Mental Health Joint Response Car

Pilot Evaluation Report

Version history

Version	Date	Notes
0.1	2019-02-20	Reviewed by Forecasting & Planning Lead
0.2	2019-02-22	Reviewed by Project Clinical Lead
0.3	2019-02-27	Reviewed by Quality and Strategy Leads
1.0	2019-03-01	Sent to stakeholders for feedback
1.1	2019-04-25	Stakeholder feedback incorporated
2.0	2019-04-26	Reviewed by Quality Lead

Report objective

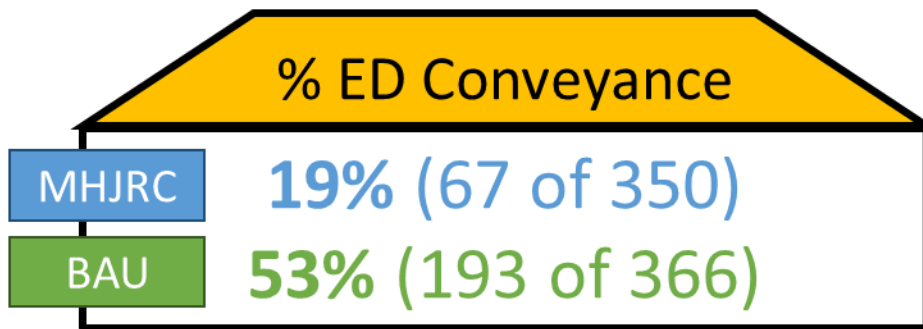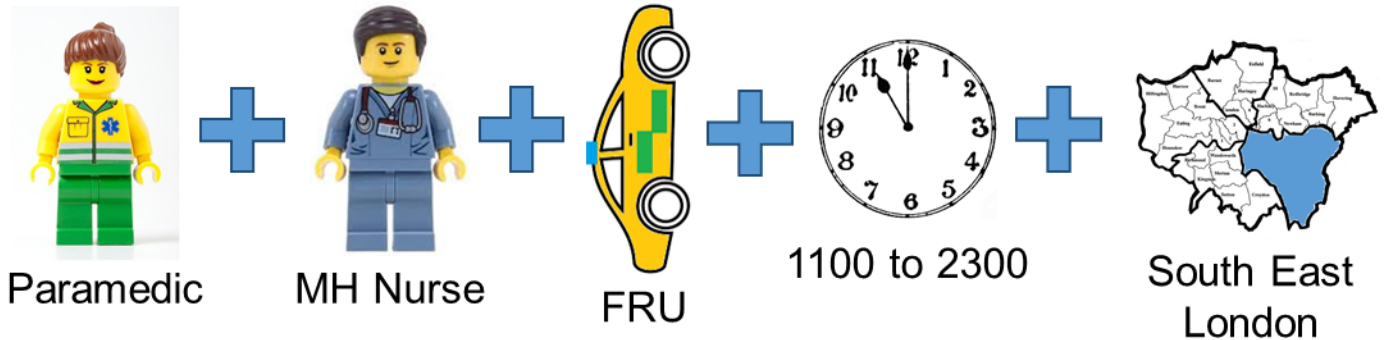This document seeks to report the context, methodology and results of the Mental Health Joint Response Car pilot.

Report RACI

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Mental Health Joint Response Car

MHJRC Pilot – Evaluation Summary – Three month interim report

Paramedic + MH Nurse + FRU + 1100 to 2300 + South East London

% ED Conveyance

MHJRC	**19%** (67 of 350)
BAU	**53%** (193 of 366)

	MHJRC	BAU
See and treat or refer	52%	17%
See and convey to other	3.7%	7.6%
Referral to MH Pathway	19%	4%
Referral to GP	9%	4%
Job cycle time	95	98
On-scene time (Non-conveyance)	76	77
On-scene time (Conveyance)	69	46
Running time	15.3	10.6
Multiple attendance ratio	1.26	1.10
Approximate recontact rate	9.2%	10.6%
Utilisation*	69%	87%
Incidents per shift*	5.05	5.70

Business as usual (BAU) MH response

MPDS card 25 (Psych)
SE London
1100 to 2300
Exclude < 18 years
Exclude Sect 136s
Exclude MH Transfers
Exclude Cat 1 acuity

*DCAs working day-shifts in SEL (not strictly MH) used for shift-based metrics

26 Nov 2018 to 10 Feb 2019 – Carly Lynch (Consultant MH Nurse) – V2

Mental Health Joint Response Car

MHJRC Pilot – FAQs– Three month interim report

Is the MHJRC is being cherry-picked for lower acuity incidents?

