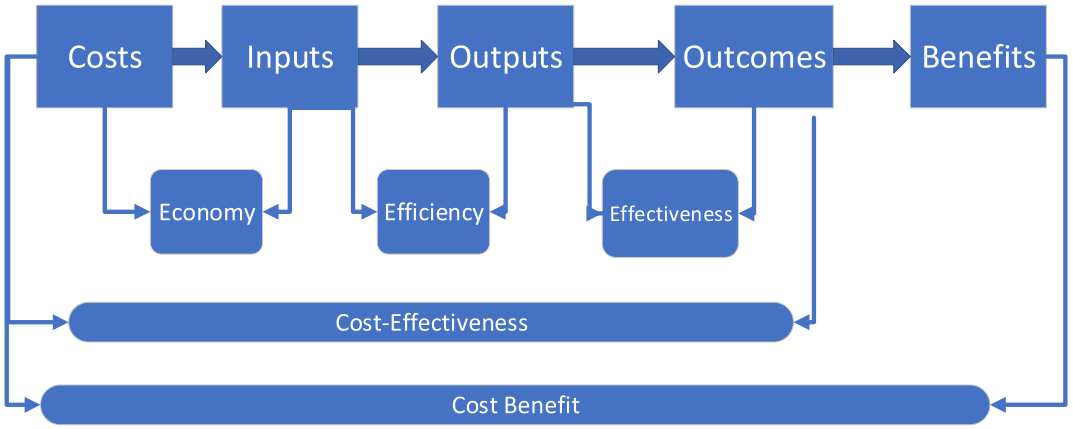

FIGURE 1 | A value for money framework around the three E's, cost-effectiveness and cost benefit. [Colour figure can be viewed at wileyonlinelibrary.com]

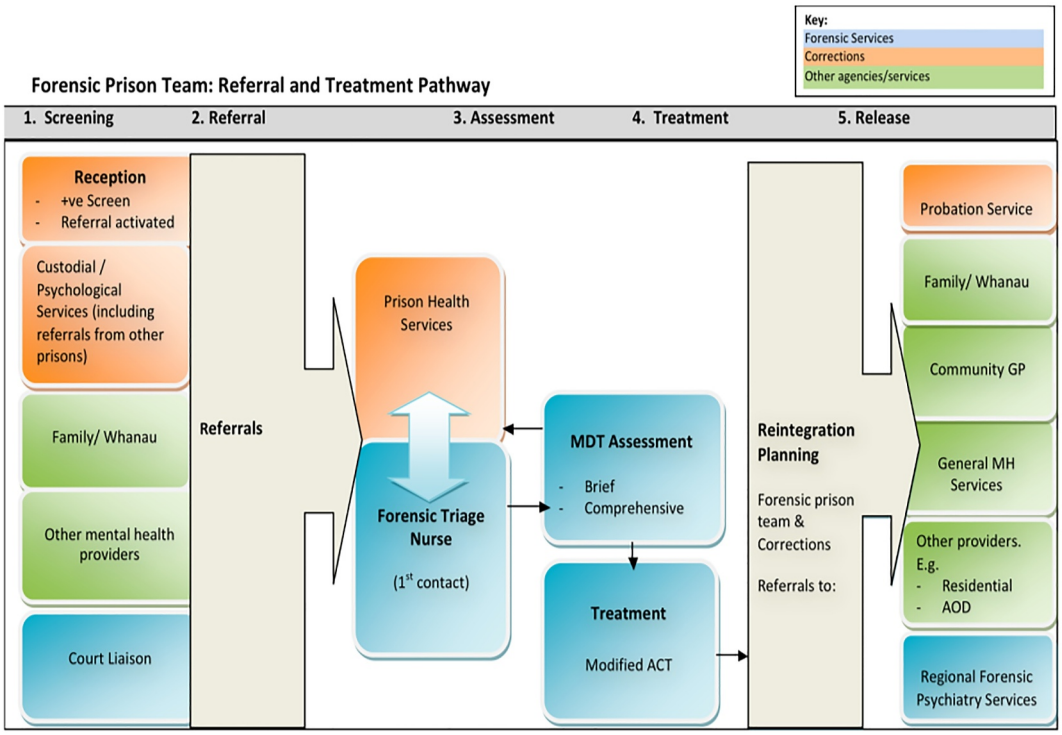

FIGURE 2 | The Prison Model of Care (PMOC) (adapted from Pillai et al. 2016). [Colour figure can be viewed at wileyonlinelibrary.com]

This model was developed by a technical advisory group, drawing on best practice indicators described or evidenced in the literature, taking the epidemiology of serious mental illness and effectiveness of screening tools into account.

