HM Prison & Probation Service

National Evaluation of the Male Offender Personality Disorder Pathway Programme

Appendices

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HM Prison and Probation Service is committed to evidence-based practice informed by high-quality social research and statistical analysis. We aim to contribute to the informed debate on effective practice with the people in our care in prisons, probation and youth custody.

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Topic guides

IRAS Ref: 204989

University of BRISTOL

National Evaluation of Offender Personality Disorder Pathway

Offender Interview Schedule – baseline interview - men

Overarching question: How do you define progression and how can you achieve it?

Introduction

1. How long have you been here?
   Prompt: Explore sentence history (when sentenced, journey since sentencing)

2. What are your main problems?
   Prompt: explore criteria on information sheet

3. What do you currently find helpful?
   Prompt: explore current service/intervention, case formulation

4. What didn't help?

5. What would be helpful in preventing you re-offending?
   Prompt: explore obstacles and facilitators

6. Have you heard of the Offender Personality Disorder Pathway?
   Prompt: explore knowledge and opinions of Pathway and Pathway components

7. What's been most helpful until now?

8. Is there anything that would have helped that you have not been offered?

IRAS Ref: 204989

National Evaluation of Offender Personality Disorder Pathway

Offender Interview Schedule – follow up interview - men

Overarching question: How do you define progression and how can you achieve it?

1. How have things changed since I last saw you?

2. What has been helpful?
   Prompt: explore current service/intervention, case formulation

3. What didn't help?

4. What would help you keep out of trouble?
   Prompt: explore obstacles and facilitators

5. Is there anything that would have helped that you have not been offered?

IRAS Ref: 204989

University of BRISTOL

National Evaluation Offender Personality Disorder Pathway
Staff Interview Schedule

Thanks for agreeing to do this interview.

Overarching question: Has this Pathway changed the management of offenders with PD? If so, how?

1. Please can I start by asking you to tell me a bit about your role?
   Prompt: explore length of time in role, in service, how came to service, previous job

2. Can you tell me a bit about this service – who is it for, what does it provide?

3. What do you think the offender understands about receiving this service?

4. How does the Pathway differ from what was previously available?

5. Do you think this service/Pathway has an impact on offenders? If so, how?

6. In what way does change show itself in the offender?

7. Do you think this Pathway has changed the way high risk offenders with PD are managed?

8. Do you feel you have developed your skills in working with this group?
   Prompt: how (training, formal/informal supervision, support) or why not – what is missing? Examples of situations

9. What services are you able to offer your high risk offenders with PD?
   Prompt: how useful are they? who does well? Why do you think that works (environmental context)? Explore understanding of Pathway and components.

10. How do you manage some offenders knowing they are in the Pathway and others not knowing?

11. The Pathway involves a lot of multi-agency working. Can you give me some examples where this has worked well or where it could have been better?
    Prompt: explore how disagreements are managed between agencies

IRAS Ref: 204989

University of BRISTOL

National Evaluation Offender Personality Disorder Pathway
Staff Interview Schedule – Follow up

Thanks for agreeing to do this interview.

Overarching question: How has this Pathway changed the management of offenders with PD?

1. Recap role, then - can you tell me if anything has changed about your role since I last saw you? What has it been like for you working here?
   a. Has anything changed about the unit since I was last here?
   b. (**Prompt**: mix of prisoners on unit, unit place in pathway)

2. Can you tell me a bit about how case formulation differs from sentence planning? (**Prompt**: How does it differ from what was available before?)
   a. From the point the offender is first sentenced, how often, if at all, would they have conversations about their mental health?

3. From the point the offender is first sentenced, how often would they have conversations about their risk and risk of re-offending?

4. How many offenders on this unit are aware they are in the pathway?

5. How do you think being here impacts on the offenders?
   a. **Prompt:** Explore facilitators and barriers to progression
   b. Since I last saw you, how would you say your experience of working with this population has changed? (**Prompt**: explore training, supervision etc)

6. The Pathway involves a lot of multi-agency working. Can you give me some examples where this has worked well or where it could have been better?
   Prompt: explore sharing of information between and within organisations

Appendix B
Description of extracted datasets

Table B1: Description of extracted datasets

Extract	Individual Cases[a]	Records[a]	Dates[b]	PID[c]	Variables included in the extract (excluding Personal Identifiable Data)
NDelius NSI OPD	47,548[d]	47,548[d]	Referral Date Jan 2012 – Sept 2017	CRN, PNC, first name, surname, D.o.B.	**Defines whether an offender is in the Pathway,** holds probation information (division, cluster, LDU), also Component status e.g.- pending consultation, ready for services etc; and Outcome
NDelius Contacts OPD	28,887 [d]	107,654[d]	Contact date Jan 2012 – Sept 2017	CRN, first name, surname, DoB., PNC	**Provides information on types of contacts within the Pathway** e.g Case Consultation, Case Formulation, Prison PD Treatment etc.
NDelius Screen pc	64,541 [d]	142,011[d]	Created date May 1999 – Jan 2017	CRN, PNC, first name, surname, DoB	**Provides information on screening criteria offender for the Pathway** i.e. OASYS ≥7 items, 4 additional items listed individually
NDelius Identifiers & Sentence	30,999 (28, 321 men)	30,999	Disposal date Oct 1964 – Oct 2017	CRN, PNC, surname, first name, DoB	**Provides information on characteristics of offenders on the Pathway** including personal characteristics, type of disposal, Offence type, MAPPA levels, OGRS scores, other scores and custody status etc.
Treatment and Progression (T&P)	8,790 (7,337 men)	9,438 (7,840 men)	Date started core service Jan 2002 (DSPD) - 2017	CRN, PNC, first name, surname, DoB, NOMIS Number	**A collation of manually completed excel sheets** from Prison OPD Treatment Units, Prison Provision and Progression PIPEs, Therapeutic Communities +, AP PIPEs, HMPPS funded Intensive Risk Management in the Community and, mentoring and advocacy in the community). **The data includes service description, sentence type, offenders personal description. Holds OGRS scores.**
Police National Computer (PNC)	41, 802 men	2, 493, 634	Offence start date: Jan 1900 – July 17	Surname, first name, DoB, PNC,	**Provides key information on re-offending** Total number of variables: 15 Offence details and dates (lots of disposal and offence start dates missing).

Extract	Individual Cases[a]	Records[a]	Dates[b]	PID[c]	Variables included in the extract (excluding Personal Identifiable Data)
Recall	91, 121 men	137, 114	Return to Custody date Sept 2001 – Dec 2016	Surname, first name, DoB, NOMIS number,	**Provides key information on recall** Total number of variables: 13 Dates for licence revoked, tariff expiry, returned to custody, sentence; custody type, index offence.
Adjudications	138,421 (129, 063 men)	792,338 (749, 840 men)	Incident date July 1990 – Jun 2017	Surname, first name, DoB, NOMIS Number	**Provides key information on adjudications** Total no variables: 52 (including personal characteristics, number of convictions, previous custodial sentences, security category, descriptions of offences/sentences, pleas and findings descriptions, sanctions descriptions)
ACCT	14,041 [d]	65,813[d]	Start date: March 2007 – June 2017	NOMIS number	**Provides information who have had an ACCT opened (risk to self)** Date ACCT opened and date closed
OASys	44, 878 (43,437 men)	530, 975 (517, 692 men)[e]	Date assessment completed: June 02 – Jan 18	Surname, first name, DoB, NOMIS number, PNC, CRN	**Provides key information on offending risk** Total no variables: 63 (Covers risk scores (OGRS scores missing) and some OASys items)

a. Individuals (cases) can have more than one record in a data extract.

b. We aimed to identify date variables in each database that could act as points which would indicate pre and post Pathway data (e.g. sentence date, date of referral to Pathway). The dates parameters are listed. NB. many NDelius parameters predate the introduction of the OPD Strategy.

c. Personal Identifiable Data. This refers to the unique identifiers in each database. Databases can only be linked if they share at least one item of PID.

d. Both females and males assumed in – database did not have a Gender variable

Appendix C
Participant characteristics (qualitative sample)

Table C1: Staff participant characteristics

Role	**N = 38**
Senior commissioners	4
Offender Managers	10
Other probation staff (regional, area and AP managers, support workers, probation service officer)	6
Prison officers	8
Psychologists	4
Other clinicians (MH Nurses, OT and CAT Therapist)	6
Settings	**N = 38**
HMPPS and NHS England	4
Prison PD Treatment Unit	5
Prison Progression PIPE	5
Prison Provision PIPE	2
DTC	2
NHS MSU	3
Community PD Treatment	3
Community PIPE	3
Other Community (LDU, AP, Regional level)	11
Gender	**N = 38**
Male	19
Female	19
Age	*N= 15*
Mean age (s.d.)	41.7 yrs (11 yrs)
Age range	26 – 61 yrs
Length of time in profession	*N=23*
Mean years (s.d.)	13.6 yrs (8.3 yrs)
Range	4 months – 3 yrs
Length of time in Pathway	*N=30*
Mean months (s.d.)	27.5 months (16.2 months)
Range	4-66 months

Table C2: Offender participant characteristics

	N =36
Location	
Prison PD Treatment	9
Prison Progression PIPE	6
Prison Provision PIPE	2
DTC	2
NHS MSU	5
Community PD Treatment	4
Community PIPE	4
Community Specification Model	4
Ethnicity	
White English	33
White Other	1
Black Caribbean	1
Dual heritage Black/White	1
Index offence	
Murder	11
GBH/Wounding with intent offences	8
Sexual offences	3
Robbery	3
Arson offences (endangering life)	3
Other[1]	6
Missing	2
Type of Sentence	
Life sentence	15
Indeterminate Public Protection (IPP) sentences[2]	8
Determinate sentence	10
Community Sentence	1
Missing	2

	Mean	(SD)	Range
Age	38.7 years	(9.6)	23-58 years
Length of sentence			
Life sentence tariff	12.6 years	(1.5)	3-21 yrs
IPP/DPP tariff	4.8 years	(0.8)	2 yrs 3 mths – 10 yrs
Determinate sentence length	5.9 years	(1.4)	2 – 14 yrs
Time served of sentence	9.2 years	(8.3)	1 - 40 years
Time in Pathway service	14.5 mths	(17.7)	1.5 – 84 months
Time over tariff[3]	6.7 years	(5.1)	1-17 years
Time between initial and follow up interviews	10.1 mths	(1.9)	7-13 months

1 includes non-violent offences against children, false imprisonment, threats to kill, drug offences and assault

2 includes one offender given a Determinate Public Protection (equivalent to IPP for under 18 years)

3 10 of the 23 participants serving IPP and Life sentences were over tariff at the time of interview

Appendix D

Descriptive statistics for treatment and comparator groups

Tables D1 through to Table D7 show descriptive statistics for the comparator and overall Treatment Group from the NDelius datasets prior to matching. A total of 28,321 offenders existed with similar ages and ethnicities between the two groups (Table D1 – Table D3). There was a higher proportion of offenders in the Comparator Group with a prison sentence under four years compared to those in the Treatment Group, and a higher proportion in the Treatment Group with a prison sentence over 12 years compared to the Comparator Group. Offenders in the Comparator Group had a higher proportion of a Community service or Determinate sentence compared to those in the Treatment Group, and Treatment Group offenders a higher proportion of serving Life or IPP compared to the Comparator population. Offenders in the Treatment Group were more likely to have a high or very high assessment of serious harm (Table D6), and more likely to have had a higher offender group reconviction rate (Table D7) compared to those in the Comparator Group.

Table D1: Number of offenders classified in the analysis Treatment Groups according to services/treatment received

Treatment Group	Counts	Percentages
Comparator	18,900	66.73
Pathway	9,421	33.27
Total	28,321	100.00

Table D2: Age of offenders on 1st February 2018

	Comparator (n= 18,900)	Treatment (n= 9,421)	Overall (n= 28,321)
Mean (sd) Age in years	37.65 (12.74)	38.02 (12.08)	37.77 (12.53)
Age range: min-max in years	18.18 - 90.14	18.52- 90.79	18.18 - 90.79

Table D3: Ethnicity of offenders

Counts (%)	Comparator	Treatment	Overall
White	14,818 (80.57)	7,349 (79.66)	22,167 (80.27)
Asian	739 (4.02)	345 (3.74)	1,084 (3.93)
Black	1,875 (10.19)	980 (10.62)	2,855 (10.34)
Mixed	794 (4.32)	478 (5.18)	1,272 (4.61)
Other	166 (0.90)	73 (0.79)	239 (0.87)
Total	18,392 (100.00)	9,225 (100.00)	27,617 (100.00)

Table D4: Time left to serve in prison from referral to the Pathway

Counts (%)	Comparator	Treatment	Overall
Left prison	418 (2.21)	199 (2.20)	617 (2.18)
Under 4 years	10,176 (53.90)	4,339 (46.18)	14,515 (51.34)
Between 4 and 12 years	3,962 (20.99)	1,938 (20.63)	5,900 (20.87)
Over 12 years	4,322 (22.89)	2,920 (31.08)	7,242 (25.61)
Total	18,878 (100.00)	9,396 (100.00)	28,274 (100.000)

Table D5: Sentence Type

Counts (%)	Comparator	Treatment	Overall
Community Sentence	1,774 (9.39)	603 (6.40)	2,377 (8.40)
Determinate	8,222 (43.52)	3,596 (38.17)	11,818 (41.74)
Short Determinate	4,875 (25.80)	2,296 (24.37)	7,171 (25.33)
IPP	1,614 (8.54)	1,493 (15.85)	3,107 (10.97)
Life	2,331 (12.34)	1,409 (14.96)	3,740 (13.21)
Other	77 (0.41)	23 (0.24)	100 (0.35)
Total	18,893 (100.00)	9,420 (100.00)	28,313 (100.00)

Table D6: Assessment of Risk of Serious Harm (RoSH)

Counts (%)	Comparator	Treatment	Overall
Low	208 (1.22)	43 (0.49)	251 (0.97)
Medium	5,107 (29.94)	2,051 (23.46)	7,158 (27.74)
High	11,330 (66.41)	6,232 (71.29)	17,562 (68.06)
Very High	415 (2.43)	416 (4.76)	831 (3.22)
Total	17,060 (100.00)	8,742 (100.00)	25,802 (100.00)

Table D7: Offender Group Reconviction Scale (OGRS)

	Comparator (N= 18,900)	Treatment (N= 9,421)	Overall (N= 28,321)
OGRS3 1-year mean (sd)	36.13 (24.76)	38.84 (24.06)	37.03 (24.56)
Min, max	0, 96	0, 96	0, 96
OGRS3 2-year mean (sd)	48.58 (27.94)	51.93 (26.62)	49.69 (27.56)
Min, max	0, 98	0, 98	0, 98

Appendix E
Propensity Score Matching by Outcome Variable

The analysis sample for each outcome variable included individuals with usable data of the respective outcome and the baseline covariates. After restricting our sample to offenders' baseline values (one data record per offender), propensity scores were obtained using the predicted probability of a binary logistic regression with group indicator as the dependent variable. Age was used as a continuous variable, after having checked a categorical and a non-linear version of the age variable. The kernel matching algorithm used a kernel half-width value of 0.06 for all primary analyses and 0.002 for some secondary analyses that used less data. Also, all analyses used a bi-weight kernel function. The kernel function and the value of the kernel half-width were chosen after examining how various values and functions affected the quality of matching. We examined the quality of matching through the production of standardised mean differences of the two groups for each covariate, before and after matching (Tables E1 – E10).