1. **The operational design of the pilot was intended to reduce the likelihood of cherry-picking**
    1. The MHJRC was dispatched through the standard sector allocation process
2. **Data analysis showed little evidence of cherry-picking**
    1. Incidents attended by the MHJRC had a comparable profile of suspected confounding factors (patient age, alcohol-related incidents, and acuity categories) to the BAU group
    2. If cherry-picking was present, higher rates of ED conveyance may have been observed in the BAU group (picking up the slack). Instead, the BAU group had lower rates of ED conveyance relative to the same sector during a previous period, as well as relative to other sectors during the same period.

Is the Paramedic / MH Nurse model necessary?

1. **Positive therapeutic risk-taking is a common practice within MH services**
    1. Mental Health incidents are often complex, drawing on specialist skills and experience.
    2. It is believed Band 6 Paramedics have had more of an opportunity to develop these skills and receive exposure to engage in such positive risk-taking
2. **Patients will often have physical co-morbidities**
    1. Considering patients with an illness code noted and seen by the MHJRC:
        1. 41% (27 / 66) patients conveyed to ED, and
        2. 29% (49 / 171) patients discharged through see and treat or refer
    2. Had a non-MH illness code noted (often in addition to a MH-related code)
3. **Service model provides a tangible career development pathway for Paramedic staff**
4. **Parity of esteem works in both directions**

Are there appropriate safeguards for the MHJRC?

1. **The service is subject to existing trust-wide audit and governance processes**
2. **Clinical oversight is provided by the consultant nurse and paramedic leads**
3. **Re-contact rates were comparable between the MHJRC and BAU groups**
    1. There was only one incident (0.5%) discharged through See and Treat or Refer by the MHJRC that went on to be conveyed to ED within 24 hours.
    2. However this patient was discharged on a second call by a different resource through See and Treat or Refer, before being conveyed on a third call.

26 Nov 2018 to 10 Feb 2019 – Carly Lynch (Consultant MH Nurse) – V2

A paramedic – mental health nurse joint response is associated with lower rates of conveyance to an emergency department for mental health incidents: a pilot evaluation

Summary

Background: The Mental Health Joint Response Car (MHJRC) offers a specialist response to patients who have been identified as experiencing a Mental Health (MH) crisis.

Objective: To assess the impact, safety and productivity of the new service through a pilot in South East London, relative to comparable Mental Health incidents receiving a Business As Usual (BAU) response.

Setting: The MHJRC attended its first incident on Monday 26 November 2018. Data was analysed for the 11 weeks up to and including Sunday 10 February 2019. The rota was based on a single vehicle 1100 to 2300 daily shift in a FRU car.

Comparison: A BAU response was based on calls triaged through MPDS card 25 (Psychiatric) in South East London with an on-scene arrival time between 11am and 11pm. Patients under 18 years old and incidents involving Section 136s, MH transfers or Category 1 acuity were excluded from analysis.

Methodology: Statistical regression models were employed to investigate differences between MHJRC and BAU groups. Where data was available, influence of potential confounders and effect modifiers was investigated.

Results: We hypothesised that this novel bespoke service would see a lower rates of conveyance to an Emergency Department (ED). This hypothesis was confirmed, with incidents seen by the MHJRC requiring ED conveyance 19% of the time, compared with 53% for a BAU response. To ensure a financially viable service, productivity metrics were also assessed. Despite a longer on-scene time when a conveyance was required, the MHJRC demonstrated a comparable overall Job Cycle Time (95 vs 98 minutes) thanks to its lower conveyance rate. The MHJRC managed to see an average of 5.05 incidents per shift, only marginally lower than the 5.7 average for Double Crewed Ambulances in South East London. A proxy for patient safety was assessed through an approximate recontact rate measure. This metric was comparable between MHJRC and BAU incidents (9.2% vs. 10.6%).

Conclusion: With such promising benefits relative to the existing response, it is recommended to expand the MHJRC service to new settings and scales across London. The positive risk-taking culture at the heart of this service will rely on integrating skilled and experienced clinicians into the existing high-performing team. A gradual expansion is therefore recommended to ensure outcome metrics remain stable as the service scales.

Contents

Introduction

Background

The London Ambulance Service (LAS) plays a crucial role in the mental health crisis care pathway. In 2017/18, we attended more than 95k incidents with an aspect of mental health.