A framework was developed to identify appropriate measures from data that could be collected routinely, to evaluate the performance of this model of care from the perspective of the Forensic Mental Health Team in the prison as well as its value for money. Traditional frameworks often treat an organisation as a black box, focussing on high level activities and ignoring underlying actions (Tan and Harvey 2016). The framework in our study uses a network model of "sub-activities" linked sequentially from an initial prisoner screening to release planning, thereby providing transparency and insights into the various stages of mental health service provision in prisons. Developments of key outcomes (improvements in detection rates for serious mental illness, community mental health contacts post release and trends towards decrease in recidivism at 6 months) have been published elsewhere (McKenna et al. 2014, 2018; Pillai et al. 2016).

1.1 | Performance Measurement Frameworks

Performance measurement research in mental health services is sparse (Department of Health and Social Care 2008, 2012). O'Neill et al. (2016) described a model for continual evaluation of remand prison in-reach and court liaison services under the acronym of STRESS Testing (Screening and identification of caseload, Transfer of care, Risk appropriateness of diversions, Efficiency and productivity, Self-harm, Service mapping, Testing), arguing that these parameters describe the healthy function of a mental health system in a correctional setting, emphasising clinical outcomes. The Quality Network of the Royal College of Psychiatrists (2025) has developed a set of standards for assessing mental health services in prisons, with services rated according to whether they are essential to patient safety, standards that all services should meet or desirable standards expected only of high performing services. There is no published study on their cost effectiveness or efficiency. The recent study of Skeem et al. (2018) has shown that marked gains in cost effectiveness can be achieved with thoughtful service implementation, in this case in probation based mental health services for persons with serious mental illness. Value for money, however, remains challenging in prison mental health care because endpoints may involve both health related objectives (decreased suffering, relief of symptoms, prevention of (further) victimisation as mental health improves) and perhaps reduction in criminal justice costs if offending is linked to ill health (the cost of keeping someone in custody; recidivism reduction). These benefits are difficult to measure and responsibility for them may be shared by custodial and mental health services.

In contrast, there is no shortage of performance measurement frameworks in the business literature, the most common being the balanced scorecard (Kaplan and Norton 1992), performance pyramid (Lynch and Cross 1991), performance prism (Neely et al. 2001) and programme logic models. The balanced scorecard uses four perspectives around client, financial, internal and learning and growth and identifies measures that reflect these perspectives. For example, client satisfaction with services might be reflected in waiting times, finance in the cost of providing those services, efficiency of service provision (number of assessments performed) and initiatives for continuous improvement. The performance pyramid arranges measures around internal and external views in a hierarchical structure where strategy and goals at the top cascade into lower-level measures and drivers. The performance prism is organised around five distinct but linked perspectives: stakeholder satisfaction, strategies, processes, capabilities and stakeholder contributions. Programme logic models vary but typically follow a similar pattern, as in Figure 1 with resources (inputs), activities, outputs and outcomes (Tremblay et al. 2017), sometimes focused more on outcomes (Maddox et al. 2019).

More recent developments include results-based accountability, a logic model arranged around 10 questions on process and outcome assessment, 'as well as the use of evaluative results to improve and sustain a programme' (Wandersmana et al. 2000). A framework that focuses on accountability for public sector organisations is provided by Ramanathan (1985), which is organised explicitly around the components of Figure 1 (costs, inputs, outputs, outcomes, benefits).

All these frameworks facilitate measures to be located and linked to provide holistic views of performance. They each involve various stakeholders, both external and internal, and allow for high-level measures to be taken down to underlying drivers. They do not, however, lend themselves easily to identification and measurement of value for money, except for the Ramanathan framework, which enables the three E's to be identified and was originally designed for public sector settings. Programme logic models and results-based accountability have a close correspondence to the Ramanathan framework, although not so tractable when modelling the interconnected process structure of the Prison Model of Care.

Our aim for this research was to gauge whether the implementation of a specified Prison Model of Care improves the value for money of mental health services in New Zealand prisons, first developing a value for money framework, based on performance measurement literature, using elements of Figure 1 but tailored to measure the main components of value for money, which guided the data collection and subsequent analyses.

2 | Methods

2.1 | Ethics

The research was approved by the Upper South B Regional Ethics Committee (Ethics Ref: URB/10/12/053).