Table E1: Descriptive statistics (means, standard deviations and proportions) before and after matching for OGP and OVP outcomes

	Comparator Before Matching	Treatment	Comparator After Matching
Age, mean (sd)	37.554 (12.489)	37.909 (12.048)	38.212 (12.489)
Ethnicity			
- White	0.807	0.800	0.795
- Asian	0.040	0.037	0.037
- Black	0.100	0.105	0.110
- Mixed	0.044	0.050	0.050
- Other	0.008	0.009	0.008
Time left to serve			
- left prison	0.013	0.018	0.020
- under 4 yrs	0.565	0.445	0.406
- 4 and 12 yrs	0.211	0.207	0.226
- over 12 yrs	0.211	0.330	0.348
Screening items			
- 0	0.344	0.235	0.219
- 1	0.174	0.175	0.185
- 2	0.254	0.254	0.265
- 3	0.157	0.204	0.206
- 4	0.072	0.132	0.124
RoSH			
- Low	0.012	0.004	0.003
- Medium	0.317	0.230	0.229
- High	0.649	0.721	0.727
- Very High	0.022	0.045	0.041

	Comparator Before Matching	Treatment	Comparator After Matching
Sentence type			
- Community	0.092	0.059	0.046
- Determinate	0.451	0.386	0.381
- Short Determin.	0.260	0.228	0.229
- IPP	0.088	0.166	0.172
- Life	0.108	0.161	0.173
OGRS score 1, mean (sd)	36.754 (24.533)	38.891 (24.534)	39.123 (12.489)
OGRS score 2, mean (sd)	49.390 (27.503)	52.129 (26.223)	52.428 (12.489)
OGP baseline, mean (sd)	37.621 (23.269)	39.765 (22.693)	39.457 (12.489)
OVP baseline, mean (sd)	29.238 (18.865)	30.592 (18.825)	30.144 (12.489)

Table E2: Standardised mean/proportion differences before and after matching for OGP and OVP outcomes

	Before matching	After matching
Age	0.029	0.006
Ethnicity		
- White	0.019	0.004
- Asian	0.015	0.000
- Black	0.016	0.005
- Mixed	0.026	0.001
- Other	0.002	0.001
Time left to serve		
- left prison	0.040	0.005
- under 4 yrs	0.242	0.007
- 4 and 12 yrs	0.009	0.008
- over 12 yrs	0.270	0.016
Screening items		
- 0	0.243	0.002
- 1	0.004	0.005
- 2	0.000	0.009
- 3	0.124	0.002
- 4	0.200	0.023
RoSH		
- Low	0.089	0.006
- Medium	0.197	0.002
- High	0.155	0.011
- Very High	0.130	0.020
Sentence type		
- Community	0.124	0.003
- Determinate	0.133	0.005
- Short Determin.	0.076	0.010
- IPP	0.234	0.023
- Life	0.156	0.004
OGRS score 1	0.089	0.005
OGRS score 2	0.102	0.004
OGP baseline	0.093	0.006
OVP baseline	0.072	0.007

Table E31: Descriptive statistics (mean, standard deviations and proportions) before and after matching for adjudications

	Comparator Before Matching	Treatment	Comparator After Matching
Age, mean (sd)	34.510 (10.603)	35.621 (10.799)	35.937 (10.603)
Ethnicity			
- White	0.763	0.773	0.771
- Asian	0.045	0.041	0.041
- Black	0.131	0.122	0.127
- Mixed	0.053	0.055	0.053
- Other	0.008	0.009	0.008
Time left to serve			
- left prison	0.015	0.024	0.023
- under 4 yrs	0.429	0.362	0.339
- 4 and 12 yrs	0.297	0.251	0.266
- over 12 yrs	0.258	0.364	0.372
Screening items			
- 0	0.344	0.218	0.214
- 1	0.178	0.180	0.184
- 2	0.247	0.246	0.252
- 3	0.148	0.209	0.212
- 4	0.083	0.147	0.138
RoSH			
- Low	0.005	0.002	0.002
- Medium	0.199	0.158	0.156
- High	0.767	0.787	0.795
- Very High	0.029	0.053	0.047
Sentence type			
- Community	0.015	0.013	0.012
- Determinate	0.431	0.379	0.375
- Short Determin.	0.323	0.252	0.251
- IPP	0.101	0.191	0.189
- Life	0.130	0.165	0.174
OGRS score 1, mean (sd)	43.453 (24.201)	44.278 (23.165)	44.173 (24.201)
OGRS score 2, mean (sd)	56.732 (26.294)	58.014 (24.853)	57.952 (26.294)

Table E4: Standardised mean/proportion differences before and after matching for adjudications

	Before matching	After matching
Age	0.104	0.001
Ethnicity		
- White	0.022	0.002
- Asian	0.016	0.001
- Black	0.025	0.006
- Mixed	0.007	0.008
- Other	0.008	0.004

	Before matching	After matching
Time left to serve		
- left prison	0.060	0.006
- under 4 yrs	0.138	0.006
- 4 and 12 yrs	0.104	0.009
- over 12 yrs	0.229	0.012
Screening items		
- 0	0.284	0.000
- 1	0.007	0.001
- 2	0.004	0.009
- 3	0.161	0.007
- 4	0.202	0.019
RoSH		
- Low	0.047	0.007
- Medium	0.107	0.006
- High	0.048	0.017
- Very High	0.120	0.021
Sentence type		
- Community	0.019	0.003
- Determinate	0.105	0.009
- Short Determin.	0.157	0.002
- IPP	0.256	0.024
- Life	0.098	0.008
OGRS score 1	0.035	0.005
OGRS score 2	0.050	0.006

Table E5: Descriptive statistics (means, standard deviations and proportions) before and after matching for self-harm

	Comparator Before Matching	Treatment	Comparator After Matching
Age, mean (sd)	34.261 (9.987)	34.802 (10.252)	35.038 (9.987)
Ethnicity			
- White	0.828	0.827	0.829
- Asian	0.041	0.032	0.034
- Black	0.082	0.083	0.084
- Mixed	0.041	0.049	0.047
- Other	0.008	0.009	0.007
Time left to serve			
- left prison	0.016	0.021	0.020
- under 4 yrs	0.428	0.373	0.342
- 4 and 12 yrs	0.302	0.269	0.288
- over 12 yrs	0.254	0.338	0.350
Screening items			
- 0	0.175	0.113	0.109
- 1	0.166	0.147	0.146
- 2	0.295	0.254	0.265
- 3	0.223	0.263	0.267
- 4	0.141	0.223	0.214

	Comparator Before Matching	Treatment	Comparator After Matching
RoSH			
- Low	0.005	0.001	0.001
- Medium	0.169	0.124	0.121
- High	0.790	0.810	0.821
- Very High	0.036	0.065	0.057
Sentence type			
- Community	0.013	0.008	0.007
- Determinate	0.448	0.401	0.391
- Short Determin.	0.311	0.259	0.262
- IPP	0.112	0.197	0.195
- Life	0.116	0.136	0.146
OGRS score 1, mean (sd)	45.809 (24.370)	46.114 (23.304)	46.057 (24.370)
OGRS score 2, mean (sd)	59.009 (26.135)	59.771 (24.820)	59.689 (26.135)

Table E6: Standardised mean/proportion differences before and after matching for self-harm

	Before matching	After matching
Age	0.053	0.002
Ethnicity		
- White	0.003	0.003
- Asian	0.045	0.004
- Black	0.002	0.004
- Mixed	0.039	0.006
- Other	0.010	0.007
Time left to serve		
- left prison	0.036	0.010
- under 4 yrs	0.113	0.000
- 4 and 12 yrs	0.073	0.009
- over 12 yrs	0.183	0.007
Screening items		
- 0	0.178	0.009
- 1	0.052	0.003
- 2	0.092	0.008
- 3	0.094	0.012
- 4	0.213	0.012
RoSH		
- Low	0.064	0.007
- Medium	0.129	0.011
- High	0.050	0.022
- Very High	0.132	0.021
Sentence type		
- Community	0.050	0.003
- Determinate	0.096	0.000
- Short Determin.	0.116	0.014
- IPP	0.235	0.023
- Life	0.061	0.008

	Before matching	After matching
OGRS score 1	0.013	0.010
OGRS score 2	0.030	0.009

Table E7: Descriptive statistics (means, standard deviations and proportions) before and after matching for recalls

	Comparator Before Matching	Treatment	Comparator After Matching
Age, mean (sd)	34.423 (9.538)	34.920 (9.938)	34.854 (9.538)
Ethnicity			
- White	0.814	0.802	0.797
- Asian	0.030	0.030	0.030
- Black	0.093	0.097	0.099
- Mixed	0.053	0.058	0.061
- Other	0.010	0.012	0.013
Time left to serve			
- left prison	0.006	0.010	0.007
- under 4 yrs	0.600	0.569	0.542
- 4 and 12 yrs	0.288	0.278	0.302
- over 12 yrs	0.106	0.144	0.149
Screening items			
- 0	0.308	0.194	0.185
- 1	0.179	0.172	0.181
- 2	0.250	0.246	0.248
- 3	0.161	0.223	0.225
- 4	0.101	0.165	0.161
RoSH			
- Low	0.005	0.003	0.003
- Medium	0.208	0.171	0.172
- High	0.750	0.767	0.772
- Very High	0.037	0.058	0.053
Sentence type			
- Community	0.013	0.010	0.009
- Determinate	0.435	0.442	0.433
- Short Determin.	0.480	0.422	0.431
- IPP	0.039	0.072	0.070
- Life	0.032	0.055	0.056
OGRS score 1, mean (sd)	48.752 (23.705)	48.733 (23.141)	49.023 (23.705)
OGRS score 2, mean (sd)	62.031 (25.427)	62.268 (24.456)	62.618 (25.427)

Table E8: Standardised mean/proportion differences before and after matching for recalls

	Before matching	After matching
Age	0.051	0.009
Ethnicity		
- White	0.030	0.008
- Asian	0.005	0.006
- Black	0.013	0.005
- Mixed	0.024	0.006
- Other	0.018	0.005
Time left to serve		
- left prison	0.045	0.020
- under 4 yrs	0.063	0.012
- 4 and 12 yrs	0.024	0.004
- over 12 yrs	0.114	0.019
Screening items		
- 0	0.265	0.002
- 1	0.020	0.003
- 2	0.008	0.004
- 3	0.158	0.007
- 4	0.188	0.009
RoSH		
- Low	0.030	0.003
- Medium	0.094	0.000
- High	0.040	0.011
- Very High	0.101	0.024
Sentence type		
- Community	0.032	0.002
- Determinate	0.013	0.011
- Short Determin.	0.118	0.007
- IPP	0.143	0.023
- Life	0.112	0.018
OGRS score 1	0.001	0.008
OGRS score 2	0.010	0.009

Table E9: Descriptive statistics (means, standard deviations and proportions) before and after matching for reoffending analyses

	Comparator Before Matching	Treatment	Comparator After Matching
Age, mean (sd)	38.980 (13.714)	36.245 (13.144)	34.225
Ethnicity			
- White	0.909	0.924	0.931
- Asian	0.033	0.021	0.020
- Black	0.028	0.021	0.015
- Mixed	0.016	0.014	0.021
- Other	0.014	0.021	0.014

	Comparator Before Matching	Treatment	Comparator After Matching
Time left to serve			
- left prison	0.041	0.014	0.019
- under 4 yrs	0.883	0.834	0.787
- 4 and 12 yrs	0.057	0.124	0.164
- over 12 yrs	0.018	0.028	0.030
Screening items			
- 0	0.485	0.343	0.350
- 1	0.106	0.074	0.083
- 2	0.217	0.245	0.287
- 3	0.153	0.218	0.223
- 4	0.038	0.120	0.057
RoSH			
- Low	0.050	0.026	0.025
- Medium	0.619	0.556	0.563
- High	0.323	0.410	0.406
- Very High	0.009	0.009	0.006
Sentence type			
- Community	0.715	0.639	0.572
- Determinate	0.120	0.188	0.208
- Short Determin.	0.159	0.153	0.198
- IPP	0.007	0.021	0.022
OGRS score 1, mean (sd)	16.782 (20.999)	23.151 (24.616)	26.161
OGRS score 2, mean (sd)	24.536 (25.920)	32.441 (28.735)	35.168

Table E10: Standardised mean/proportion differences before and after matching for reoffending analyses

	Before matching	After matching
Age	0.204	0.097
Ethnicity		
- White	0.054	0.033
- Asian	0.074	0.001
- Black	0.047	0.018
- Mixed	0.020	0.045
- Other	0.052	0.093
Time left to serve		
- left prison	0.168	0.071
- under 4 yrs	0.139	0.003
- 4 and 12 yrs	0.234	0.012
- over 12 yrs	0.062	0.093
Screening items		
- 0	0.292	0.029
- 1	0.112	0.009
- 2	0.068	0.024
- 3	0.165	0.068
- 4	0.306	0.018

	Before matching	After matching
RoSH		
- Low	0.127	0.040
- Medium	0.128	0.019
- High	0.182	0.026
- Very High	0.003	0.050
Sentence type		
- Community	0.163	0.022
- Determinate	0.189	0.012
- Short Determin.	0.016	0.003
- IPP	0.119	0.113
OGRS score 1	0.278	0.132
OGRS score 2	0.289	0.116

Appendix F

Regression analyses (Treatment vs Comparator groups)

The continuous (OGP and OVP) outcomes were analysed using mixed-effects linear regression with two nested random intercepts at the offender's level (offender cluster) and at a regional level (Local Delivery Unit (LDU) cluster), respectively. The effectiveness of the Pathway was estimated by comparing the before/after referral to the Pathway slope difference of the Treatment Group with that of the Comparator Group. This was conveniently modelled within the statistical model via a three-way interaction between the Group variable, time (duration to and from referral to the Pathway in years) and a before/after referral to the Pathway binary indicator. The sample was restricted to analyse only those values recorded within a maximum of three years prior to and after referral to the Pathway, as there were insufficient numbers after three years (<1% of data) and the numbers were not well balanced between the two groups. The outcomes' rates of change were estimated before and after referral for each group, using linear predictions from the models. Statistical assumptions associated with the models were checked and there were no obvious violations.