999 and NHS 111 are often the first point of care for patients experiencing a mental health crisis. We have a crucial role in risk assessment, and in signposting patients to the most appropriate point of care or service. We have employed mental health nurses on our clinical hub to provide telephone advice to patients. Mental Health calls are often complex, and take time and specialist expertise to manage effectively. Patients experiencing a mental health crisis may also be suffering from substance misuse which compounds the challenges faced by staff in carrying out a full assessment of the patients presenting condition and needs.

Our crews sometimes have difficulty accessing appropriate care pathways for patients experiencing a mental health crisis. We know that some of these calls can tie up crews for many hours whilst they try to negotiate the many and varied pathways and services that may be needed. This often leads to patients being conveyed to an emergency department, which is rarely the correct environment for their effective assessment, management and a positive experience of care, and is often associated with extremely long lengths of stay and escalation of their presenting condition.

Our mental health pioneer service will see a Registered Mental Health Nurse (RMN), paired with a paramedic respond to patients who have been identified as experiencing a mental health crisis, or requiring a specialist mental health response. A RMN would be able to provide specialist care and support to patients experiencing a mental health crisis. They would also be able to navigate the appropriate mental health pathways, especially out of hours, and would have the skills and knowledge to discuss risk assessments, recommended management plans and presenting condition with approved medical practitioners and mental health units. An RMN providing specialist assessment details can effectively access a wide range of appropriate care pathways. Furthermore, brief psychological interventions can be delivered with the aim of easing emotional distress. This will all mean that patients are able to be treated in the most appropriate way to meet their needs.

Objectives

Our objective was to assess the impact, safety and productivity of the new Mental Health Joint Response Car (MHJRC) through a pilot in South East London.

It was hypothesised that relative to comparable MH incidents receiving a Business As Usual (BAU) response, the new service would have:

1. Lower rates of patients conveyed to an Emergency Department (as a result of more patients treated on scene and/or referred through alternative Appropriate Care Pathways)
2. Comparable safety outcomes
3. Comparable productivity metrics

Methods

Evaluation Design

A group of MH incidents was selected with a similar MPDS triage, acuity, spatial, temporal, and demographic profile for comparison.

Where metrics were more appropriately analysed on a shift-by-shift basis, such as crew utilisation and incidents seen per shift, DCAs in South East London were used for comparison.

Setting

The MHJRC attended its first incident on Monday 26 November 2018. The rota was based on a single vehicle daily 1100 to 2300 shift in a FRU car.

Data for analysis was extracted from the LAS Data Warehouse on Monday 25 February 2019. At this time PRF data had been processed up to and including Sunday 10 February 2019. Data was analysed for the 11 weeks between Monday 26 November 2018 and Sunday 10 February 2019.

The evaluation framework had anticipated having to exclude the initial couple of weeks as a start-up period while the pilot sorted out unanticipated issues and settled into a more consistent pattern of work. However, based on anecdotal reports from the project lead and from a review of incident characteristics and metrics (analysis not shown), this initial period was not suspected of being substantially different from the rest of the pilot. This is put down to the several test shifts run by the project lead prior to the start of the pilot period addressing most potentially unanticipated issues.

MHJRC incident allocation

Incidents were allocated to the joint response service through three methods. The project lead provided an estimation of the allocation proportions.

Method	% allocations (estimate)
Standard sector allocation process	70%
Allocation via EOC MH Nurse	25%
Self-allocation by joint response car staff	5%

Table 1. Method of allocation of incidents to the MHJRC

The logic outlined in Table 2 was used as the basis to investigate whether potential allocation bias or cherry picking by the MHJRC was causing BAU responses in SEL to be attending a higher proportion of incidents requiring conveyance to ED (e.g. potentially higher acuity patients).

For this analysis, BAU incidents where compared with: (1) comparable incidents in SEL during 12 months prior to the pilot period, and (2) comparable incidents in other locations (SWL, NEL, NCL, and NWL) during the pilot period.

Incident-based outcomes comparison group

Comparable MH incidents receiving a Business as Usual (BAU) response were defined using the following criteria:

Criteria	Detail
MPDS triage card 25 (Psychiatric)	A large proportion of incidents triaged via Card 25 should be relevant for the MHJRC to attend. A small proportion will be inappropriate, for example, incidents requiring a conveyance under Section 136. It should be noted that Card 25 only represents a small portion of incidents that will be relevant for the joint response to attend. For example, this will not capture calls from 111 or MPS or calls reclassified by CHUB. This is because data is not captured at the time of the call that allows differentiation between 111 mental health and 111 non-mental health calls. Despite the absence of captured data, EOC will (often) still be able to identify mental health calls and dispatch appropriately.