2.2 | Sampling

The PMOC was implemented in five prisons throughout the northern half of the North Island of New Zealand. These

prisons ranged from mainly pre-trial (remand) to fully sentenced, with one prison being for women only. Mean monthly muster size ranged from 305 to 957 with an overall total of just over 3000 inmates. Data were collected for the year before and the year after implementation of the model. The pathways by which prisoners were referred to and accepted by the specialist mental health team were tracked using the electronic management systems used in each of the prisons. All those in prison at the start of the pre and post implementation study periods and newly received over the subsequent 12 months were eligible for inclusion. File reviews of the electronic management systems provided socio-demographic and crime-related data, prisoner needs and interventions to address needs, and compliance with outcome data collection, for example, Health of the Nation Outcome Scales (HoNOS, Royal College of Psychiatrists 2025). The dates of episodes of care were collected from on-site prison spreadsheets or logbooks, and from the Correction's Analysis and Reporting System. Contacts, reviews and outcomes for prisoners were identified through a combination of electronic file reviews and automatically generated spreadsheets. Prisoner release dates were collected from the Department of Corrections Integrated Offender Management System. Post-release engagement with mental health services was collected primarily from the Project for the Integration of Mental Health Data (PRIMHD). Data on post-release charges were collected from the Ministry of Justice Research and Evaluation Sector Group.

2.3 | Planned Analyses

Data were transferred to Excel spreadsheets and aggregated over the five prisons. The statistical significance of the results was tested using one-tailed Z-tests.

The elements of the Ramanathan framework (Ramanathan 1985) are costs (C), inputs (I), outputs (O), outcomes (Oc) and benefits (B). The benefit-cost ratio, a commonly used evaluation method, can be expressed as:

$$\frac{B}{C}=\frac{B}{OC}\times\frac{OC}{O}\times\frac{O}{I}\times\frac{I}{C}$$

Effectiveness is defined as the success rate of outputs at achieving outcomes (OC/O), efficiency as how well inputs are used to provide outputs (O/I) and economy as how well the costs of inputs are managed (I/C). For economy, the ratio is interpreted as the quantity of input per dollar of cost. In addition, we calculated cost effectiveness using either (OC/C) if costs were available or (OC/I) if only inputs were available.

The Ramanathan framework was modified to correspond with the five stages of the model of care used (Figure 3; in addition, a full summary of the variables measured is provided in online Appendix A). Treatment is split into Standard Care and the High Needs at Risk Unit (ARU). The sequential nature of

Screening → Referral → Assessment → Treatment / Intervention → Release

	Screening	*Referral/Initial Assessment*	*Assessment - MDT*	*Treatment standard care*	*Treatment High Needs (ARU + Waitlist)*	*Release/Transfer*
Critical Success Factor	All prisoners screened effectively and eligible patients referred appropriately	Appropriate cases referred for full specialist assessment.	Provision of a comprehensive mental health assessment within six weeks	Comprehensive multi- disciplinary treatment delivered in a timely fashion as per the Model of Care		Engagement with community mental health teams post release
Outcomes	% age of receptions screened using evidence based screening tool	Referral rate consistent with known properties of screening tool.	Total assessments completed	Numbers discharged	Episodes in ARU resolved	Mental health contacts post release
	Numbers referred for triage in FPMHT	All referrals assessed within assigned priority times		Episodes in ARU	ARU episodes more than one week	Post release re-offending
				Noncompliance with medication		
Outputs	Numbers screened	Number of triage assessments completed	Number of full assessments performed (Psychiatric, Risk, AoD, cultural)	Numbers treated	Weeekly visits	Contacts with key agencies three months prior to release
			Number of psychiatric, risk, AOD or cultural assessments	Episodes of monthly contact with caseload	MDT Reviews 3, 6, 9 monthly	Number with evidence of release planning
			HONOS undertaken	Needs Identified		
			Feedback to referrer	Management plans arranged:		
				Reviews as per PMOC		
Inputs	New receptions	Referrals from all sources	Referrals from triage	Mean monthly caseload	Caseload ARU episodes	Number of cases with release date within 90 days
		Medical officer episodes	Medical officer episodes	Medical officer episodes		Medical officer episodes
		Nursing episodes	Nursing episodes	Nursing episodes		Nursing episodes
Cost	Corrections Cost	Medical officer direct costs	Medical officer direct costs	Medical officer direct costs		Medical officer direct costs
		Nursing direct costs	Nursing direct costs	Nursing direct costs		Nursing direct costs

FIGURE 3 | Prison Model of Care Performance Framework (selected measures). [Colour figure can be viewed at wileyonlinelibrary.com]

elements of the model allows some of the outcomes from each stage to be used as the input for the next. Particular importance was given to critical success factors which define successful high-level outcomes for each successive phase and provide an interface between the measurement system and strategic objectives. The evaluation was focused on the Forensic Prison Mental Health Team (FPMHT) and so items such as costs for Corrections officers were not included.