For the count outcomes, analyses were conducted only for those offenders who had an event date and therefore sufficient information to enable the time periods for analyses to be constructed. The amount of data available was examined both before and after referral to the Pathway in order to establish the length of exposure within which the number of events would be counted for each individual. For those individuals who were still in prison, a maximum three-year exposure duration both before and after referral to the Pathway was applied. Individuals for whom an indication of having left prison after referral to the Pathway were assigned a maximum three-year length of exposure before referral, but after referral exposure time was less than three years (depending on their release date). After aggregating the individual incidences within the exposure period into counts, each offender had at most two count measures, one for before referral, one for after referral, or both. Exposure time length for the number of offences was four years (two years pre- and two years post-referral), as there were not sufficient numbers beyond that period and the numbers were not balanced between the two groups. All incidence rates reported in the document can be converted to incidence per 1,000 people within the exposure period if their value is multiplied by 1,000. The group effect was assessed via an interaction between group and the binary before/after referral indicator. After checking for over-dispersion, all count outcomes were analysed with a negative binomial regression using robust standard errors at the regional level (LDU), except

for the number of recalls, which were analysed with a Poisson regression, since over-dispersion was not a serious concern.

All analyses applied propensity weights produced from the kernel matching algorithm. All analyses used a 5% level to declare statistical significance.

OGP and OVP outcomes

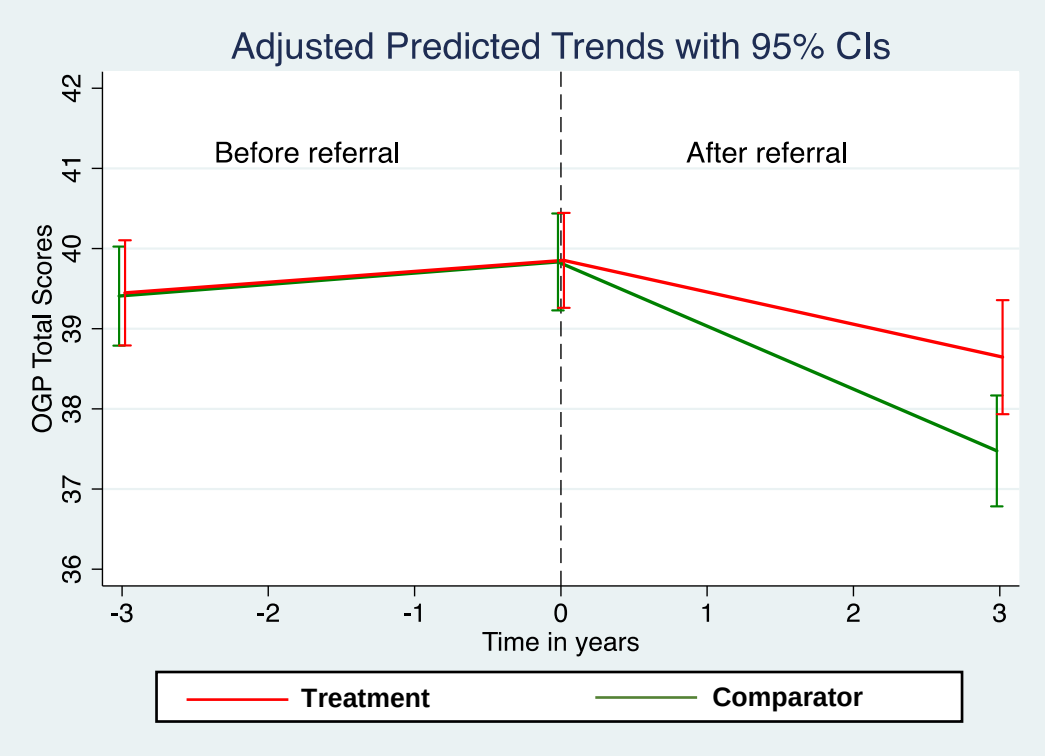
Results from the linear mixed model analysis of the OGP outcome are reported in Table F1. The estimated regression slopes in the linear mixed model represent the rate of change (change per year) in OGP score. The effectiveness of the OPD Pathway is represented by the 3-way interaction between group, before/after indicator and time (which is the “difference of differences” in Table F1). For the OGP outcome, the effectiveness of the OPD Pathway was found to be 0.39 (95% CI: 0.054, 0.726, p=0.023). This indicates that, taking account of the pre-Pathway difference in slopes between the groups, the Treatment Group was improving at a slower (by 0.39 OGP points per year) rate than the Comparator Group.

Table F1: Propensity weighted linear mixed model results for the OGP outcome. Analysis included a total of n=19,440 individuals, with data from 3 years before to 3 years after referral to the Pathway

Group	Before/After referral to the Pathway	Estimated Slope	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.142	0.068	0.036	0.009, 0.274
	After	-0.786	0.077	<0.001	-0.937, -0.634
	Difference (after minus before)	-0.927	0.109	<0.001	-1.140, -0.714
Treatment	Before	0.135	0.083	0.105	-0.028, 0.298
	After	-0.402	0.073	<0.001	-0.545, -0.258
	Difference (after minus before)	-0.537	0.116	<0.001	-0.764, -0.310
	Difference of difference (Treatment minus Comparator)*	0.390	0.171	0.023	0.054, 0.726

* Effectiveness of the Pathway in terms of OGP outcome

Figure 1: Plot of the linear mixed model results for the OGP outcome. Analysis included a total of n=19,440 individuals, with data from 3 years before to 3 years after referral to the Pathway.



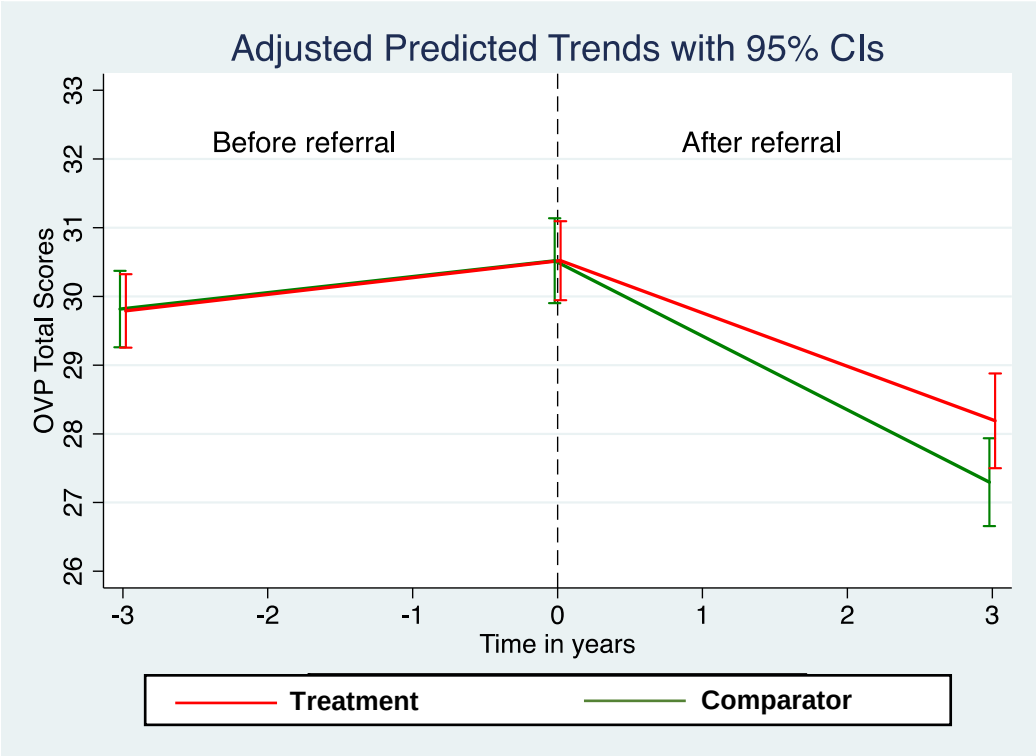
Results from the linear mixed model analysis of the OVP outcome are reported in Table F2. For the OVP outcome, the effectiveness of the OPD Pathway was found to be 0.29 (95% CI: -0.051, 0.627), however this effect was not statistically significant (p=0.095). In other words, the improvement rate in both groups is statistically similar.

Table F2: Propensity weighted linear mixed model results for the OVP outcome. Analysis included a total of n=19,440 individuals, with data from 3 years before to 3 years after referral to the Pathway

Group	Before/After referral to the Pathway	Estimated Slope	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.234	0.069	0.001	0.098, 0.370
	After	-1.074	0.078	<0.001	-1.220, -0.921
	Difference (after minus before)	-1.309	0.115	<0.001	-1.535, -1.082
Treatment	Before	0.243	0.071	0.001	0.104, 0.383
	After	-0.777	0.074	<0.001	-0.922, -0.631
	Difference (after minus before)	-1.020	0.112	<0.001	-1.239, -0.801
	Difference of difference (Treatment minus Comparator)*	0.288	0.173	0.095	-0.051, 0.627

* Effectiveness of the Pathway in terms of OVP outcome

Figure 2: Plot of the linear mixed model results for the OVP outcome. Analysis included a total of n=19,440 individuals, with data from 3 years before to 3 years after referral to the Pathway.



Adjudications

Table F3 presents the accrued number of adjudication events and person-years by group and by time period, across all offenders that took part in the analysis and had outcome data for a duration of six years (from 3 years before to 3 years after referral to the Pathway).

Table F3: Total accrued number of adjudication events and person-years from 3 years before to 3 years after referral to the Pathway

	Comparator		Treatment	
	Before	**After**	**Before**	**After**
Total count of adjudication events (d)	25,380	18,151	28,674	21,628
Total person-years (t)	23,334	19,470	22,294	20,052

The clustering of the adjudication counts (similar for all other count outcomes) by LDU was accounted for by use of robust standard errors. The results presented in Table F4 represent incidence rates and rate ratios. Incidence rates for each time period (after/before referral to the Pathway) represent the number of events per person per unit exposure time (year) within that period. A rate ratio with a value greater than one represents a higher rate of adjudication events for the period after referral compared to that before referral to the Pathway. On the other hand, a rate ratio with a value less than one represents a higher rate of adjudication events for the period before referral compared to that after referral to the Pathway. The estimated adjudication incidence rate ratios in Table F4 (Comparator after/before rate ratio=0.818, Treatment after/before rate ratio=0.787) show that both groups had a lower rate of adjudication events after referral to the Pathway compared to the period before referral to the Pathway. This was found to be statistically significant for both groups ($p<0.001$). Effectiveness of the Pathway was defined as the ratio of the two rate ratios, that is, by dividing the after/before rate ratio of the Treatment Group by that of the Comparator Group. The estimated effectiveness of the Pathway for the adjudications outcome was found to be 0.962 (95% CI: 0.896, 1.026; $p=0.252$). It can be seen that the estimated ratio of the rate ratios is close to one with a statistically non-significant p-value. This indicates that improvement rates for the two groups were statistically similar.

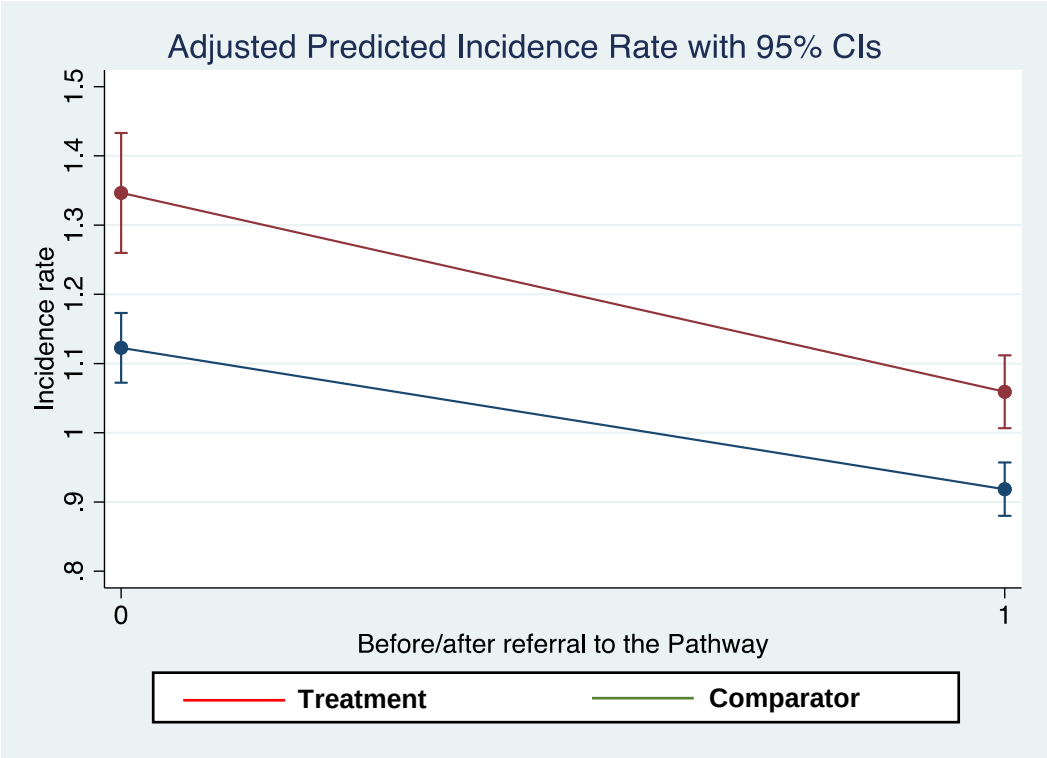
Table F4: Propensity weighted negative binomial regression for adjudication incidence counts. Analysis included a total of n=12,998 individuals, with data from 3 years before to 3 years after referral to the Pathway

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	1.123	0.026	<0.001	1.072 , 1.173
	After	0.918	0.020	<0.001	0.880 , 0.957
	Incidence rate ratio (after/before)	0.818	0.023	<0.001	0.772 , 0.864
Treatment	Before	1.346	0.044	<0.001	1.259 , 1.433
	After	1.059	0.027	0.024	1.006 , 1.111
	Incidence rate ratio (after/before)	0.787	0.025	<0.001	0.737 , 0.836
	Ratio of ratios (Treatment/ Comparator)*	0.962	0.033	0.252	0.896 , 1.026

* Effectiveness of the Pathway in terms of adjudication events.

NB. Incidence rates for each time period (after/before referral to the Pathway) represent the number of events per person per unit exposure time (year) within that period. All incidence rates can be converted to incidence per 1,000 people within the exposure period, by simply multiplying their value by 1,000.

Figure 3: Plot of incidence rates from propensity weighted negative binomial model for adjudication incidence counts. Analysis included a total of n=12,998 individuals, with data from 3 years before to 3 years after referral to the Pathway.



Self-harm

Table F5 presents the accrued number of self-harm events and person-years by group and by time period, across all offenders that took part in the analysis and had outcome data for a duration of six years (from 3 years before to 3 years after referral to the Pathway).