	It should also be noted that overdoses often have a component of Mental Health, however should be captured separately on triage Card 23. Overdoses are less appropriate to be seen by the MHJRC so the BAU group did not include Card 23.
South East London call location	The MHJRC was predominately, but not exclusively based in South East London. Calls originating in South East London will share similar Appropriate Care Pathways. All references to location in this report refer to the location of the patient/incident, not the sector of the LAS responding vehicle.
11am to 11pm on-scene arrival time	The MHJRC ran predominantly, but not exclusively on a daily 11am to 11pm rota. Responses during similar hours will share similar Appropriate Care Pathways.
Excluded: Patient under 18 years old	The MHJRC predominantly, but not exclusively, attended patients over 18 years old. The training and experience of the current MH Nurses was more focused towards adult mental health.
Excluded: Section 136s	Incidents where a patient requires conveyance under Section 136 should receive a response by a vehicle with conveying capability. The vehicle used by the joint response team during the pilot did not meet this criteria.
Excluded: Mental Health transfers	Incidents where a Health Care Professional have requested the conveyance of a patient should receive a response by a vehicle with conveying capability. The vehicle used by the joint response team during the pilot did not meet this criteria.
Excluded: Category 1 acuity calls	Category 1 incidents should receive a response by a vehicle with conveying capability. The vehicle used by the joint response team during the pilot did not meet this criteria. As the MHJRC was staffed by a Paramedic, the crew was able to be auto-dispatched to Category 1 calls, but data from these incidents was analysed separately.

Table 2. Criteria for defining comparison group for incidents receiving a BAU response

Incident-based outcome metrics

Incident-based outcome metrics of interest included:

Focus	Name	Detail
Primary	ED conveyance rate	Face to face incidents where at least one patient was conveyed to an Emergency Department by an LAS vehicle for immediate care.
Secondary	See and treat or refer	Face to face incidents with disposition description containing the string 'refer' or disposition codes 9002 (treated but not conveyed), 9010 (assisted but not conveyed) or 9011 (GP call/left in care)
Secondary	See but declined against advice	Face to face incidents with disposition code 9001 (declined against advice)
Secondary	See but no trace	Face to face incidents with disposition code 9013 (no trace)
Secondary	See but not required	Face to face incidents with disposition code 9090 (not required)
Secondary	See other	Face to face incidents not meeting criteria for other 'See' categories
Secondary	See and convey to Other	Face to face incidents where at least one patient was conveyed to non-Emergency Department pathway by an LAS vehicle for immediate care.

Secondary	Referral to MH Pathway	Face to face incidents where referral to external MH team code noted on PRF.
Secondary	Referral to GP	Face to face incidents where referral to GP code noted on PRF.
Secondary	Job cycle time	Minutes from allocation to green
Secondary	On-scene time (Non-conveyance)	Minutes from arrival on scene to green
Secondary	On-scene time (Conveyance)	Minutes from arrival on scene to left scene (conveying vehicle) or green (remaining vehicle/s)
Secondary	Running time	Minutes from tires moving to arrival of a vehicle on-scene
Secondary	Multiple attendance ratio	LAS vehicles that arrived on scene to an incident. Taxis are excluded from this metric.
Secondary	Approximate recontact rate	Numerator: Incidents where LAS attended an incident at the same easting/northing by a patient of the same gender within 24 hours of a See Treat or Refer discharge (see row 2 of this table for definition) by the MHJRC or BAU groups. Denominator: See Treat or Refer incidents that did not occur at a known care home or medical facility. See Treat or Refer: PRF discharge codes including Assisted but not conveyed, Assisted and referred, Treated but not conveyed, Referred to (various), or Taxi referral Due to limited capacity, matches were not manually checked to confirm a matching patient identity, so metric will only be approximate. Despite this limitation, metric should still be appropriate for relative comparisons between the joint response and BAU incidents.

Table 3. Incident-based outcome metrics

Shift-based outcomes comparison group

Where metrics were more appropriately analysed on a shift-by-shift basis, DCAs working day shifts in South East London were used for comparison.

These shifts will include all types of incidents, not exclusively mental health incidents.