Each stage organises the measures around cost, inputs, outputs and outcomes. Ratios of efficiency, effectiveness and economy can then be obtained using the definitions above and the relationships depicted in Figure 1.

Figure 3 commences where inputs (new receptions) are screened to produce outputs (numbers screened), with outcomes being those referred for triage or initial assessment. The *screening* stage stems from previous work (Evans et al. 2010), which established the satisfactory sensitivity and specificity of a screening system based on the *Brief Jail Mental Health Screen* in detecting the presence of serious mental illness. The Prison Model of Care described here recommends all new receptions to prison (inputs) are screened; this was done by Corrections staff who had had screening training. Prior to the implementation of the model, such screening had been done only in the women's prison. Everywhere else, screening was introduced at different times for the four other prisons during the post period of this study.

The *triage* stage was introduced to resolve the discrepancy between expected and actual numbers of prisoners on the treatment caseload by enabling referrals from a broad range of sources, including positive reception screen, family, other mental health staff and prison officers, and referral from primary healthcare providers. Inputs included referrals from all sources as well as medical officer and nursing episodes, with costs pertaining to these episodes. Outputs were the number of triage assessments that led to the outcomes: referrals (or not—consistent with the known properties of the screening tool) and number assessed within assigned priority times.

The *Assessment* stage defines a minimum set of evaluation information to be completed for decisions about treatment. There are four minimum assessments that occur: psychiatric, alcohol and other drug use (AoD) and related problems, risk of harm towards self or others, and cultural assessment. Inputs include the number of medical officer and nursing episodes and costs thereof, and referrals from triage. Outputs included the number of full assessments (all four elements and the number of each), evidence of feedback in the form of a letter to referrers and Health of the Nation Outcome Scales (HONOS) assessments undertaken. Outcomes for this stage are the total number of assessments, separately and collectively, completed.

The *Intervention* or *Treatment* stage includes standard care and high intensity contact for prisoners requiring placement on the *at risk unit* (ARU—close observation in suicide proof cells). Some prisoners are placed on a waiting list for admission to a secure hospital. Inputs included the mean monthly caseload and medical and nursing episodes, with costs pertaining to these episodes. Nursing and medical officer resources are already in place for the ARU as it is part of the standard treatment facility. For all prisoners under the treatment phase, the overarching model requires a formal documented approach to needs assessment and care planning and a minimum frequency for case discussion and liaison with Corrections officials to share information relevant to safe and therapeutic management of prisoners. Outputs included the numbers treated, episodes of monthly contact with caseload, number of needs identified (e.g., drug, safety to self), management plans arranged and reviews at three, six and 9 months. Outcomes for Standard Care included numbers discharged (which can include transfers or releases), episodes in the acute risk unit and numbers with at least one non-compliance with medication episodes. For the acute risk unit, inputs include caseload episodes, outputs include weekly visits and multi-disciplinary reviews and outcomes numbers of episodes resolved and numbers staying longer than 1 week.

The *Release* stage of the model requires collaborative working with Correctional officers to ensure timely and coordinated on-referral to community-based providers. This phase seeks to resolve recognised risks of known failures of services to meet the needs of prisoners as they re-enter the wider community (Lennox et al. 2011). Release may not be directly connected to the previous stage, as prisoners may be released or transferred before treatment is finished. Inputs are patients due to be released (or transferred) within 90 days, and should, but did not, include Corrections and mental health team details. Outputs and outcomes are release plans, contacts made with key external agencies and post-offence reoffending.

The selection of measures for the framework components was developed through a series of in-depth focus groups over 2 months, comprising the academic researchers and senior clinicians. This framework guided identification of measures for each stage and formed a substantial part of the data collection process (see online Appendix A for full list).

3 | Results

Table 1 provides details of the mean monthly muster and caseload numbers together with the number of follow up episodes and mean average duration for each prison type.

Table 2A shows selected measures of cost, inputs, outputs and outcomes for the screening, triage and assessment stages. Table 2B reports the value for money measures together with measures of statistical significance.

Screening numbers and percentages screened relative to new receptions increased three-fold between pre and post periods—1681 to 5786 with Table 2B showing an improvement in efficiency of 9%–30.3% ($Z = 46.91$, $p = 0.0001$). The numbers and percentage screened for the pre-model period are low because only the women's prison screened new prisoners. For the post-model period, all prisons used the screening tool but the timing

TABLE 1 | Muster, caseload and duration for prison types.

