The Actuarial Prediction of Sexual Reoffending

Responding to Changing Offending Patterns – Technical Appendix

Disclaimer

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Appendix A   Operational and revised OSP algorithms

For both operational (OSP/C and OSP/I) and revised (OSP/DC and OSP/IIC) OSP algorithms, risk scores (or bands) will be calculated for all adult males, aged 18 years and over, convicted of a current or previous sexual or sexually motivated offence. This includes offences which occurred before their 18th birthday.

OSP/C

OSP/C has seven risk factors and the points for each factor are whole numbers. The data is collected via an additional set of questions prompted in OASys.

A. Sanctions for contact adult sexual offences: zero (0 points); one (5); two (10); three or more (15).

B. Sanctions for contact child sexual offences: zero (0 points); one (3); two (6); three or more (9).

C. Sanctions for noncontact sexual offences other than indecent images: zero (0 points); one (2); two (4); three or more (6).

D. Age at start of reoffending follow-up: 18 to 20 (14 points); 21 to 23 (13); 24 to 26 (12)… 57 to 59 (1); 60 and over (0).

E. Age at last sanction for a sexual offence: 10 to 15 (0 points), 16 or 17 (5); 18 and over (10).

F. Any previous criminal history: no (0 points); yes (6). This does NOT differentiate between sexual or non-sexual offending

G. Index sanction includes a contact sexual offence with a stranger victim: no (0 points); yes (4). (In research settings, information on 'stranger victim' may not be available; if so, 2 points should be scored for a contact sexual index sanction.)

The sum of all points determines the OSP/C risk band: low (0-21 points), medium (22-29), high (30-35), and very high (36 64), which indicates an offender's risk of sexual reoffending at the start of the reoffending follow-up.

OSP/I

OSP/I is a simple algorithm that estimates indecent images risk of reoffending based on sexual offending history alone. Other offending history has not been found previously to be

associated with this outcome and age has a nonlinear relationship (Howard & Barnett, 2015), which does not improve predictive validity.

Individuals with sexual sanctions are placed in three categories:
- OSP/I risk band high: Those with multiple indecent image sanctions
- OSP/I risk band medium: Those with one indecent image sanction
- OSP/I risk band low:
  - Those men with no IIOC sanctions, but multiple sanctions for contact child sexual offences
  - Those men with no IIOC sanctions, but one sanction for contact child sexual offences
  - Any other male with a sexual offending history

OSP/DC

Calculation of OSP/DC largely mirrors that of OSP/C. For each of the seven risk factors, points are assigned as whole numbers to each factor level.

A. Sanctions for contact adult sexual offences: zero (0 points); one (5); two (10); three or more (15).

B. Sanctions for direct contact child sexual offences: zero (0 points); one (3); two (6); three or more (9).

C. Sanctions for noncontact sexual offences other than indecent images: zero (0 points); one (2); two (4); three or more (6).

D. Age at start of reoffending follow-up: 18 to 20 (14 points); 21 to 23 (13); 24 to 26 (12)… 57 to 59 (1); 60 and over (0).

E. Age at last sanction for a sexual offence: 10 to 15 (0 points), 16 or 17 (5); 18 and over (10).

F. Any previous criminal history: no (0 points); yes (6). This does NOT differentiate between sexual or non-sexual offending

G. Index sanction includes a contact sexual offence with a stranger victim: no (0 points); yes (4). (In research settings, information on 'stranger victim' may not be available; if so, 2 points should be scored for a contact sexual index sanction.)

The sum of all points determines the OSP/DC risk band: low (0-21 points), medium (22-29), high (30-35), and very high (36-64).

OSP/IIC

OSP/IIC extended the OSP/I algorithm detailed above to include to include indirect contact child offences in the sanction occasion counts to determine the risk score and band There are multiple 'Low' risk categories because, in addition to the risk band, a percentage risk is estimated for each category for use in the Risk of Serious Recidivism (RSR) algorithm, a separate ARAI used to predict future serious reoffending (Craik et al, 2023). The OSP/I score is now a component of the RSR score, and the OSP/IIC score would logically replace it.