Shift-based outcome metrics

Shift-based outcome metrics of interest included:

Name	MHJRC	SEL DCAs
Incidents per shift	On-scene responses during a 12 hour shift.	On-scene responses per 12 hour day shift of DCAs in SEL.
Utilisation	Minutes worked on calls divided by minutes available for calls. Takes into account out of service time.	Minutes worked on calls divided by minutes available for calls. Takes into account out of service time. BI Report 628.

Table 4. Shift-based outcome metrics

Potential confounders and effect modifiers

The following factors were flagged by the Project Lead as being potential confounders or effect modifiers. Factors considering alcohol related incidents and patient location were identified during the course of the pilot. All other factors were identified before the pilot started during the scoping phase.

Factor	Detail
Patient age	Elderly patients are more likely to have physical health comorbidities so may be more likely to require conveyance.
Patient sex	Not expected to be a potential confounder, but included in statistical analysis to confirm not the case
Alcohol related incidents	Patients deemed drunken but capable may be more likely to require conveyance.
Patient location	Patients not at home may be more likely to require conveyance. Due to the limitations of a paper-based Patient Report Form, limited data was available to investigate this factor.
Patient medical/mental health history	Patient medical/mental health history is expected to impact presenting acuity, and therefore likelihood of requiring conveyance. Due to the limitations of a paper-based Patient Report Form, limited data was available to investigate this factor.
Appropriate Care Pathway availability	The ability for Clinicians to discharge or refer on scene relies on the availability of Appropriate Care Pathways. Mitigation was attempted through comparison group inclusion criteria that considered incidents from the same date range, a similar time of day and a similar part of London (South East).
LAS or NHS other initiatives	It is plausible initiatives external to the pilot could have contributed to observed benefits. Mitigation was attempted through comparison group inclusion criteria that considered incidents from the same date range, a similar time of day and a similar part of London (South East).

Table 5. Potential confounders and effect modifiers

Data sources

Data from the time of the call is captured through the Command Point application. This includes call start time, patient age, patient sex, incident location, MPDS triage category, and DoH acuity category.

Data from the time of the response is captured through a combination of the Mobile Data Terminal and the Patient Report Form. This includes callsigns that arrived on-scene, dispatch/on-scene/job-cycle times, and conveyance or referral destinations.

Mental Health Section 136 and Alcohol-related incident flags are based off a combination of Command Point call notes, MPDS categories, and Patient Report Forms, in methods established by Business Intelligence.

Where multiple responders arrived onscene, the responder type was derived from the vehicle that stopped the clock as per BI logic based on AQI guidelines.

Incidents with non-Mental Health illness codes were defined as incidents with at least one illness code, excluding:

1. Confusion/distressed/upset (14)

2. Psychiatric problems – diagnosed (40)
3. Psychiatric problems-other (41)
4. Unable to cope (66)

Study size

The primary objective of the pilot was to estimate the ED conveyance rate of the new service to an acceptable level of confidence.

Pre-pilot trial shifts suggested the MHJRC might be able to see five incidents per shift, with an ED conveyance rate of approximately 20%. A three month pilot was proposed by project stakeholders, which would have resulted in approximately 400 incidents seen by the MHJRC. The 95% confidence interval of the rate under such assumptions would have been approximately 16% to 24% (20% ± 4%), which was considered acceptable by the project team.

It should be noted hypothesis tests around secondary metrics may be under-powered and may not have sufficient sample sizes to detect statistically significant effects.

Statistical methods

A MHJRC/BAU only model considered pilot status as a binary predictor.

A confounder model considered patient age, sex, alcohol and interactions in addition to pilot status.

Due to limited capacity, secondary metrics were analysed using the MHJRC/BAU only model.

Confidence intervals were calculated for the primary metric using a p-value of 0.05 for significance. Confidence intervals were calculated for secondary metrics incorporating a Bonferroni correction for multiple testing, resulting in a p-value of 0.005 for significance.

Binary outcome variables were analysed using logistic regression. Continuous outcome variables were analysed using linear regression.

Point estimates are supplemented with 95% confidence intervals (95% CI) throughout the paper.

Results and discussion

We evaluated outcomes of the novel pre-hospital Mental Health Joint Response Car at LAS.

Incident volumes

During the analysis period, the MHJRC attended 369 incidents. 350 of these 369 incidents remained once category 1 acuity incidents were excluded.

The BAU group of 366 incidents was based on a subset of the 251,024 total face to face incidents seen by LAS during the period.