	Women		Remand		Sentenced		Mixed		Totals	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**
Muster	305	315	919	940	625	669	1427	1365	3276	3289
Caseload	26	30	29	39	49	59	92	112	196	240
Follow-up episodes	36	14	59	80	35	42	105	207	235	343
Mean duration (days)	60.5	112.5	72.3	61.8	119.6	144.9	59.0	52.7	77.6	83.3

Note: Follow-up is the number of referrals receiving monthly MDT face-to-face contact; Mean duration is for non-ARU cases. Mixed includes two prisons: A: 470 pre/465 post; B: 957 pre/900 post.

of its implementation was managed by Corrections and was not under the control of the research team. While 30% might not appear efficient, the figure is related to timing differences in implementation for the four prisons which had not previously screened new prisoners, whereas the women's prison screening efficiency was 100% both pre- and post-model implementation. The outcomes of screening included an increase in referrals from 192 to 758. Effectiveness relates to the outcome of the screening process relative to its output, specifically here relating to severe mental illness. In the pre-model period, of 1681 screened, 192 were deemed "positive", requiring referral to the next stage. Effectiveness is measured as the ratio of referrals to numbers screened; this was 11% and 13% in the pre and post periods respectively ($z = 1.764$, $p = 0.03$).

Numbers referred from Screening are combined with referrals from other sources to become "input" in the *Triage* phase. These were 683 pre- and 843 post-model implementations. Since only the women's prison screened in the pre-period, 491 (683–192) were referred from other sources across the remaining four prisons. For the post period, 85 were referred by the sentenced prison which did not do screening, that is, 843 less 758 screening referrals from the other four prisons. Other inputs pre-/post-model implementation included staff cost $45,281 ($40,954) and forensic mental health doctor and nurse episodes 630 (703). The reduction in cost can be seen in the reduction in medical officer (MO) cost from $27,753 to $15,020 and increase in nurse cost from $17,518 to $25,934. Using the Ramanathan interpretation, the rate of episodes per $100 cost in Panel II Economy shows an increase of 1.39 to 1.72 ($z = 3.816$, $p = 0.00007$). Although outputs show an increase in numbers triaged (630–703), the efficiency measures show a decline in the assessments to referrals ratio from 0.92 to 0.83 ($z = 1.829$, $p = 0.034$). Reasons for the lower triage efficiencies relate to no assessments (53 pre, 140 post), mainly comprising prisoner transfers or releases (34, 76), declining to engage with the team (4, 36) or referral withdrawn (10, 9). Adjusting for these, results in a ratio of 1 for pre and post. The ratio of numbers assessed to staff episodes is unchanged but improves for numbers assessed to $100 cost ($z = 3.816$, $p = 0.00007$).

Outcomes include referrals to the multi-disciplinary team of 423 (pre-model 477) and measures of compliance with time limits (pre-470; post-531). Despite an increase in the volume of referrals, both effectiveness measures are statistically insignificant. The cost-effectiveness measure of referrals per $100 cost improved from 0.93 to 1.16 ($z = 3.291$, $p = 0.0005$).

Inputs for *Assessment* included referral outcomes from Triage with numbers increasing from 423 to 477. Other inputs include nursing, medical officer episodes (799 and 916) and cost ($68,187 and $80,848). The Economy measure for episodes per $100 cost shows a decline ($z = 0.694$, $p = 0.2437$), but this change was not statistically significant. Outputs selected are the number of full assessments, the highest number of psychiatric, risk, Alcohol and other Drugs (AOD) or cultural individual assessments, number of HONOS assessments and feedback to referrers. Except for feedback, all outputs increased with the largest increase being HONOS assessments from 734 to 1144. None of the efficiency measures for the assessments changed significantly, but the HONOS ratios improved substantially for referrals, episodes and cost (all p values below 0.001%).

The outcome is the total number of assessments completed (excluding full assessments to avoid double-counting) which increased from 1943 to 2461. The effectiveness measure uses total assessments divided by the maximum number of individual assessments which shows an improvement of 463–522 ($z = 3.971$, $p = 0.004\%$). Cost-effectiveness shows an increase in both assessments per $100 cost from 2.85 to 3.05 ($z = 2.196$, $p = 0.0141$) and the ratio of total assessments to referrals ($z = 3.858$, $p = 0.0001$).

Tables 3A and 3B show the value for money measures relating to Intervention and Release Planning together with measures of statistical significance.