Table F5: Total accrued number of self-harm events and person-years from 3 years before to 3 years after referral to the Pathway

	Comparator		Treatment	
	Before	**After**	**Before**	**After**
Total count of self-harm events (d)	4,341	3,363	4,784	4,228
Total person-years (t)	9,963	8,413	9,219	9,274

The estimated self-harm incidence rate ratios in Table F6 (Comparator after/before rate ratio=0.895, Treatment after/before rate ratio=0.855) show that both groups have a lower rate of self-harm report events after referral to the Pathway compared to the period before referral to the Pathway. This was statistically significant for both groups (p<0.001). The estimated effectiveness of the Pathway for the self-harm reports outcome was found to be 0.955 (95% CI: 0.867, 1.042; p=0.326). This result indicates that improvement rates for the two groups were statistically similar.

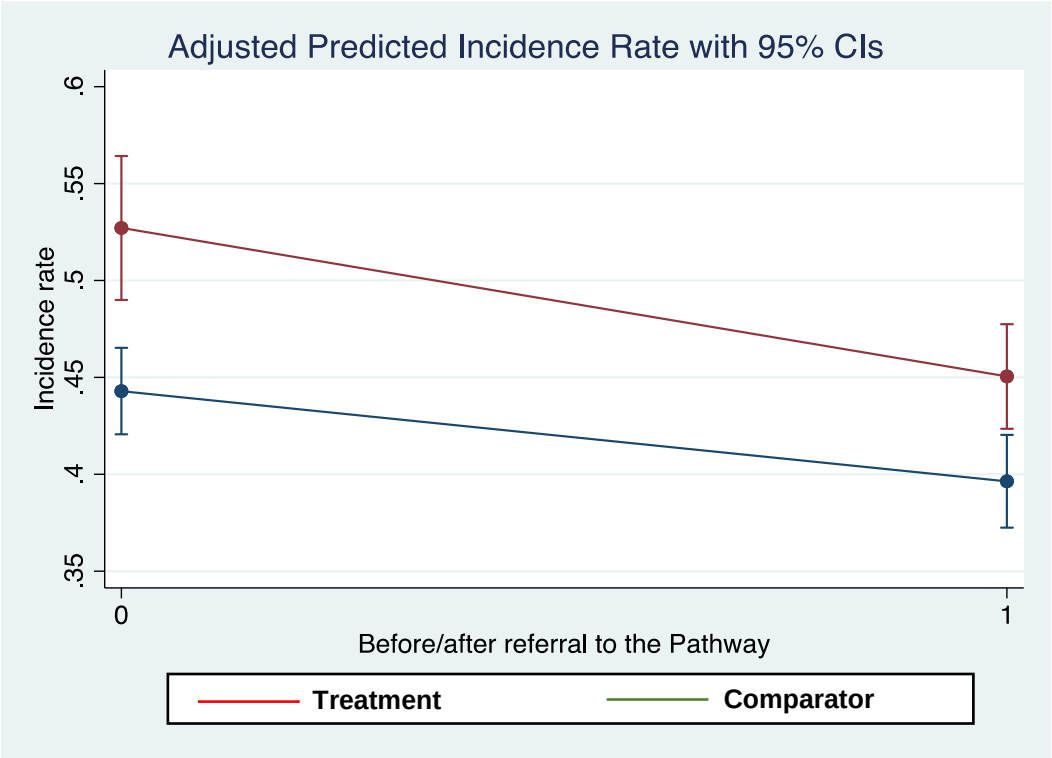
Table F6: Propensity weighted negative binomial regression for number of self-harm reports. Analysis included a total of n=5,513 individuals, with data from 3 years before referral to 3 years after referral to the Pathway

Group	**Before/After referral to the Pathway**	**Incidence Rate**	**Standard Error**	**P-value**	**95% Confidence Interval**
Comparator	Before	0.443	0.011	<0.001	0.421, 0.465
	After	0.396	0.012	<0.001	0.372, 0.420
	Incidence rate ratio (after/before)	0.895	0.027	<0.001	0.841, 0.949
Treatment	Before	0.527	0.019	<0.001	0.490, 0.564
	After	0.450	0.014	<0.001	0.424, 0.477
	Incidence rate ratio (after/before)	0.855	0.032	<0.001	0.793, 0.917
	Ratio of ratios (Treatment/Comparator)*	0.955	0.045	0.326	0.867, 1.042

*Effectiveness of the Pathway in terms of number of self-harm reports.

NB. Incidence rates for each time period (after/before referral to the Pathway) represent the number of events per person per unit exposure time (year) within that period. All incidence rates can be converted to incidence per 1,000 people within the exposure period, by simply multiplying their value by 1,000.

Figure 4: Plot of incidence rates from propensity weighted negative binomial model for number of self-harm reports. Analysis included a total of n=5,513 individuals, with data from 3 years before to 3 years after referral to the Pathway



Recalls

A Poisson regression was used for the recalls outcome, as over-dispersion was not of concern. The interpretation of the parameters for the Poisson regression is similar to that of the negative binomial regression model (see description for adjudications results). Table F7 presents the accrued number of recall events and person-years by group and by time period, across all offenders that took part in the analysis and had outcome data for a duration of six years (from 3 years before to 3 years after referral to the Pathway).

Table F7: Total accrued number of recall events and person_years from 3 years before to 3 years after referral to the Pathway

	Comparator		Treatment	
	Before	**After**	**Before**	**After**
Total count of recall events (d)	1,889	958	1,769	1,183
Total person-years (t)	9,602	5,039	8,900	6,047

The estimated recalls incidence rate ratios in Table F8 (Comparator after/before rate ratio=0.972, Treatment after/before rate ratio=0.991) show that both groups had a lower rate of recall events after referral to the Pathway compared to the period before referral to the Pathway. This however was not statistically significant for either group (Comparator p=0.218, Treatment p=0.746). The estimated effectiveness of the Pathway for the recalls outcome was found to be 1.019 (95% CI: 0.938, 1.099; p=0.640). This result indicates that improvement rates for the two groups were statistically similar.

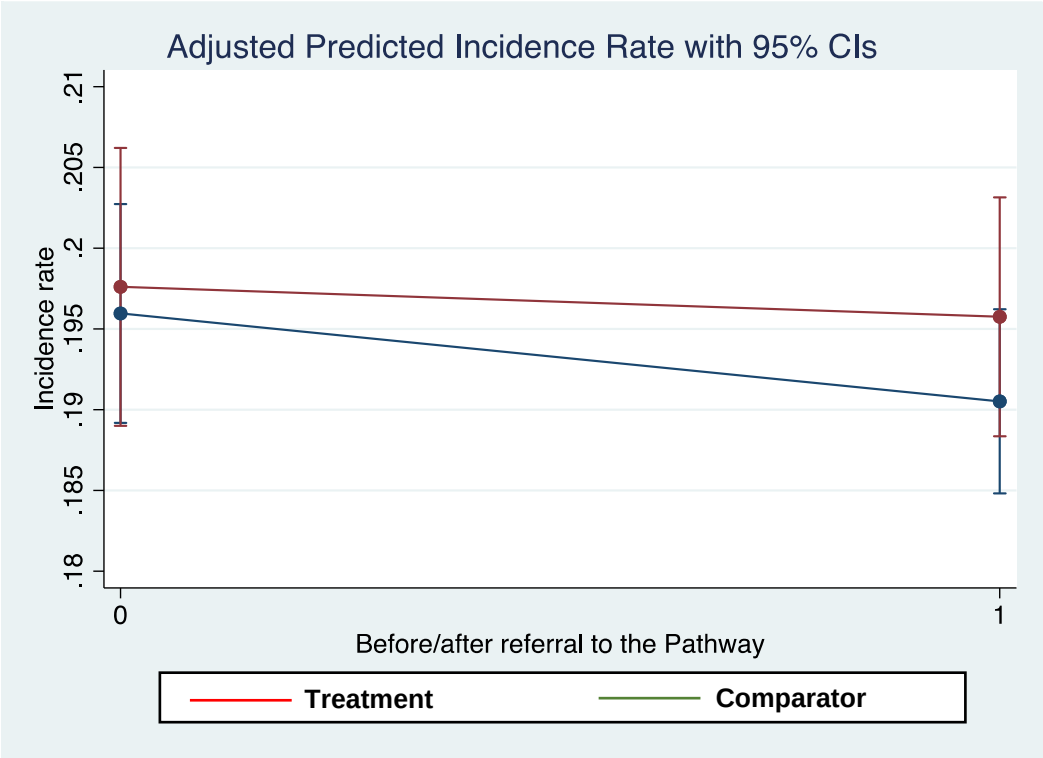
Table F8: Propensity weighted Poisson regression for number of recalls. Analysis included a total of n=6,440 individuals, with data from 3 years before to 3 years after referral to the Pathway

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.196	0.003	<0.001	0.189, 0.202
	After	0.191	0.003	<0.001	0.185, 0.196
	Incidence rate ratio (after/before)	0.972	0.022	0.218	0.929, 1.015
Treatment	Before	0.198	0.004	<0.001	0.189, 0.206
	After	0.196	0.004	<0.001	0.188, 0.203
	Incidence rate ratio (after/before)	0.991	0.029	0.746	0.934, 1.047
	Ratio of ratios (Treatment/ Comparator)*	1.019	0.041	0.640	0.938, 1.099

*Effectiveness of the Pathway in terms of number of recalls.

NB. Incidence rates for each time period (after/before referral to the Pathway) represent the number of events per person per unit exposure time (year) within that period. All incidence rates can be converted to incidence per 1,000 people within the exposure period, by simply multiplying their value by 1,000.

Figure 5: Plot of incidence rates from propensity weighted Poisson model for number of recalls. Analysis included a total of n=6,440 individuals, with data from 3 years before to 3 years after referral to the Pathway



Offending

Offences were categorised into four classes: non-violent, sexual, violent, and sexual and violent. Each class was analysed as a separate outcome. Time duration for the number of offences was four years (two years pre- and two years post-referral), as there were not sufficient numbers after two years from referral to the Pathway. Analysis results for each outcome are presented below.

Non-Violent Offences

The negative binomial regression model for the analysis of the number of non-violent offences included 402 offenders (Comparator n=297, Treatment n=105). Table F9 presents the accrued number of non-violent offences and person-years by group and by time period.

Table F9: Total accrued number of non-violent offences and person-years from 2 years before to 2 years after referral to the Pathway

	Comparator		Treatment	
	Before	**After**	**Before**	**After**
Total count of non-violent offences (d)	273	61	245	47
Total person-years (t)	420	74	416	75

The estimated non-violent offence incidence rate ratios in Table F10 (Comparator after/before rate ratio=1.314, Treatment after/before rate ratio=1.199) show that both groups had a higher rate of non-violent offence events after referral to the Pathway compared to the period before referral to the Pathway. This was however not statistically significant for either group (Comparator p=0.203, Treatment p=0.479). The estimated effectiveness of the Pathway for the non-violent offences was found to be 0.912 (95% CI: 0.324, 1.5; p=0.779). This result indicates that the worsening rates did not differ statistically between the two groups.

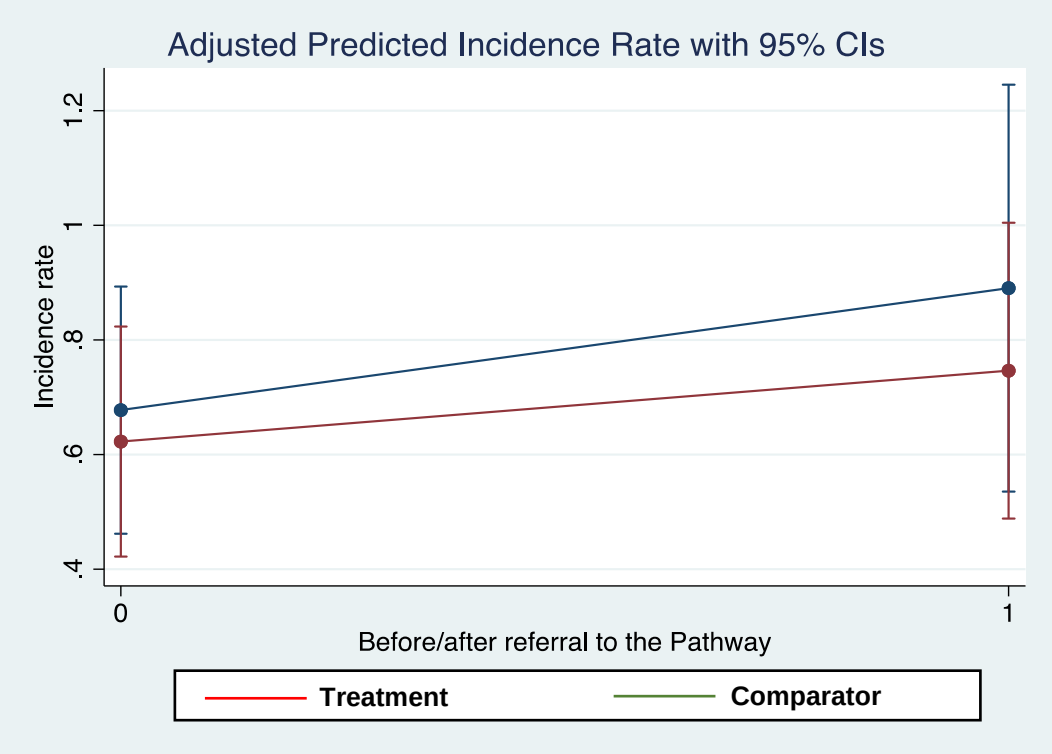
Table F10: Propensity weighted negative binomial regression for number of non-violent offences. Analysis included a total of n=402 individuals, with data from 2 years before to 2 years after referral to the Pathway

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.678	0.110	0.016	0.462, 0.893
	After	0.890	0.181	0.568	0.535, 1.245
	Incidence rate ratio (after/before)	1.314	0.282	0.203	0.762, 1.867
Treatment	Before	0.623	0.102	0.004	0.422, 0.823
	After	0.746	0.132	0.097	0.488, 1.004
	Incidence rate ratio (after/before)	1.199	0.307	0.479	0.597, 1.800
	Ratio of ratios (Treatment/Comparator)*	0.912	0.300	0.779	0.324, 1.499

*Effectiveness of the Pathway in terms of number of non-violent offences.

NB. Incidence rates for each time period (after/before referral to the Pathway) represent the number of events per person per unit exposure time (year) within that period. All incidence rates can be converted to incidence per 1,000 people within the exposure period, by simply multiplying their value by 1,000.

Figure 6: Plot of incidence rates from propensity weighted negative binomial model for number of non-violent offences. Analysis included a total of n=402 individuals, with data from 2 years before referral to 2 years after referral to the Pathway



Sexual Offences

The negative binomial regression model for the analysis of the number of sexual offences included 1,359 offenders (Comparator n=960, Treatment n=399). Table F11 presents the accrued number of sexual offences and person-years by group and by time period.