Proportion	Criteria
206,478 of 251,024	Had MPDS (excluding 111) available
4,061 of 206,478	Were Triage Card 25 (Psychiatric) incidents
914 of 4,061	South East London only
541 of 914	Received a response between 11am-11pm
480 of 541	Excluding under 18 Excluding transfers Excluding Section 136 Excluding Category 1
366 of 480	Excluding incidents seen by MHJRC

Table 6. Incident subset volumes of the BAU group

The fact that the MHJRC and BAU volumes are similar is by coincidence, not by design.

During the pilot period there were 20,203 incidents flagged as Mental Health by Business Intelligence across LAS. 15,401 of these incidents were deemed MHJRC appropriate (Under 18, transfers, Section 136, Category 1 and Triage Card 23 Overdose all excluded).

Criteria	Incidents flagged by BI as MH	MHJRC appropriate incidents flagged by BI as MH
Triage Card 25 Psychiatric	4,036	3,458
PRF MH	8,046	5,438
Call log text search	10,005	6,505
TOTAL	20,203	15,401

Table 7. Business Intelligence Mental Health flag criteria breakdown

Table 7 was calculated using IF ELSE cascading logic to avoid double counts. This logic was chosen to illustrate the large volume of calls flagged only through call log text search.

This suggests the MHJRC saw 1.7% (350 / 20,203) of LAS Mental Health demand. 4,319 of 20,203 occurred in SEL. This suggests the MHJRC saw 8.1% (350 / 4,319) of SEL demand.

When considering incidents that are more appropriate to be seen by the MHJRC, the MHJRC attended 2.3% (305 / 15,401) of LAS and 11.2% (305 / 3,121) of SEL demand.

Incident characteristics

Participant characteristics between groups were similar. The MHJRC attended slightly younger patients (41 vs 45 years old).

Characteristic	MHC n = 350	BAU n = 366
Mean Age	41	45
Female (%)	181 (52%)	193 (53%)
Alcohol related (%)	30 (9%)	46 (13%)
Category 3 acuity (%)	302 (86%)	302 (83%)

Table 8. Incident characteristics

Rates of missing data for patient age was similar between MHC and BAU groups (5% and 5%, respectively). Rates of missing data for patient gender was similar between MHC and BAU groups (1% and 0%, respectively). The alcohol related incident flag defaults to 0, so no view is available on missing data.

91% (333 of 366) of BAU incidents had the clock stopped by AEU (320) or Training AEU (13) responses.

Considering patients with an illness code noted and seen by the MHJRC:

1. 41% (27 / 66) patients conveyed to ED, and
2. 30% (51 / 171) patients discharged through see and treat or refer

Had a non-MH illness code noted (often in addition to a MH-related code). This illustrates the importance of the Paramedic to diagnose or discharge the physical component of patient presentations.

Shift volumes

There were 77 calendar days during the period of analysis. The MHJRC arrived on scene at least once during 73 of those 77 calendar days. The MHJRC worked approximately full days (first activation before 2pm, last green after 8pm) 69 of those 73 calendar days. The majority of out of service time was due to a combination of vehicle issues and staffing capacity shortages.

Primary results

Of primary interest was the ability of the service to reduced pressure on Emergency Departments.

After excluding Category 1 acuity incidents, 19% (67 of 350) incidents attended by the MHJRC were conveyed to an ED. The 95% confident interval for the underlying ED conveyance rate was between 14% and 25%. This compared favourably with the BAU response (48% to 58%) and demonstrates the benefits of the MHJRC.

Model	MHC (95% CI) n = 350	BAU (95% CI) n = 366	Significant difference
MHJRC/BAU only model	19% (14%, 25%)	53% (48%, 58%)	Yes

Table 9. Primary results

When considering potential confounders, neither patient age nor gender nor alcohol-related incidents had a statistically significant impact on ED conveyance rates. Additionally, no interaction effects were observed between these factors and the MHJRC or BAU groups individually. This makes the observation that the MHJRC attended a slightly younger cohort less of a concern.

Factor	Significant factor
Patient Age	No
Patient Sex	No
Alcohol related	No

Table 10. Potential confounders

Secondary results (incident-based outcomes)

Incidents attended by the MHJRC not resulting in a conveyance to an ED were predominantly resolved through See and Treat or Refer 52%.