Standard care inputs include mean monthly caseload, nurse and medical officer episodes and costs. The economy measure in Panel II, episodes per $100 cost, and the first two efficiency measures of numbers treated (relative to episodes and cost) have no significant changes. Other outputs include contact episodes, needs identified, management plans, and reviews. With the exception of the needs to episodes ratio, the efficiency ratios of monthly contact, plans, and reviews increased significantly ($z = 2.095$, $p = 0.0181$; $z = 1.977$, $p = 0.024$; $z = 1.806$, $p = 0.0354$).

Selected outcomes are number of discharges, episodes in the acute "at risk unit" and medication non-compliance, all of which increased in volume. The effectiveness measures show a lower discharge rate and steady non-compliance rates relative to total numbers treated, both of which are statistically insignificant. The number of "at risk unit" episodes relative to the

TABLE 2A | Results of screening, triage and assessment for all prisons.

Selected high level results I										
	Screening			Triage/Initial assessment			Assessment MDT			
	Pre		Post	Pre		Post	Pre		Post	
Critical Success Factor	All prisoners screened effectively and eligible patients referred appropriately			Appropriate cases referred for full specialist assessment.			Provision of a comprehensive mental health assessment completed within 6 weeks			
Outcomes	Numbers referred for triage	192	758	Referrals to assessment	423	477	Total assessments completed		1943	2462
				Met priority times	470	531				
Outputs	Numbers screened	1681	5786	Triage assessments completed	630	703	Number of full assessments		112	129
							Maximum number of psychiatric, risk, AOD or cultural assessments		420	472
								HONOS undertaken	734	1144
								Feedback to referrer	178	168
Inputs	New receptions	18,710	19,080	Referrals from all sources	683	843	Referrals from triage		423	477
				Medical officer episodes	209	111	Medical officer episodes		383	445
				Nursing episodes	421	592	Nursing episodes		416	471
				Total episodes	630	703	Total episodes		799	916
Cost	Corrections cost	N/A	N/A	Cost - MO	$27,763	$15,020	Cost - MO		$50,877	$60,215
				Cost - nurse	$17,518	$25,934	Cost - nurse		$17,310	$20,633
				Total	$45,281	$40,954	Total		$68,187	$80,848

numbers treated declined providing a good outcome ($z = 1.352$, $p = 0.0882$), that is, fewer numbers relative to numbers treated despite the increase from 405 to 444. The cost effectiveness measure, numbers discharged per $100 cost, declined ($z = 1.591$, $p = 0.0542$) but at risk episodes per $1000 cost shows a reduction ($z = 1.78$, $p = 0.0376$). Changes in medication non-compliance per $1000 were insignificant.

High needs treatment inputs include at-risk unit use as well as standard care (405 and 444 pre-/post-model) and medical officer and nursing inputs. The latter, however, are combined with standard care so are not separated out for the at risk unit. Outputs include weekly visits and multi-disciplinary team reviews at 3, 6 and 9 months and the efficiency measures in Panel II show declines relative to caseload episodes with visits being weakly significant ($z = 1.385$, $p = 0.083$). Outcomes include episodes in the at-risk unit resolved—increasing from 298 to 325; only the visit ratio is significant ($z = 2.874$, $p = 0.002$). ARU episodes exceeding one week decreased from 188 to 161 with only the reviews ratio significant ($z = 1.981$, $p = 0.0237$).

Release inputs are referrals who have a release date within 90 days, which increased from 109 to 172. Outputs comprise FPMHT engagement with key agencies in the pre-release period and the number of release plans prepared. The efficiency measure for agency contacts pre-release relative to referrals increased significantly ($z = 1.712$, $p = 0.0434$). Outcomes include patient contacts with mental health services post release and the rate of reoffending. Ratios of post release contacts show significant improvements between pre and post periods ($z = 2.949$; $p = 0.0016$; $z = 4.357$, $p = 0.0007\%$); the ratio of reoffending to agency contacts also shows a weak significant improvement but with no significant change in the reoffending to release planning ratio. The cost-effectiveness post release contacts show a significant improvement but with no significant change in the reoffending ratio.

4 | Discussion

Economic analyses of services, common in other public sector areas, have often been overlooked in respect of prison mental health services (e.g., O'Neill et al. 2016). Our study confirms that appropriate and rather standard approaches to service evaluation and value for money calculations can work well in this context. We examined how changes following implementation of a prison model of care can be described in terms of economy, efficiency, effectiveness, and cost-effectiveness using an accountability model based on Figure 1. For each sequential stage, we have been able to show gains across all four components, representing greater value for money for service funders.