Table F11: Total accrued number of sexual offences and person-years from 2 years before to 2 years after referral to Pathway

	Comparator		Treatment	
	Before	**After**	**Before**	**After**
Total count of sexual offences (d)	341	21	362	36
Total person-years (t)	1,566	54	1,538	71

The estimated sexual offence incidence rate ratios in Table F12 (Comparator after/before rate ratio=1.819, Treatment after/before rate ratio=2.306) show that both groups had a higher rate of sexual offence events after referral to the Pathway compared to the period before referral to the Pathway. This was statistically significant for both groups (Comparator p=0.008, Treatment p<0.001). The estimated effectiveness of the Pathway for the number of sexual offences was found to be 1.268 (95% CI: 0.574, 1.962; p=0.395). This result indicates that the worsening rates for both groups were statistically similar.

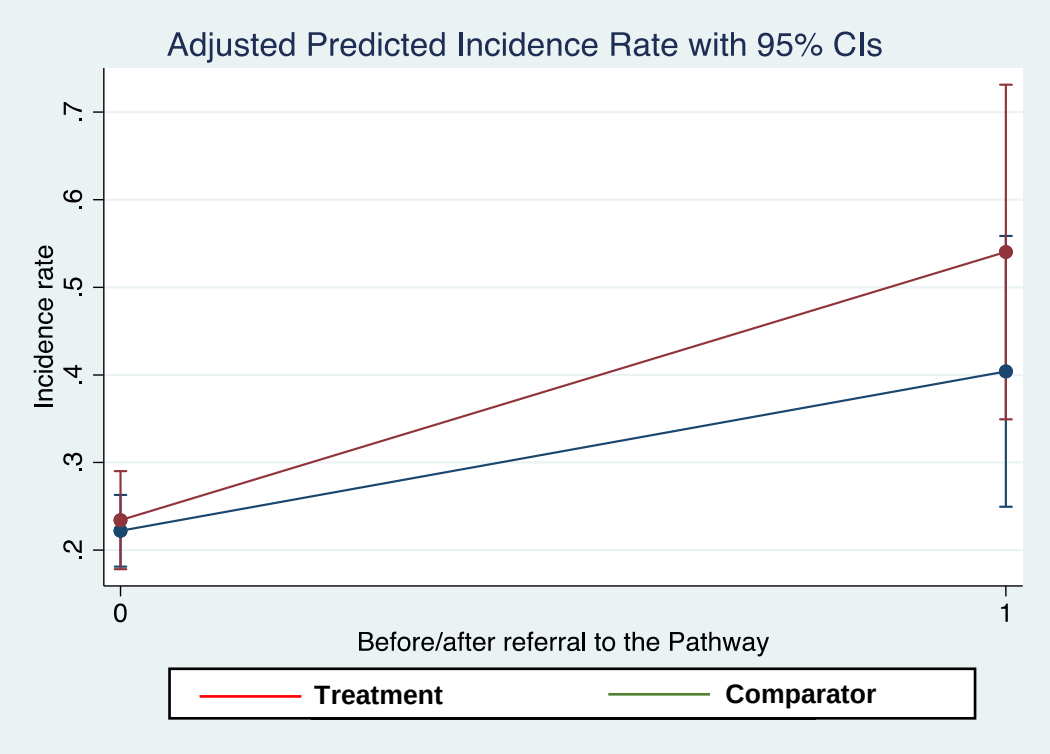
Table F12: Propensity weighted negative binomial regression for number of sexual offences. Analysis included a total of n=1, 359 individuals, with data from 2 years before to 2 years after referral to the Pathway

Group	**Before/After referral to the Pathway**	**Incidence Rate**	**Standard Error**	**P-value**	**95% Confidence Interval**
Comparator	Before	0.222	0.021	<0.001	0.181, 0.263
	After	0.404	0.079	<0.001	0.249, 0.559
	Incidence rate ratio (after/before)	1.819	0.411	0.008	1.014, 2.624
Treatment	Before	0.234	0.029	0.001	0.178, 0.290
	After	0.540	0.097	0.001	0.349, 0.731
	Incidence rate ratio (after/before)	2.307	0.403	<0.001	1.517, 3.096
	Ratio of ratios*	1.268	0.354	0.395	0.574, 1.962

*Effectiveness of the Pathway in terms of number of sexual offences.

NB. Incidence rates for each time period (after/before referral to the Pathway) represent the number of events per person per unit exposure time (year) within that period. All incidence rates can be converted to incidence per 1,000 people within the exposure period, by simply multiplying their value by 1,000.

Figure 7: Plot of incidence rates from propensity weighted negative binomial model for number of sexual offences. Analysis included a total of n=1,359 individuals, with data from 2 years before to 2 years after referral to the Pathway



Violent Offences

The negative binomial regression model for the analysis of the number of violent offences included 10,977 offenders (Comparator n=6,962, Treatment n=4,015). Table F13 presents the accrued number of violent offences and person-years by group and by time period.

Table F13: Total accrued number of violent offences and person_years from 2 years before to 2 years after referral to Pathway

	Comparator		Treatment	
	Before	**After**	**Before**	**After**
Total count of violent offences (d)	12,575	3,619	11,735	4,165
Total person-years (t)	15,128	3,859	14,950	4,267

The estimated violent offence incidence rate ratios in Table F13 (Comparator after/before rate ratio=1.036, Treatment after/before rate ratio=1.139) show that both groups had a higher rate of violent offence events after referral to the Pathway compared to the period before referral to the Pathway. This was statistically significant for the Treatment Group (p=0.001), but not for the Comparator Group (p=0.362) The estimated effectiveness of the Pathway for the number of violent offences was found to be 1.099 (95% CI: 0.988, 1.210; p=0.066). This result indicates that the worsening rates for both groups were statistically similar.

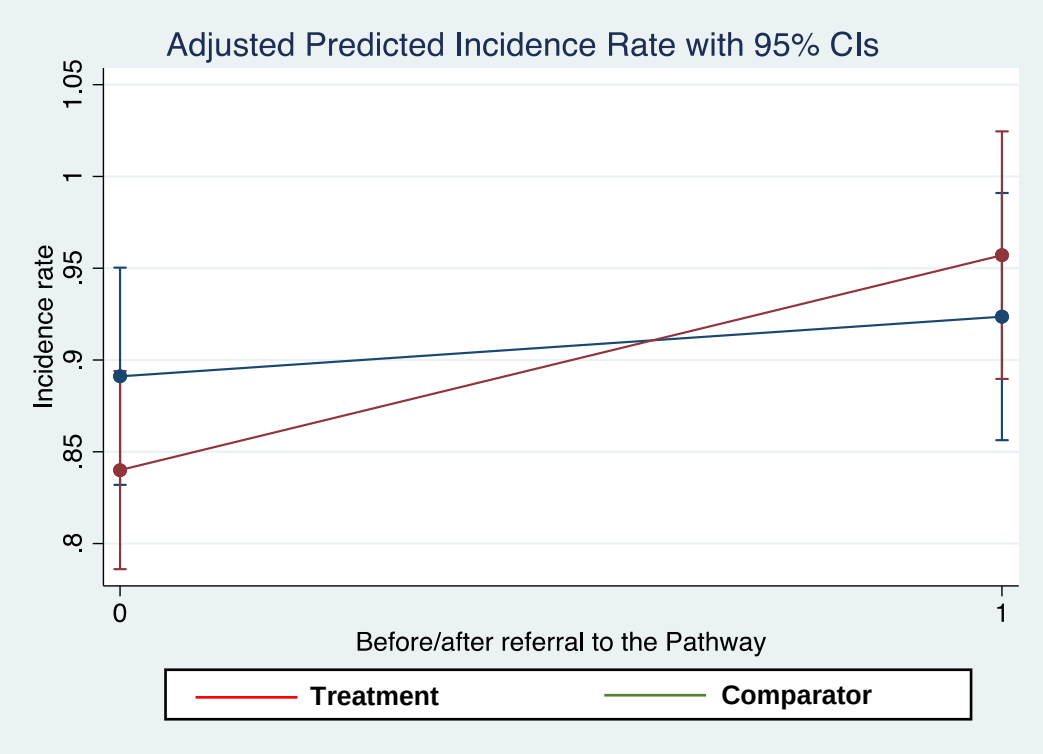
Table F14: Propensity weighted negative binomial regression for number of violent offences. Analysis included a total of n=10,977 individuals, with data from 2 years before to 2 years after referral to the Pathway

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.891	0.030	0.001	0.832, 0.950
	After	0.924	0.034	0.033	0.856, 0.991
	Incidence rate ratio (after/before)	1.036	0.041	0.362	0.957, 1.116
Treatment	Before	0.840	0.028	<0.001	0.786, 0.894
	After	0.957	0.034	0.223	0.890, 1.024
	Incidence rate ratio (after/before)	1.139	0.043	0.001	1.054, 1.224
	Ratio of ratios*	1.099	0.057	0.066	0.988, 1.210

* Effectiveness of the Pathway in terms of number of violent offences.

NB. Incidence rates for each time period (after/before referral to the Pathway) represent the number of events per person per unit exposure time (year) within that period. All incidence rates can be converted to incidence per 1,000 people within the exposure period, by simply multiplying their value by 1,000.

Figure 8: Plot of incidence rates from propensity weighted negative binomial model for number of violent offences. Analysis included a total of n=10,977 individuals, with data from 2 years before to 2 years after referral to the Pathway



Sexual and Violent Offences

The negative binomial regression model for the analysis of the number of sexual and violent offences included 3,468 offenders (Comparator n=2,117, Treatment n=1,351). Table F15 presents the accrued number of sexual and violent offences and person-years by group and by time period.

Table F15: Total accrued number of sexual and violent offences and person-years from 2 years before to 2 years after referral to the Pathway

	Comparator		Treatment	
	Before	**After**	**Before**	**After**
Total count of sexual and violent offences (d)	3,229	1,086	3,560	1,338
Total person-years (t)	5,132	1,019	5,053	1,233

The estimated sexual and violent offence incidence rate ratios (Comparator after/before rate ratio=1.599, Treatment after/before rate ratio=1.441) show that both groups had a higher rate of sexual and violent offence events after referral to the Pathway compared to the period before referral to the Pathway. This was statistically significant for both groups (p<0.001). The estimated effectiveness of the Pathway for the number of sexual and violent offences was found to be 0.901 (95% CI: 0.728, 1.074; p=0.289). This result indicates that the worsening rates for the two groups were statistically similar.

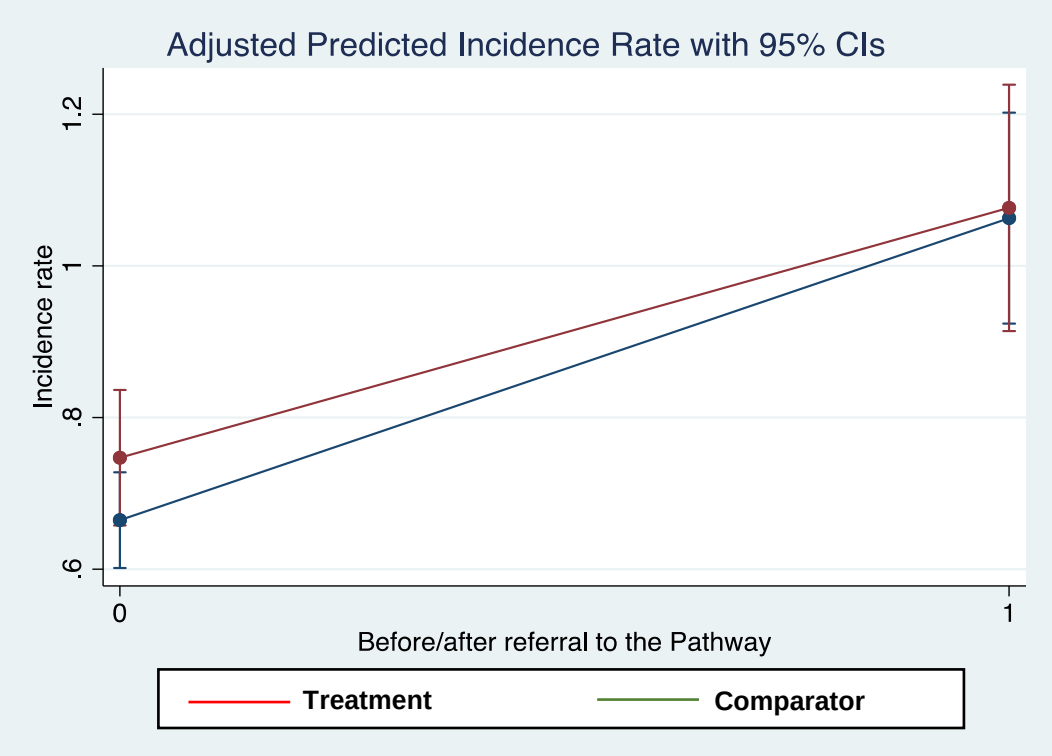
Table F16: Propensity weighted negative binomial regression for number of sexual and violent offences. Analysis included a total of n=3, 478 individuals, with data from 2 years before to 2 years after referral to the Pathway.

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.665	0.032	<0.001	0.602, 0.728
	After	1.063	0.071	0.360	0.924, 1.202
	Incidence rate ratio (after/before)	1.599	0.118	<0.001	1.367, 1.831
Treatment	Before	0.747	0.046	<0.001	0.658, 0.837
	After	1.077	0.083	0.338	0.914, 1.239
	Incidence rate ratio (after/before)	1.441	0.115	<0.001	1.216, 1.665
	Ratio of ratios*	0.901	0.088	0.289	0.728, 1.074

* Effectiveness of the Pathway in terms of number of sexual and violent offences.

NB. Incidence rates for each time period (after/before referral to the Pathway) represent the number of events per person per unit exposure time (year) within that period. All incidence rates can be converted to incidence per 1,000 people within the exposure period, by simply multiplying their value by 1,000.

Figure 91: Plot of incidence rates from propensity weighted negative binomial model for number of sexual and violent offences. Analysis included a total of n=3,468 individuals, with data from 2 years before to 2 years after referral to the Pathway



Appendix G
Subgroup analyses

Table G1: Sample sizes, split by treatment group (for subgroup analyses)

	Comparator	Treatment group 1	Treatment group 2
Risk (OVP/OGP)	12,050	5,733	1,656
Adjudications	7,840	3,779	1,380
Self-harm	2,991	1,753	772
Recalls	3,997	1,921	524
Reoffending – non-violent	294	94	11*
Reoffending – violent	6,962	2,998	1,019
Reoffending – sexual	959	335	64*
Reoffending – sexual & violent	2,118	1,075	273

* Analyses not completed due to small sample size

Subgroup analyses were conducted to assess whether complex formulations and referral to intervention services was differentially associated with outcomes. As stated in the primary analyses, the maximum follow-up period for the number of offences was four years (two years pre- and two years post-referral), as there were insufficient data beyond two years from referral to the Pathway.