This corresponded to a higher referral rate into external MH services (19%) relative to a BAU response (4%). This is a good outcome for the experience of the patient. If the MHJRC service scales, considerations should be made about how this is likely to redistribute the flow of patients and demand for services on the London MH trusts.

Rates of other outcomes including: See but declined against advice, See but no trace, See but not required, and See and convey to Other, were comparable with a BAU response.

Unexpectedly, MHJRC non-conveyed incidents were not associated with a longer on-scene time (76 minutes) relative to a BAU response (77 minutes). Higher rates of referral through MH pathways (19% vs 4%) was expected to cause the MHJRC to spend longer time on-scene, but this did not seem to be the case.

MHJRC incidents requiring conveying had a longer on-scene time (69 minutes) relative to a BAU response (46 minutes). This difference is likely associated with having to wait for a conveying vehicle to arrive.

Having a single resource cover a specific subset of incidents over a large geographical area, it was expected that the MHJRC would have to travel longer for jobs. This was observed through a longer running time (15.3 minutes) relative to a BAU response (10.6 minutes).

The MHJRC had a similar job cycle time (95 minutes) relative to a BAU response (98 minutes). The MHJRC's longer on-scene time (when a conveyance was required), was offset by the lower overall conveyance rate.

Attending incidents as a non-conveying response means that an additional resource is required if the decision is made to convey. This was reflected in a higher MHJRC multiple attendance ratio (1.26 on-scene responses) relative to a BAU response (1.10 on-scene responses).

A significance threshold of p < 0.005 (adjusted for multiple comparisons) was used.

Metric	MHC (95% CI) n = 350	BAU (95% CI) n = 366	Significant difference
See and treat or refer	52% (40%, 64%)	17% (12%, 23%)	Yes
See but declined aid against advice	5.4% (2.3%, 11.8%)	8.0% (4.6%, 12.5%)	No
See but no trace	3.7% (1.2%, 11.5%)	3.0% (1.1%, 6.2%)	No
See but not required	6.0% (2.4%, 15.0%)	4.1% (1.8%, 7.7%)	No
See other	10% (5%, 20%)	8% (5%, 12%)	No
See and convey to Other	3.7% (1.3%, 9.0%)	7.4% (4.1%, 11.8%)	No
Referral to MH Pathway	19% (9%, 37%)	4% (2%, 7%)	Yes
Referral to GP	9% (4%, 20%)	4% (2%, 8%)	No
Job cycle time	95 (85, 105)	98 (91, 105)	No
On-scene time (Non-conveyance)	76 (62,89)	77 (66, 88)	No
On-scene time (Conveyance)	69 (55, 82)	46 (39, 53)	Yes
Running time	15.3 (13.4, 17.3)	10.6 (9.2, 12.0)	Yes
Multiple attendance ratio	1.26 (1.16,1.37)	1.10 (1.03, 1.17)	Yes

Table 11. Secondary results (incident-based outcomes)

There was no significant difference between MHJRC and BAU responses for approximate recontact rate. The MHJRC attended 182 See Treat or Refer incidents that did not occur at a known care home or medical facility, and the patient was present and did not refuse treatment. For 17 of these 182 (9.2%) MHJRC See Treat or Refer incidents, LAS attended an incident at the same easting/northing by a patient of the same gender within 24 hours. The comparable number for BAU responses was 7 of 66 (10.6%).

Metric	MHC n = 182	BAU n = 66	Significant difference
Approximate recontact rate	9.2%	10.6%	No

Table 12. Approximate recontact rate

1 of 182 (0.5%) MHJRC See Treat or Refer incidents went on to be conveyed to ED within 24 hours of the initial call. It is worth noting that the patient was seen and declined aid against advice during a second response of two on-scene vehicles (Call 2), before a third call that resulted in the conveyance. The comparable number for BAU responses was 0 of 66 (0%). It is likely there was insufficient sample size to report on this metric accurately.

Data	Call 1	Call 2	Call 3
Date	Sun 20 Jan	Sun 20 Jan	Mon 21 Jan
Time	14:55	20:14	04:48

Triage acuity	C3	C2	C2
Triage MPDS	None – via Metro Police	Overdose	Overdose
On-scene responses	N358 MHJRC	M350 FRU PD69 PAS/VAS	M231 DCA
Conveyed	No	No	Yes
Outcome	Referred to MH Team	Declined aid against advice	Conveyed to ED
Clinician PRF	Psychiatric	Alcohol No injury or illness	Drug overdose Vomiting

Table 13. Event details leading up to a MHJRC recontact resulting in a conveyance to ED

Secondary results (shift-based outcomes)

The MHJRC had lower utilisation (69%) than a typical South East London DCA (87%).