Whilst the gains did not result in access rates equivalent to the levels of needs described in the literature (Forrester et al. 2018), nonetheless gains were achieved simply by focussing on key components of the care pathway. Further, we may have underestimated the impact of the model as it took some time for the gains to emerge, evidenced by later data tracking. A noteworthy aspect is that these successes were achieved without any additional resource allocation for the introduction of the model,

TABLE 2B | Value for Money analysis of screening, triage and assessment for all prisons (levels of significance: *10%; **5%; ***1%). [Colour table can be viewed at wileyonlinelibrary.com]

	Economy				Efficiency				Effectiveness				Cost effectiveness			
		Pre	Post	Z value		Pre	Post	Z value		Pre	Post	Z value		Pre	Post	Z value
Screening					Screened/ Receptions	0.09	0.30	46.910***	Triage referrals/ Screened	0.11	0.13	1.764**				
Triage/Initial assessment	Episodes/ $100 cost	1.39	1.72	3.816***	Assessed/ Referrals	0.92	0.83	1.829**	Referrals/Assessed	0.67	0.68	0.1570	Referrals/$100 cost	0.93	1.16	3.291***
					Assessed/ Episodes	1.00	1.00	0.00	PriorityTimes/ Assessed	0.75	0.76	0.1960				
					Assessed/$100 cost	1.39	1.72	3.816***								
Assessment MDT	Episodes/ $100 cost	1.17	1.13	0.6940	Full assessments/ Referrals	0.26	0.27	0.1640	Total assessments/ Maximum psych etc	4.63	5.22	3.971***	Total assessments/ $100 cost	2.85	3.05	2.196**
					Maximum psych etc/Referrals	0.99	0.99	0.0510					Total assessments/ Referrals	4.59	5.16	3.858***
					Maximum psych etc/Episodes	0.53	0.52	0.2970								
					Maximum psych etc/$100 cost	0.62	0.58	0.7970								
					HONOS/Referrals	1.74	2.40	6.940***								
					HONOS/Episodes	0.92	1.25	6.588***								
					HONOS/Cost	0.01	0.01	5.868***								

TABLE 3A | Results of intervention/treatment and release planning for all prisons.

Selected high level results II									
	Treatment standard care			**ARU**			**Release/transfer**		
		Pre	**Post**		**Pre**	**Post**		**Pre**	**Post**
Critical success factor	Comprehensive multi- disciplinary treatment delivered in a timely fashion as per the model of care						Engagement with community mental health teams post release		
Outcomes	Numbers discharged	846	973	Episodes in ARU resolved	298	325	Mental health contacts post release	130	327
	Episodes in ARU	405	444						
	Noncompliance with medication	85	96	ARU episodes ≥ 1 week	188	161	Post release re-offending	29	37
Outputs	Numbers treated	1047	1260	Weekly visits	74	64	Contacts with key agency 3 months prior to release	141	265
	Episodes of monthly contact with caseload	235	343	MDT reviews 3, 6, 9 months	67	71	Number with evidence of release planning	84	138
	Needs identified	1740	2094						
	Management plans arranged	1413	1813						
	Reviews as per PMOC	116	172						
Inputs	Mean monthly caseload	196	240	Caseload ARU episodes	405	444	Number referrals with release date within 90 days	109	172
	Medical officer episodes	583	708						
	Nursing episodes	817	967						
	Total episodes	1400	1675						
Cost	Cost—Medical officer	$38,722	$47,901						
	Cost—Nurse	$16,998	$21,181						
	Total	$55,720	$69,082						

it was the systematic approach to service delivery that changed, not staffing numbers. Nevertheless, we found areas where performance did not improve, such as communicating the results of assessments to referrers; there was also evidence of decline in specific areas.

5 | Limitations

Inevitably, our study has limitations. First, it is a real-world implementation and service delivery staff were aware of the needs to improve services. Secondly, the follow-up period was confined to the first 12 months after the change in model. Thirdly, since this study, there have been changes in the number of prisoners on remand. This number has increased although sentence prison numbers have diminished. A changing context will require model adaptation and re-evaluation. Services in general put little emphasis on optimal service evaluation and may thus get locked into measuring simple operational requirements than support strategic positioning into the future. Finally, we did not collect data on staff time and the costs involved in the screening and release planning stages. Nevertheless, by applying an accountability framework and testing it, we evidenced a way to examine important aspects of value for money in service provision in prisons.

6 | Conclusions

Our study shows how, by teasing out the key components of a model of mental health services delivery to prisoners and applying standard health economic measures, the model can be tested to yield reliable measures of value for money in terms of economy, efficiency and effectiveness. The importance of this is twofold: first such measurement of a health service has rarely been undertaken in a prison environment and secondly, being able to evidence value for money will provide the basis for improved service funding and access for those needing it. The model and evaluation framework are each generic and can be tailored to other countries and locations. Collecting measures to populate the framework continuously with a view to periodic review would provide a sound basis for improved management of mental health services in prisons as well as enabling self-learning.