OGP and OVP outcomes

Treatment without T&P vs. Control: OGP outcome

The analysis model for the OGP outcome for this subgroup included 17,783 (Comparator n=12,050, Treatment without T&P n=5,733) offenders. The average number of repeated outcome measures per offender was 6.2 (min=1, max=35). Results from the linear mixed model analysis of the OGP outcome are reported in Table G2. The results show that OGP scores in both groups deteriorated (increased) significantly in the period before referral to the Pathway (Comparator slope = 0.149, p=0.023; Treatment without T&P slope=0.234, p=0.009). During the period after referral to the Pathway, OGP scores for both groups improved as indicated by the negative slopes (Comparator slope = -0.744, p<0.001; Treatment without T&P slope=-0.317, p<0.001), which are both statistically significant. The before/after difference in the slopes for both groups was also statistically significant (Comparator slope=-0.893, p<0.001; Treatment without T&P slope= -0.551, p<0.001). For the OGP outcome the effectiveness of the OPD Pathway for this subgroup analysis was found to be 0.342 (95% CI: -0.009, 0.693), however this effect was not found to be statistically significant (p=0.056). In other words, the improvement rate in both groups is statistically similar.

T&P vs. Comparator: OGP outcome

The analysis model for the OGP outcome for this subgroup included 13,706 (Comparator n=12,050, T&P n=1,656) offenders. The average number of repeated outcome measures per offender was 6 (min=1, max=27). Results from the linear mixed model analysis of the OGP outcome are reported in Table G3. The results show that OGP scores in the Comparator Group deteriorates (increase) slightly in the period before referral to the Pathway (Comparator slope = 0.076, p=0.330) but the T&P Group improves (T&P slope=-0.157, p=0.303). During the period after referral to the Pathway, OGP scores for both groups improved (declined) as indicated by the negative slopes (Comparator slope = -0.903, p<0.001; T&P slope=-0.843, p<0.001), which are both statistically significant. The before/after difference in the slopes for both groups was also statistically significant (Comparator slope=-0.980, p<0.001; T&P slope= -0.686, p=0.007). For the OGP outcome the effectiveness of the OPD Pathway was found to be 0.29 (95% CI: -0.254, 0.842), however this effect was not statistically significant (p=0.294). This means the improvement rate in both groups is statistically similar.

Results for both Treatment Subgroups as well as the Comparator show similar trends to the primary analysis i.e. both Treatment Subgroups, improved after referral to the Pathway. However, unlike the primary analysis, improvement rate of neither of the Pathway Subgroups differed significantly from the Comparator Group in terms of the overall effectiveness. The statistical significance of the effectiveness in the primary analysis may be due to higher statistical power driven by the bigger sample size.

Table G2: Comparison of the Comparator Group and Treatment without T&P Subgroup. Results from propensity weighted linear mixed model results for the OGP outcome. Analysis included a total of n=17,783 individuals, with data from 3 years before referral to 3 years after referral to the Pathway

Group	Before/After referral to the Pathway	Estimated Slope	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.149	0.066	0.023	0.020, 0.278
	After	-0.744	0.077	<0.001	-0.895, -0.592
	Difference (after minus before)	-0.893	0.107	<0.001	-1.103, -0.683
Treatment without T&P	Before	0.234	0.090	0.009	0.058, 0.410
	After	-0.317	0.081	<0.001	-0.476, -0.158
	Difference (after minus before)	-0.551	0.125	<0.001	-0.797, -0.306
	Difference of difference (Treatment without T&P minus Comparator)*	0.342	0.179	0.056	-0.009, 0.693

* Effectiveness of the Pathway in terms of the OGP outcome.

Table G3: Comparison of the Control Group and T&P Subgroup. Results from propensity weighted linear mixed model results for the OGP outcome. Analysis included a total of n=13,706 individuals, with data from 3 years before to 3 years after referral to the Pathway

Group	Before/After referral to the Pathway	Estimated Slope	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.076	0.078	0.330	-0.077 , 0.230
	After	-0.903	0.085	<0.001	-1.070 , -0.736
	Difference (after minus before)	-0.980	0.126	<0.001	-1.227 , -0.732
T&P	Before	-0.157	0.152	0.303	-0.455 , 0.141
	After	-0.843	0.150	<0.001	-1.137 , -0.548
	Difference (after minus before)	-0.686	0.252	0.007	-1.180 , -0.192
	Difference of difference (T&P minus Comparator)*	0.294	0.280	0.294	-0.254 , 0.842

* Effectiveness of the Pathway in terms of the OGP outcome.

Pathway without T&P vs Control: OVP outcome

The analysis model for the OVP outcome for this subgroup included 17,783 (Comparator n=12,050, Pathway n=5,733) offenders. The average number of repeated outcome measures per offender was 6.2 (min=1, max=35). Results from the linear mixed model analysis of the OVP outcome for this subgroup are reported in Table G4. The results show that OVP scores in both groups deteriorated (increased) significantly in the period before referral to the Pathway (Comparator slope = 0.257, p<0.001; Treatment without T&P slope=0.332, p<0.001). During the period after referral to the Pathway, OVP scores for both groups improved (declined) as indicated by the negative slopes (Comparator slope = -1.046, p<0.001; Treatment without T&P slope=-0.688, p<0.001), which are both statistically significant. The before/after difference in the slopes for both groups was also statistically significant (Comparator slope=-1.302, p<0.001; Treatment without T&P slope= -1.020, p<0.001). For the OVP outcome the effectiveness of the OPD Pathway for this subgroup analysis was found to be 0.283 (95% CI: -0.057, 0.623), however this effect was not statistically significant (p=0.103). In other words, the improvement rate in both groups is statistically similar.

T&P vs Comparator: OVP outcome

The analysis model for the OVP outcome for this subgroup included 13,706 (Comparator n=12,050, T&P n=1,656) offenders. The average number of repeated outcome measures per offender was 6 (min=1, max=27). Results from the linear mixed model analysis of the OVP outcome are reported in Table G5. The results show that OVP scores in the Comparator Group deteriorated (increased) slightly in the period before referral to the Pathway (Comparator slope=0.117, p=0.130) but the T&P Group improved slightly (T&P slope=-0.022, p=0.900). Neither rates however are statistically significant. During the period after referral to the Pathway, OVP scores for both groups improved (declined) as indicated by the negative slopes (Comparator slope = -1.170, p<0.001; T&P slope=-1.224, p<0.001), which are both statistically significant. The before/after difference in the slopes for both groups was also statistically significant (Comparator slope=-1.287, p<0.001; T&P slope= -1.202, p<0.001). For the OVP outcome for this subgroup analysis the effectiveness of the OPD Pathway was found to be 0.084 (95% CI: -0.494, 0.663), however this effect was not statistically significant (p=0.775). This means the improvement rate in both groups is statistically similar.

Table G4: Comparison of the Comparator and Treatment without T&P Subgroup. Results from propensity weighted linear mixed model results for OVP. Analysis included a total of n=17,783 individuals, with data from 3 years before to 3 years after referral to the Pathway

Group	Before/After referral to the Pathway	Estimated Slope	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.257	0.069	<0.001	0.122, 0.392
	After	-1.046	0.080	<0.001	-1.202, -0.889
	Difference (after minus before)	-1.302	0.115	<0.001	-1.529, -1.076
Treatment without T&P	Before	0.332	0.072	<0.001	0.189, 0.473
	After	-0.688	0.084	<0.001	-0.852, -0.524
	Difference (after minus before)	-1.020	0.118	<0.001	-1.250, -0.789
	Difference of difference (Treatment without T&P minus Comparator)*	0.283	0.173	0.103	-0.057, 0.623

* Effectiveness of the Pathway in terms of the OVP outcome.

Table G5: Comparison of the Comparator Group and T&P Subgroup. Results from propensity weighted linear mixed model results for the OVP outcome. Analysis included a total of n=13,706 individuals, with data from 3 years before to 3 years after referral to the Pathway.

Group	Before/After referral to the Pathway	Estimated Slope	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.117	0.077	0.130	-0.034, 0.268
	After	-1.170	0.077	<0.001	-1.321, -1.019
	Difference (after minus before)	-1.287	0.125	<0.001	-1.532, -1.042
T&P	Before	-0.022	0.173	0.900	-0.361, 0.3179
	After	-1.224	0.134	<0.001	-1.486, -0.961
	Difference (after minus before)	-1.202	0.255	<0.001	-1.703, -0.702
	Difference of difference (T&P minus Comparator)*	0.084	0.295	0.775	-0.494, 0.663

* Effectiveness of the Pathway in terms of the OVP outcome.

Adjudication events

Treatment without T&P vs Comparator: adjudication events

The negative binomial regression model for the analysis of the number of adjudication events included 11,619 offenders (Comparator n=7,840, Treatment without T&P n=3,779). The estimated adjudication events incidence rate ratios in Table G6 (Comparator after/before rate ratio=0.813, Treatment without T&P after/before rate ratio=0.830) show that both groups had a lower rate of adjudication events after referral to the Pathway compared to the period before referral to the Pathway. This was statistically significant for both groups ($p<0.001$). The estimated effectiveness of the Pathway for the adjudication events outcome was found to be 1.021 (95% CI: 0.940, 1.101; $p=0.614$). This result indicates that improvement rates for both groups were statistically similar.

T&P vs. Comparator: adjudication events

The negative binomial regression model for the analysis of the number of adjudication events included 9,220 offenders (Comparator n=7,840, T&P n=1,380). The estimated adjudication events incidence rate ratios in Table G7 (Comparator after/before rate ratio=0.831, T&P after/before rate ratio=0.717) show that both groups had a lower rate of adjudication events after referral to the Pathway compared to the period before referral to the Pathway. This was statistically significant for both groups ($p<0.001$). The estimated effectiveness of the Pathway for the adjudication events outcome for this subgroup analysis was found to be 0.862 (95% CI: 0.766, 0.958; $p=0.009$). This result indicates that the improvement rate for the T&P Subgroup was significantly higher.

Table G6: Comparison of the Comparator Group and Treatment without T&P Subgroup. Propensity weighted negative binomial regression for number of adjudications. Analysis included a total of n=11,619 individuals, with data from 3 years before to 3 years after referral to the Pathway.

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	1.126	0.026	<0.001	1.075, 1.177
	After	0.915	0.020	<0.001	0.876, 0.954
	Incidence rate ratio (after/before)	0.813	0.024	<0.001	0.766, 0.859
Treatment without T&P	Before	1.224	0.054	<0.001	1.117, 1.330
	After	1.015	0.031	0.620	0.955, 1.075
	Incidence rate ratio (after/before)	0.830	0.033	<0.001	0.765, 0.894
	Ratio of ratios*	1.021	0.041	0.614	0.940, 1.101

* Effectiveness of the Pathway in terms of the adjudications outcome.

Table G7: Comparison of the Comparator Group and T&P Subgroup. Propensity weighted negative binomial regression for number of adjudications. Analysis included a total of n=9,220 individuals, with data from 3 years before to 3 years after referral to the Pathway.

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	1.123	0.027	<0.001	1.069, 1.176
	After	0.933	0.023	0.005	0.889, 0.978
	Incidence rate ratio (after/before)	0.831	0.025	<0.001	0.782, 0.880
T&P	Before	1.659	0.081	<0.001	1.501, 1.817
	After	1.189	0.055	<0.001	1.082, 1.296
	Incidence rate ratio (after/before)	0.717	0.039	<0.001	0.641, 0.792
	Ratio of ratios*	0.862	0.049	0.009	0.766, 0.958

* Effectiveness of the Pathway in terms of the adjudications outcome.

Self-harm

Treatment without T&P vs Comparator: number of self-harm reports

The negative binomial regression model for the analysis of the number of self-harm events included 4,744 offenders (Comparator n=2,991, Treatment without T&P n=1,753). The estimated self-harm events incidence rate ratios in Table G8 (Comparator after/before rate ratio=0.898, Treatment after/before rate ratio=0.900) show that both groups have a lower rate of self-harm events after referral to the Pathway compared to the period before referral to the Pathway. This was statistically significant for both groups (Comparator p=0.001, Treatment without T&P p=0.011). The estimated effectiveness of the Pathway for the self-harm events outcome for this subgroup analysis was found to be 1.003 (95% CI: 0.907, 1.098; p=0.958). This result indicates that the rate ratios for both groups were statistically similar.

T&P vs Comparator: number of self-harm reports

The negative binomial regression model for the analysis of the number of self-harm events included 3,749 offenders (Comparator n=2,977, T&P n=772). The estimated self-harm events incidence rate ratios in Table G9 (Comparator after/before rate ratio=0.903, T&P after/before rate ratio=0.794) show that both groups have a lower rate of self-harm events after referral to the Pathway compared to the period before referral to the Pathway. This was statistically significant for both groups (Comparator p=0.001, T&P p<0.001). The estimated effectiveness of the Pathway for the self-harm events outcome in this subgroup analysis was found to be 0.879 (95% CI: 0.755, 1.003; p=0.074). This result indicates that the improvement rates for both groups were statistically similar.

Table G8: Comparison of the Comparator Group and Treatment without T&P Subgroup. Propensity weighted negative binomial regression for number of self-harm reports. Analysis included a total of n=4,744 individuals, with data from 1 year 3 months before to 3 years after referral to the Pathway

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.446	0.011	<0.001	0.424, 0.467
	After	0.400	0.012	<0.001	0.376, 0.424
	Incidence rate ratio (after/before)	0.898	0.028	0.001	0.843, 0.952

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Treatment without T&P	Before	0.478	0.021	<0.001	0.437, 0.519
	After	0.430	0.016	<0.001	0.400, 0.461
	Incidence rate ratio (after/before)	0.900	0.037	0.011	0.827, 0.973
	Ratio of ratios*	1.003	0.049	0.958	0.907, 1.098

* Effectiveness of the Pathway in terms of the self-harm reports outcome.

Table G92: Comparison of the Comparator Group and T&P Subgroup. Propensity weighted negative binomial regression for number of self-harm reports. Analysis included a total of n=3,749 individuals, with data from 1 year 3 months before to 3 years after referral to the Pathway

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Control	Before	0.435	0.013	<0.001	0.411, 0.460
	After	0.393	0.013	<0.001	0.368, 0.418
	Incidence rate ratio (after/before)	0.903	0.029	0.001	0.846, 0.960
T&P	Before	0.628	0.034	<0.001	0.560, 0.695
	After	0.498	0.027	<0.001	0.4453, 0.552
	Incidence rate ratio (after/before)	0.794	0.050	<0.001	0.697, 0.890
	Ratio of ratios*	0.879	0.063	0.074	0.755, 1.003

* Effectiveness of the Pathway in terms of the self-harm reports outcome.