Metric	MHC	LAS SEL DCA
Incidents per shift	5.05	5.7
% Utilisation	69%	87%

Table 14. Secondary results (shift-based outcomes)

Category 1 inclusive MHJRC results

In the interest of performing as similar comparison as possible, Category 1 acuity incidents were excluded from both MHJRC and BAU groups. This was to evaluate the costs and benefits of the pilot at the margin.

It is still of interest to consider the performance the MHJRC in absolute terms – inclusive of Category 1 incidents.

Metric	Category 1 exclusive (n = 350)	Category 1 inclusive (n = 369)
See and convey ED	19%	22%
See and treat or refer	52%	49%
See but declined against advice	5.4%	6.0%
See but no trace	3.7%	3.5%
See but not required	6.0%	5.7%
See other	10%	10%
See and convey to Other	3.7%	3.5%
Referral to MH Pathway	19%	18%
Referral to GP	8.9%	8.7%
Job cycle time	95	93
On-scene time (Non-conveyance)	76	75
On-scene time (Conveyance)	69	65
Running time	15.3	14.9
Multiple attendance ratio	1.26	1.32

Table 15. MHJRC category 1 inclusion/exclusion analysis

There were only minor differences when analysing MHJRC inclusive or exclusive of Category 1 acuity incidents.

Allocation bias

If the MHJRC was cherry-picking lower acuity incidents, we might observe a higher rate of ED conveyances by the BAU group.

Scenario	Acuity of BAU group patients	Acuity of Pilot group patients
No pilot	Baseline	Not applicable
Pilot without cherry-picking	Baseline	Baseline
Pilot with cherry-picking	Higher than baseline	Lower than baseline

Table 16. Theoretical impact of cherry-picking

To investigate higher rates of ED conveyances by the BAU group, two comparisons were performed:

1. MH patients in the same geography during different periods (the same period from the previous year)
2. MH patients in different geographies during the same period (SEL versus SWL, NEL, NCL, NWL).

ED conveyance rates of MH patients in SEL seen by a BAU response were:

- 57% in 2017/18
- 53% in 2018/19 (Pilot period)

A year-on-year increase in acuity (and therefore conveyance rates) might have been suggestive of cherry-picking (as per Table 16). This did not seem to be the case.

Changes in ED conveyance rates of MH patients during the 2018/19 pilot period and the same period in 2017/18 were:

- +4.1% percentage points in SWL, NEL, NCL, NWL
- -4.2% percentage points in SEL (Pilot area)

An increase in acuity (and therefore conveyance rates) might have been suggestive of cherry-picking (as per Table 16). This did not seem to be the case.

Limitations

It was hypothesised by the project lead that the benefits of the MHJRC were likely due to a combination of the following elements:

Theme	Element
MH Nurse	Ability of the Mental Health Nurse to perform mental health assessments
MH Nurse	Ability of the Mental Health Nurse to deliver mental health crisis interventions
Culture	A culture of positive risk-taking approach enabled through a skilled and experienced team
Culture	A culture of professional trust enabled through the operation as a small close-knit team
Training	One week of specialist training before the start of the pilot
ACPs	Capacity and capability of Appropriate Care Pathways
ACPs	Staff knowledge of and a relationships with Appropriate Care Pathways
Allocation	Allocation of patients to the MHJRC i.e. cherry-picking lower acuity incidents
Expectations	Use of a non-conveying vehicle impacting clinician and patient expectations around conveyance to an Emergency Department
Expectations	Expectation by staff of conveyance rate as a primary pilot evaluation metric

Table 17. Elements likely contributing to MHJRC benefits

This pilot did not seek to quantify the contribution of each element and the interactions between elements to the pilot benefits. Caution should therefore be applied when extrapolating the results from this pilot to different settings and scales.

The elements of most concern when considering expanding the service to a new setting are the capacity and capability of, and staff relationship with, Alternative Care Pathways in a new location.

The element of most concern when considering expanding the service to larger scales are the availability of sufficiently skilled and experienced clinicians, essential to the culture of positive risk-taking at the heart of this service. Additionally, the reduction in familiarity and professional trust built from time in a small close-knit team may also present challenges to establishing an optimal culture.

With this is mind, it is recommended to expand the service, albeit in a gradual fashion to confirm outcome metrics remain stable at scale.