TABLE 3B | Value for Money analysis of Intervention/Treatment and Release Planning for all prisons (levels of significance: *10%; **5%; ***1%). [Colour table can be viewed at wileyonlinelibrary.com]

	Economy				Efficiency				Effectiveness				Cost effectiveness			
		Pre	Post	Z value		Pre	Post	Z value		Pre	Post	Z value		Pre	Post	Z value
Treatment	Total episodes/ $100 cost	2.5126	2.4247	0.9820	Numbers treated/Total episodes	0.75	0.75	0.1310	Numbers discharged/ Numbers treated	0.81	0.77	0.9620	Numbers discharged/ $100 cost	1.52	1.41	1.591*
					Numbers treated/Cost	0.0188	0.0182	0.7110	ARU episodes/ Numbers treated	0.39	0.35	1.352*	ARU episodes/ $1000 cost	7.27	6.43	1.780**
					Monthly contact/Caseload	1.20	1.43	2.095**	Medication NC/ Numbers treated	0.08	0.08	0.4250	Medication NC/$1000 cost	1.53	1.39	0.6230
					Needs/Episodes	1.24	1.25	0.1800								
					Plans/Episodes	1.01	1.08	1.977**								
					Reviews/ Episodes	0.08	0.10	1.806**								
At risk unit (ARU)					Visits/ARU episodes	0.18	0.14	1.385*	ARU episodes resolved/Visits	4.03	5.08	2.874***				
					Reviews/ARU episodes	0.17	0.16	0.1990	ARU episodes resolved/Reviews	4.45	4.58	0.3585				
									Episodes > 1 week/ Visits	2.54	2.52	0.0918				
									Episodes > 1 week/ Reviews	2.81	2.27	1.981**				
Release/ Transfer					Agency contacts pre-release/ Referrals	1.29	1.54	1.712**	Post release contacts/ Agency contacts pre release	0.92	1.23	2.949***	Post release contacts/ Referrals	1.19	1.90	4.777***
					Release plans/ Referrals	0.77	0.80	0.2920	Post release contacts/ Release planning	1.55	2.37	4.357***	Reoffending/ Referrals	0.27	0.22	0.8380
									Reoffending/Agency contacts	0.21	0.14	1.482*				
									Reoffending/Release planning	0.35	0.27	0.9360				

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Ethics Statement

The research was approved by the Upper South B Regional Ethics Committee (Ethics Ref: URB/10/12/053).

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Research data are not shared.

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Appendix A: Variables Data Collected

Data relating to each of the following variables were collected:

Numbers at each stage of Prison Model of Care: The number of prisoners (for the screening stage) or referrals (for all other stages) involved at each stage of the MOC process.

Gender, Age, Ethnicity.

Diagnosis of caseload: The most up-to-date diagnosis for the prisoner before the end of the referral, or the end of the period of interest (whichever came first).

Charges/Convictions: The most serious charge or conviction for which the prisoner was incarcerated. For example, Homicide and related

offences, Offences threatening persons, Sexual assault and related offences, Illicit drug offences, Non-threatening offences.

New receptions and muster numbers, Referrals to FPMHT, Prisoners with repeat referrals.

Prisoner status: remand/sentenced (new referrals only).

Numbers of initial assessments, Reasons for no initial assessment, Skill mix involved in initial assessment, Initial assessments completed within assigned priority time.

Referred prisoners receiving MOC assessment, Skill mix involved in MOC assessment.

Types of assessment: Numbers of psychiatric assessments, risk assessments, cultural assessments and alcohol or drug assessments.

Integrated Health Care and Recovery Plans, Needs and management plans, Management plans arranged, for example, Medication management Psycho education or therapies.

Waiting list and At Risk Unit episodes of care, Outcome of waiting list episodes, Length of time of waiting list episodes and contacts, Review of waiting list episodes.

Length of time in At Risk Unit and review and contacts, Outcome of all At Risk Unit episodes.

Length of time of other caseload episodes and review and contacts, Outcome for other caseload episodes.

Skill mix involved in MDT management of caseload.

Compliancy with medication, HONOS compliancy, HONOS Scores.

Release Planning: Numbers of referred prisoners who had a release date within 90 days of their referral date that had a release plan available.

FPMHT engagement in 3 months before prisoner release, Recidivism rates.