Recalls

Treatment without T&P vs Comparator: number of recalls

The Poisson regression model for the analysis of the number of recall events included 5,918 offenders (Comparator n=3,997, Treatment without T&P n=1,921). The estimated recall events incidence rate ratios in Table G10 (Comparator after/before rate ratio=0.977, Treatment without T&P after/before rate ratio=1.017) show that the Comparator Group had a lower rate of recall events after referral to the Pathway compared to the period before referral to the Pathway, but the Treatment without T&P Subgroup had a higher rate of recalls after referral. This was not statistically significant however, for either Group (Comparator p=0.305, Treatment without T&P p=0.603). The estimated effectiveness of the

Pathway for the recall events for this subgroup analysis was found to be 1.041 (95% CI: 0.952, 1.131; p=0.354). This result indicates that the rate ratios for both groups were statistically similar.

T&P vs. Comparator: number of recalls

The Poisson regression model for the analysis of the number of recall events for this subgroup analysis included 4,501 offenders (Comparator n=3,977, T&P n=524). The estimated recall events incidence rate ratios in Table G11 (Comparator after/before rate ratio=0.952, T&P after/before rate ratio=0.887) show that both groups had a lower rate of recall events after referral to the Pathway compared to the period before referral to the Pathway. This was statistically significant for the Comparator Group (p=0.042), but not for the T&P Group (p=0.100). The estimated effectiveness of the Pathway for the recall events outcome for this subgroup analysis was found to be 0.932 (95% CI: 0.792, 1.072; p=0.362). This result indicates that the improvement rates for both groups were statistically similar.

Table G10: Comparison of the Comparator Group and Treatment without T&P Subgroup. Propensity weighted Poisson regression for number of recall events. Analysis included a total of n=5,918 individuals, with data from 2 years before to 3 years after referral to the Pathway

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.198	0.003	<0.001	0.191, 0.204
	After	0.193	0.003	<0.001	0.187, 0.199
	Incidence rate ratio (after/before)	0.977	0.022	0.305	0.933, 1.020
Treatment without T&P	Before	0.194	0.005	<0.001	0.184, 0.203
	After	0.198	0.004	<0.001	0.188, 0.206
	Incidence rate ratio (after/before)	1.017	0.034	0.603	0.951, 1.083
	Ratio of ratios*	1.041	0.046	0.354	0.952, 1.131

* Effectiveness of the Pathway in terms of the recalls outcome.

Table G11: Comparison of the Comparator Group and T&P Subgroup. Propensity weighted Poisson regression for number of recall events. Analysis included a total of n=4,501 individuals, with data from 2 years before to 3 years after referral to the Pathway

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.189	0.004	<0.001	0.182, 0.196
	After	0.180	0.003	<0.001	0.173, 0.185
	Incidence rate ratio (after/before)	0.952	0.023	0.042	0.906, 0.997
T&P	Before	0.210	0.009	<0.001	0.192, 0.227
	After	0.186	0.010	<0.001	0.165, 0.206
	Incidence rate ratio (after/before)	0.887	0.065	0.100	0.761, 1.014
	Ratio of ratios*	0.932	0.072	0.362	0.792, 1.072

* Effectiveness of the Pathway in terms of the recalls outcome.

Non-violent offences

Treatment without T&P vs Comparator: number of non-violent offences

The negative binomial regression model for the analysis of the number of non-violent events included 388 offenders (Comparator n=294, Treatment without T&P n=94). The estimated non-violent events incidence rate ratios in Table G12 (Comparator after/before rate ratio=1.042, Treatment without T&P after/before rate ratio=1.179) show that both groups had a higher rate of non-violent events after referral to the Pathway compared to the period before referral to the Pathway. This was statistically non-significant both groups (Comparator p=0.872, Treatment without T&P p=0.562). The estimated effectiveness of the Pathway for the non-violent events outcome in this subgroup analysis was found to be 1.131 (95% CI: 0.345, 1.916; p=0.728). This result indicates that the worsening rates for the two groups were statistically similar. The sample size was small for this analysis therefore the non-significant results may well be due to lack of statistical power.

T&P vs Comparator: non-violent offences

Comparison between the Comparator and the T&P Groups was not feasible due to lack of data (total n=280, Comparator n=269, T&P n=11). The statistical models including generation of propensity scores did not converge properly.

Table G12: Comparison of the Comparator Group and Treatment without T&P Subgroup. Propensity weighted negative binomial regression for number of non-violent offences. Analysis included a total of n=388 individuals, with data from 2 years before referral to 2 years after referral to the Pathway

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.752	0.188	0.254	0.384, 1.121
	After	0.784	0.111	0.085	0.566, 1.001
	Incidence rate ratio (after/before)	1.042	0.265	0.872	0.523, 1.560
Treatment without T&P	Before	0.648	0.113	0.013	0.427, 0.869
	After	0.764	0.150	0.171	0.469, 1.058
	Incidence rate ratio (after/before)	1.179	0.334	0.562	0.524, 1.832
	Ratio of ratios*	1.131	0.401	0.728	0.345, 1.916

* Effectiveness of the Pathway in terms of non-violent offences.

Sexual offences

Treatment without T&P vs Comparator: number of sexual offences

The negative binomial regression model for the analysis of the number of sexual offence events included 1,294 offenders (Comparator n=959, Treatment without T&P n=335). The estimated sexual offence events incidence rate ratios in Table G13 (Comparator after/before rate ratio=1.888, Treatment without T&P after/before rate ratio=2.217) show that both groups had a higher rate of sexual events after referral to the Pathway compared to the period before referral to the Pathway. This was statistically significant for both groups (Comparator p=0.010, Treatment without T&P without T&P p<0.001). The estimated effectiveness of the Pathway for the sexual offences outcome was found to be 1.175 (95% CI: 0.477, 1.873; p=0.596). This result indicates that the worsening rates for both groups were statistically similar.

T&P vs Comparator: sexual offences

Comparison between the Comparator and the T&P Groups was not feasible due to lack of data (total n=840, Comparator n=776, T&P n=64).

Table G13: Comparison of the Comparator Group and Treatment without T&P Subgroup. Propensity weighted negative binomial regression for number of sexual offences. Analysis included a total of n=1,294 individuals, with data from 2 years before to 2 years after referral to the Pathway

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.214	0.021	<0.001	0.174, 0.255
	After	0.404	0.082	<0.001	0.243, 0.565
	Incidence rate ratio (after/before)	1.888	0.465	0.010	0.976, 2.799
Treatment without T&P	Before	0.257	.034	<0.001	0.191, 0.323
	After	0.571	0.097	0.001	0.380, 0.761
	Incidence rate ratio (after/before)	2.217	0.376	<0.001	1.479, 2.955
	Ratio of ratios*	1.175	0.356	0.596	0.477, 1.873

* Effectiveness of the Pathway in terms of sexual offences.

Violent offences

Treatment without T&P vs Comparator: number of violent offences

The negative binomial regression model for the analysis of the number of violent offence events included 9,960 offenders (Comparator n=6,962, Treatment without T&P n=2,998). The estimated violent offence events incidence rate ratios in Table G14 (Comparator after/before rate ratio=1.009, Treatment without T&P after/before rate ratio=1.097) show that both groups had a higher rate of violent offences after referral to the Pathway compared to the period before referral to the Pathway. This was statistically significant for the Treatment without T&P Subgroup (p=0.012), but not for the Comparator Group (p=0.819). The estimated effectiveness of the Pathway for the violent offences outcome in this subgroup analysis was found to be 1.087 (95% CI: 0.980, 1.194; p=0.096). This result indicates that the worsening rates for the two groups were statistically similar.

T&P vs Comparator: number of violent offences

The negative binomial regression model for the analysis of the number of violent events included 7,981 offenders (Comparator n=6,962, T&P n=1,019). The estimated violent offence events incidence rate ratios in Table G15 (Comparator after/before rate ratio=1.084, T&P after/before

rate ratio=1.184) show that both groups had a higher rate of violent offence events after referral to the Pathway compared to the period before referral to the Pathway. This was not statistically significant however, for either group (Comparator p=0.103, T&P p=0.209). The estimated effectiveness of the Pathway for the violent offence outcome was found to be 1.093 (95% CI: 0.794, 1.390; p=0.524). This result indicates that the worsening rates for the two groups were statistically similar.

Table G14: Comparison of the Comparator Group and Treatment without T&P Subgroup. Propensity weighted negative binomial regression for number of violent offences. Analysis included a total of n=9,960 individuals, with data from 2 years before to 2 years after referral to the Pathway.

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.946	0.031	0.091	0.885, 1.007
	After	0.955	0.035	0.203	0.886, 1.023
	Incidence rate ratio (after/before)	1.009	0.038	0.819	0.933, 1.083
Treatment without T&P	Before	0.911	0.033	0.010	0.846, 0.975
	After	0.999	0.035	0.967	0.930, 1.066
	Incidence rate ratio (after/before)	1.097	0.040	0.012	1.017, 1.175
	Ratio of ratios*	1.087	0.054	0.096	0.980, 1.194

* Effectiveness of the Pathway in terms of violent offences.

Table G15: Comparison of the Comparator Group and T&P Subgroup. Propensity weighted negative binomial regression for number of violent offences. Analysis included a total of n=7,981 individuals, with data from 2 years before to 2 years after referral to the Pathway

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.716	0.027	<0.001	0.662, 0.769
	After	0.776	0.035	<0.001	0.708, 0.843
	Incidence rate ratio (after/before)	1.084	0.053	0.103	0.979, 1.188
T&P	Before	0.632	0.048	<0.001	0.538, 0.726
	After	0.749	0.092	0.018	0.568, 0.928
	Incidence rate ratio (after/before)	1.184	0.159	0.209	0.872, 1.495
	Ratio of ratios*	1.093	0.152	0.524	0.794, 1.390

* Effectiveness of the Pathway in terms of violent offences.

Sexual and violent offences

Treatment without T&P vs Comparator: number of sexual and violent offences

The negative binomial regression model for the analysis of the number of sexual and violent events included 3,193 offenders (Comparator n=2,118, Treatment without T&P n=1,075). The estimated sexual and violent events incidence rate ratios in Table G16 (Comparator after/before rate ratio=1.609, Treatment without T&P after/before rate ratio=1.415) show that both groups had a higher rate of sexual and violent events after referral to the Pathway compared to the period before referral to the Pathway. This was statistically significant for both groups ($p<0.001$). The estimated effectiveness of the Pathway for the sexual and violent events outcome in this subgroup analysis was found to be 0.879 (95% CI: 0.697, 1.060; p=0.222). This result indicates that the worsening rates for the two groups were statistically similar.

T&P vs Comparator: number of sexual and violent offences

The negative binomial regression model for the analysis of the number of sexual and violent events included 2,386 offenders (Comparator n=2,113, T&P n=273). The estimated sexual and violent events incidence rate ratios in Table G17 (Comparator after/before rate ratio=1.832, T&P after/before rate ratio=1.430) show that both groups had a higher rate of sexual and violent events after referral to the Pathway compared to the period before referral to the Pathway. This was statistically significant for the Comparator Group ($p<0.001$) but not for the T&P Subgroup ($p=0.056$). The estimated effectiveness of the Pathway for the sexual and violent offences outcome in this subgroup analysis was found to be 0.781 (95% CI: 0.484, 1.076; p=0.201). This result indicates that the worsening rates for the two groups were statistically similar.

Table G16: Comparison of the Comparator Group and Treatment without T&P Subgroup. Propensity weighted negative binomial regression for number of sexual and violent offences. Analysis included a total of n=3,193 individuals, with data from 2 years before to 2 years after referral to the Pathway

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.697	0.033	<0.001	0.631, 0.762
	After	1.122	0.071	0.067	0.983, 1.260
	Incidence rate ratio (after/before)	1.609	0.115	<0.001	1.382, 1.835
Treatment without T&P	Before	0.792	0.052	<0.001	0.690, 0.893
	After	1.120	0.095	0.180	0.933, 1.307
	Incidence rate ratio (after/before)	1.415	0.121	<0.001	1.177, 1.651
	Ratio of ratios*	0.879	0.093	0.222	0.697, 1.060

* Effectiveness of the Pathway in terms of sexual and violent offences.

Table G17: Comparison of the Comparator Group and T&P Subgroup. Propensity weighted negative binomial regression for number of sexual and violent offences. Analysis included a total of n=2,386 individuals, with data from 2 years before to 2 years after referral to the Pathway

Group	Before/After referral to the Pathway	Incidence Rate	Standard Error	P-value	95% Confidence Interval
Comparator	Before	0.467	0.029	<0.001	0.410, 0.523
	After	0.855	0.082	0.105	0.693, 1.016
	Incidence rate ratio (after/before)	1.832	0.190	<0.001	1.461, 2.203
T&P	Before	0.569	0.071	<0.001	0.431, 0.708
	After	0.814	0.123	0.175	0.572, 1.056
	Incidence rate ratio (after/before)	1.430	0.268	0.056	0.904, 1.956
	Ratio of ratios*	0.781	0.151	0.201	0.484, 1.076

* Effectiveness of the Pathway in terms of sexual and violent offences.

Appendix H
Sensitivity Analysis using Multiple Imputations

Sensitivity analyses by multiple imputations were conducted to investigate any potential impact of exclusions of offenders due to missing data in covariates. For each outcome variable missing data in any covariates that were used in the propensity score model were multiply imputed using chained equations (White, Royston & Wood, 2011). Each imputed dataset was analysed using the same statistical model as for the main analysis and estimates from multiple imputed datasets were combined using Rubin's Rule (Rubin, 1987). The number of imputations chosen for each outcome was guided by the proportion of records with one or more missing data in covariates. Data were imputed under the Missing At Random (MAR) assumption, and the imputation model included variables that affected the "missingness" mechanism as well as all variables that would be used in the analysis model of each outcome. The analysis methods for the imputed data were identical to those used in the main analyses except that the covariates were directly adjusted within the analysis models rather than via propensity weighting.

Tables H1 through to H9 present the results from the sensitivity analyses for the effectiveness of the Pathway. The results for the OGP, Recall events, Self-harm reports, non-violent offences, and sexual and violent offences paralleled those in the main analysis. The effectiveness of the Pathway in terms of the OVP outcome and violent offences was in the same direction as for the main analyses, but was statistically significant. A plausible explanation for the differences in terms of statistical significance may be the increased statistical power of the sensitivity analyses, as the sample size for the imputed analyses were substantially larger than that for the main analyses. The rates for the adjudication events and sexual offences changed direction but remained statistically non-significant, similar to the main analyses.

Table H1: Effectiveness of Pathway following multiple imputation for the OGP outcome. Analysis included a total of n=34,650 individuals, with data from 3 years before to 3 years after referral to the Pathway. The results represent combined estimate from 50 imputed datasets.

OGP	Estimated Slope	Standard Error	P-value	95% Confidence Interval
Difference of differences (Treatment minus Comparator)	0.339	0.127	0.008	0.090 , 0.589

Table H2: Effectiveness of Pathway based on multiple imputations for the OVP outcome. Analysis included a total of n=34,650 individuals, with data from 3 years before to 3 years after referral to the Pathway. The results represent combined estimate from 50 imputed datasets.

OVP	Estimated Slope	Standard Error	P-value	95% Confidence Interval
Difference of differences (Treatment minus Comparator)	0.636	0.116	<0.001	0.408 , 0.865

Table H3: Effectiveness of Pathway based on multiple imputations for the Adjudication outcome. Analysis included a total of n=22,292 individuals, with data from 3 years before to 3 years after referral to the Pathway. The results represent combined estimate from 40 imputed datasets.

Adjudication events	Incidence rate	Standard Error	P-value	95% Confidence Interval
Ratio of ratios (Treatment/Comparator)	1.027	0.025	0.286	-0.022 , 0.075

Table H4: Effectiveness of Pathway based on multiple imputations for the Self-harm outcome. Analysis included a total of n=9,122 individuals, with data from 3 years before to 3 years after referral to the Pathway. The results represent combined estimate from 40 imputed datasets.

Self-harm events	Incidence rate	Standard Error	P-value	95% Confidence Interval
Ratio of ratios (Treatment/Comparator)	0.961	0.035	0.250	-0.108 , 0.028

Table H5: Effectiveness of Pathway based on multiple imputations for the Recall outcome. Analysis included a total of n=12,780 individuals, with data from 3 years before to 3 years after referral to the Pathway. The results represent combined estimate from 50 imputed datasets.

Recall events	Incidence rate	Standard Error	P-value	95% Confidence Interval
Ratio of ratios (Treatment/Comparator)	1.024	0.024	0.329	-0.024 , 0.072

Table H6: Effectiveness of Pathway based on multiple imputations for non-violent offences. Analysis included a total of n=894 individuals, with data from 2 years before to 2 years after referral to the Pathway. The results represent combined estimate from 60 imputed datasets.

Non-violent offences	Incidence rate	Standard Error	P-value	95% Confidence Interval
Ratio of ratios (Treatment/Comparator)	0.956	0.173	0.795	-0.384 , 0.294

Table H7: Effectiveness of Pathway based on multiple imputations for sexual offences. Analysis included a total of n=2,409 individuals, with data from 2 years before to 2 years after referral to the Pathway. The results represent combined estimate from 50 imputed datasets.

Sexual offences	Incidence rate	Standard Error	P-value	95% Confidence Interval
Ratio of ratios (Treatment/Comparator)	0.660	0.315	0.188	-1.033 , 0.203

Table H8: Effectiveness of Pathway following multiple imputation for violent offences. Analysis included a total of n=20,858 individuals, with data from 2 years before to 2 years after referral to the Pathway. The results represent combined estimate from 50 imputed datasets.

Violent offences	Incidence rate	Standard Error	P-value	95% Confidence Interval
Ratio of ratios (Treatment/Comparator)	1.106	0.038	0.008	0.026 , 0.175

Table H9: Effectiveness of Pathway based on multiple imputations for sexual and violent offences. Analysis included a total of n= 6,220 individuals, with data from 2 years before to 2 years after referral to the Pathway. The results represent combined estimate from 50 imputed datasets.

Sexual and violent offences	Incidence rate	Standard Error	P-value	95% Confidence Interval
Ratio of ratios (Treatment/Comparator)	0.987	0.080	0.875	-0.170 , 0.144

References

Rubin, D. B. (1987). *Multiple imputation for non-response in surveys*. New York: Wiley.

White, I. R., Royston, P., & Wood, A. M. (2011) Multiple imputation using chained equations: Issues and guidance for practice. *Statistics in medicine*, 30(4):377-99.

Appendix I
Economic evaluation parameters

Table I1: Parameters in the data set for the economic statistical analysis

Parameter	Description	Source	Notes
Group	Treatment group	Created from NDelius data	0 – Comparator group 1 – Pathway intervention 2 – Pathway + T&P intervention
psm	Kernel matching parameter	Created using Kernel matching (see previous report for details)	Used in analysis to balance groups
Length of sentence Months	Length of sentence	NDelius	
NameTA	Setting	NDelius	Whether in prison, community or secure hospital
Sent_type	Sentence type	Created from NDelius data	Determinate, life, IPP sentences
Autoconditionalreleasedt	Date offender released on licence	NDelius	Release date if 'good behaviour'
EventNo	Number of previous convictions	NDelius	
Offence_type	Type of index crime	Created from NDelius data	1 = Violent offences including murder and manslaughter 2 = Sexual offences 3 = All other offences
DisposalDate	Date sentenced	NDelius	
Referral Dt	Date entered pathway	NDelius	
ActualReleaseDate	Date released	NDelius	
Licence_length	Length of licence as percentage of sentence	Created from NDelius data	
DateStartedCoreService	Date started in T&P service	T&P	
EndOfTreatmentDate	Date completed T&P service	T&P	

Parameter	Description	Source	Notes
Treatment_type	Category of treatment	Created from T&P data	Categorised into PD pathway treatments, Community pathway treatments, Prison PIPEs, Community PIPEs and other.
Days_since_entered_pathway	Number of days since offender was referred into pathway	Created from NDelius data	
Effective_from	Date the intervention is assumed to have been in place long enough to generate an effect	Created from T&P data and NDelius data	Baseline assumption is effectiveness post first review (assumed to be 18 months post-referral)
Review_complete	Whether the first review has been completed	Created from T&P data and NDelius data	Binary outcome for calculating effectiveness
Finished_treatment	Whether treatment is finished	Created from T&P data	Created from T&P date data
Days_in_treatment	How long offender spent in treatment	Created from T&P data	Created from T&P date data
incident_type	Type of incident	Created from ACCT and Adjudications datasets	Categorised into Contraband, Disobedience, Violence and Self-Harm
First_date	Date of incident	Created from ACCT and Adjudications datasets	
Last_date	End date of incident	Created from ACCT and Adjudications datasets	
Adj_process_time	How long the adjudication process took (from incident to sentence or discharge)	Created from ACCT and Adjudications datasets	
Adj_number	Number in sequence of incidents per offender	Created from ACCT and Adjudications datasets	
Time_to_first_incident	Length of time from entering prison to first incident	Created from ACCT and Adjudications datasets	Created using sentenced date. Sensitivity analysis would be since referral date
Time_to_next_incident	Time between each subsequent incident	Created from ACCT and Adjudications datasets	
Adjudication_status	Whether adjudication proven or not proven (guilty/not guilty)	Adjudications	
Adjudication_punishment	Number of days added to sentence	Adjudications	
Recalled	Whether or not offender has been recalled	Recall	Reasons for recall are not available

Parameter	Description	Source	Notes
Date_recalled	The date the offender was recalled	Recall	Length of time of recall or other recall data is not available
Reoffended	Whether or not offender has reoffended	PNC	
NewClass	Class of reoffence	PNC	
Reoffend_disposal_cat	The outcome of the reoffence (custody/caution/discharge)	PNC	
Reoffend_court_date	Date sentenced	PNC	
Reoffend_return_date	Date returned to prison	PNC	
Reoffend_sentence_days	Number of days sentenced	PNC	

Table I2: Unit costs, assumptions and sources

Description of cost	Cost	Details	Source
Prison - core prison operating cost	£757.11	Per place, per week across all prison types. Includes all direct resource expenditure including capital costs, overheads, staff costs, food, core training and core interventions.	[1]
Incident - cost of self-harm			
Hospital cost	£987.00	Per episode. Combined hospital cost of self-injury and self-poisoning	[2]
Secure transport cost	£231.48	Per episode (2 trips)	
Incident - Minor injury dealt with in prison			
GP cost	£205.00	Per hour of GP time	[3]
Nurse cost	£36.00	Per hour of nurse time	[3]
MH assessment	£39.00	Per hour of CMHT team member	[3]
Incident - Cost of violence	£14.00	0.5 hour prison officer time	[4]
Incident - Cost of contraband	£7.00	0.25 hour prison officer time	[4]
Incident - Cost of adjudication	£2,021	Per hearing. Based on the parole board costs of oral hearings and paper hearings.	[5]
Prison - group intervention	£6.42	Per group, per week	[6]
Community - group intervention	£6.29	Per group, per week	[6]
PD treatment - basic cost	£285.00	Per place, per week. Based on information on the commissioned cost of places.	[4]
Community treatment	£13,703.00	Per treatment episode, based on information on the commissioned cost of places.	[4]
Community PIPE	£2,363.00	Per treatment episode, based on information on the commissioned cost of places.	[4]
Prison treatment	£55,467.00	Per treatment place per year, based on information on the commissioned cost of places.	[4]
Prison PIPE	£7,003.00	Per treatment place per year, based on information on the commissioned cost of places and in addition to the core operating cost.	[4]

1 Justice; Mo. Costs per prison place and costs per prisoner by individual prison. HM Prison & Probation Service Annual Report and Accounts 2016-17. Management Information Addendum. London: Ministry of Justice, 2017.

2 Tsiachristas A, McDaid D, Casey D, et al. General hospital costs in England of medical and psychiatric care for patients who self-harm: a retrospective analysis. *The Lancet Psychiatry* 2017; **4**(10): 759-67.

3 Curtis L. Unit costs of health and social care. Canterbury: PSSRU, University of Kent, 2017.

4 Internal discussions and figures – Ministry of Justice

5 Board; P. Parole Board for England and Wales. Annual Report and Accounts. London: The Parole Board, 2017.

6 Brookes N, Barrett B, Netten A, Knapp E. Unit Costs in Criminal Justice (UCCJ). Canterbury: University of Kent, 2013.

Description of cost	Cost	Details	Source
Reoffending - Violence	£9,931.00	Per violent offence. Average of different violent offence types.	[7]
Reoffending - Sex crime	£9,696.00	Per sexual offence. Average of difference sexual offence types.	[7]
Reoffending - Other crime	£1,510.00	Per other offence. Average of other offence types.	[7]
Recall	£281.74	Per recall, basic cost	[4]
Secure transport	£115.74	Per recall	[4]
Offender manager	£39.00	Per recall, with one hour offender manager time.	[4]
Probation officer	£37.00	Per recall, with one hour probation officer time.	[4]
Offender supervisor	£45.00	Per recall, with one hour offender supervisor time.	[4]
Probation supervisor	£45.00	Per recall, with one hour probation supervisor time.	[4]

Table I3: Characteristics of offenders in the model, n(%)

	Comparator (n=9098)	**Pathway - case formulation (Treatment Group 1)** (n=3998)	**Pathway - PD intervention (Treatment Group 2)** (n=904)
Sentence type			
community	611 (7%)	270 (7%)	71 (8%)
determinate	6278 (69%	2796 (70%)	621 (69%)
life/ipp	2209 (24%)	932 (23%)	212 (34%)
Index offence			
violence	5088 (56%)	2200 (55%)	515 (57%)
sexual	2441 (27%)	1039 (26%)	220 (24%)
other	1569 (17%)	759 (19%)	169 (19%)

Table I4: Outputs from the model, mean (standard deviation)

Group	**Comparator** (n=9098)	**Pathway - case formulation (Treatment Group 1)** (n=3998)	**Pathway - PD intervention (Treatment Group 2)** (n=904)
Time in prison (weeks)	142.89 (114.50)	131.34 (106.33)	39.04 (40.83)
Time spent in treatment (weeks)	0 (0)	0 (0)	152.00 (140.91)
time to incident (weeks)	10.66 (40.16)	7.70 (28.65)	3.99 (11.60)
Added time (days)	16.49 (8.29)	15.78 (8.13)	16.17 (7.57)
Time on licence (weeks)	383.51 (680.69)	361.89 (669.47)	32.77 (51.89)

[7] Heeks M, Reed S, Tafsiri M, Prince S. The economic and social costs of crime. London: Home Office, 2018.

Table I5: Outputs from the model; incidents and reoffending, n(%)

	Comparator (n=9098)	**Pathway - case formulation (Treatment Group 1)** (n=3998)	**Pathway - PD intervention (Treatment Group 2)** (n=904)
Incident type			
contraband	958 (11%)	362 (9%)	67 (7%)
disobedience	1938 (21%)	784 (20%)	135 (15%)
violence	3360 (37%)	1424 (36%)	219 (24%)
Reoffending type			
Violence	258 (3%)	105 (3%)	12 (1%)
Sexual	24 (0%)	0 (0%)	0 (0%)
Other	987 (11%)	453 (11%)	0 (0%)

Table I6: Total costs per offender, mean (standard deviation)

	Comparator (n=9098)	**Pathway - case formulation (Treatment Group 1)** (n=3998)	**Pathway - PD intervention (Treatment Group 2)** (n=904)
PATHWAY			
case formulation	0 (0)	86.41 (61.06)	155.90 (98.57)
treatment	0 (0)	0 (0)	19977.27 (25711.73)
total	0 (0)	86.41 (61.06)	20133.17 (25742.02)
CONSEQUNCE			
incident	601.57 (830.47)	556.89 (802.16)	452.30 (756.75)
recall	81.14 (511.88)	71.20 (480.30)	593.20 (1270.23)
days added	807.09 (1028.11)	729.62 (980.00)	597.83 (918.80)
reoffending	343.75 (1484.67)	312.71 (1358.36)	98.30 (944.60)
total	1833.55 (2300.11)	1670.42 (2152.93)	1741.63 (2135.08)

Table I7: Incremental costs and savings of control, case formulation and PD pathway, £

	Incremental costs (£)	**Incremental savings** (£)	**Result**
Comparator v case formulation			
base case	86.41	163.13	Incremental savings greater than incremental costs; CF dominates control
sensitivity analysis 1	86.41	163.13	Incremental savings greater than incremental costs; CF dominates control
sensitivity analysis 2	86.41	326.26	Incremental savings greater than incremental costs; CF dominates control
Comparator v PD treatment			
base case	20133.17	91.92	Additional costs of PD treatment not offset by additional savings
sensitivity analysis 1	20133.17	962.74	Additional costs of PD treatment not offset by additional savings
sensitivity analysis 2	20133.17	2796.29	Additional costs of PD treatment not offset by additional savings

	Incremental costs (£)	**Incremental savings** (£)	**Result**
Case formulation v PD treatment			
base case	20046.76	-71.21	PD treatment costs more and negative costs higher, CF dominates PD treatment
sensitivity analysis 1	20046.76	799.61	Additional costs of PD treatment not offset by additional savings
sensitivity analysis 2	20046.76	2470.03	Additional costs of PD treatment not offset by additional savings
Comparator v case formulation + PD treatment			
base case	3783.33	58.07	Additional costs of PD pathway not offset by additional savings
sensitivity analysis 1	3783.33	310.59	Additional costs of PD pathway not offset by additional savings
sensitivity analysis 2	3783.33	781.77	Additional costs of PD pathway not offset by additional savings