Individuals with sexual sanctions are placed in three categories:
- OSP/IIC risk band high: Those men with multiple sanctions involving IIOC or indirect contact child offences
- OSP/IIC risk band medium: Those men with one sanction involving IIOC or indirect contact child offences
- OSP/IIC risk band low:
  - Those men with no IIOC or indirect contact child sanctions but multiple sanctions for direct contact child
  - Those men with no IIOC or indirect contact child sanctions but one sanction for direct contact child offences
  - Any other male with a sexual offending history

Appendix B   Rates & Volumes of Sexual Reoffending

Table B-1: Rates of proven reoffending in a two-year follow-up, not considering censoring: Men with Sexual History

Subgroup	Number of cases	Contact Sexual	Contact Adult	Contact Child	Direct Contact Child	Indirect Contact Child	Indecent Images	IIOC and Extreme Pornography	ONC
All	22,231	1.37%	0.58%	0.82%	0.18%	0.69%	1.55%	0.21%	0.45%
Age: 18 - 24	2,357	2.08%	0.68%	1.40%	0.42%	1.02%	1.53%	0.21%	0.72%
Age: 25 - 29	2,692	1.93%	1.08%	0.97%	0.19%	0.85%	1.78%	0.07%	0.37%
Age: 30 - 39	5,429	1.53%	0.55%	1.01%	0.29%	0.83%	1.75%	0.24%	0.57%
Age: 40 - 49	4,327	1.41%	0.65%	0.81%	0.12%	0.69%	1.43%	0.16%	0.39%
Age: 50 - 59	4,121	1.02%	0.44%	0.61%	0.10%	0.56%	1.33%	0.29%	0.39%
Age: 60 and Over	3,300	0.52%	0.24%	0.27%	0.00%	0.27%	1.45%	0.24%	0.24%
Ethnicity: Asian	1,149	1.22%	0.96%	0.44%	0.09%	0.35%	0.35%	0.00%	0.35%
Ethnicity: Black	1,255	2.63%	2.31%	0.32%	0.16%	0.16%	0.24%	0.00%	1.59%
Ethnicity: Mixed	442	1.81%	1.58%	0.45%	0.23%	0.23%	1.58%	0.23%	0.90%
Ethnicity: Not Known	760	0.92%	0.53%	0.39%	0.13%	0.39%	0.66%	0.26%	0.39%
Ethnicity: White	18,337	1.31%	0.42%	0.92%	0.19%	0.79%	1.76%	0.24%	0.37%
Disability: Does not have disability	13,861	1.07%	0.47%	0.63%	0.16%	0.51%	1.37%	0.17%	0.33%
Disability: Has disability	8,370	1.86%	0.76%	1.15%	0.22%	0.99%	1.84%	0.27%	0.63%
LDC: Likely LDC	5,030	2.39%	1.15%	1.35%	0.26%	1.13%	1.49%	0.16%	0.83%
LDC: Not likely LDC	14,850	1.06%	0.40%	0.67%	0.17%	0.56%	1.68%	0.26%	0.30%

Subgroup	Number of cases	Contact Sexual	Contact Adult	Contact Child	Direct Contact Child	Indirect Contact Child	Indecent Images	IIOC and Extreme Pornography	ONC
DV Perpetrator: Current or Former DV Perpetrator	5,281	1.53%	0.83%	0.74%	0.25%	0.55%	0.51%	0.09%	0.34%
DV Perpetrator: Never DV Perpetrator	15,662	1.32%	0.51%	0.84%	0.16%	0.73%	1.95%	0.26%	0.45%
OFM: 0 to 3 months	5,600	1.98%	0.95%	1.07%	0.18%	0.95%	1.62%	0.18%	0.73%
OFM: 4 to 9 months	5,971	1.52%	0.67%	0.92%	0.23%	0.75%	1.56%	0.23%	0.50%
OFM: 10 to 18 months	5,238	1.01%	0.31%	0.73%	0.17%	0.57%	1.53%	0.29%	0.32%
OFM: 19+ months	5,422	0.90%	0.37%	0.55%	0.13%	0.48%	1.48%	0.15%	0.20%
Fixed abode: No	3,030	1.75%	0.99%	0.83%	0.23%	0.69%	1.32%	0.07%	0.79%
Fixed abode: Yes	17,880	1.31%	0.53%	0.82%	0.17%	0.68%	1.64%	0.25%	0.36%
DV Perpetrator: No OASys	1,288	1.32%	0.39%	0.93%	0.16%	0.85%	0.85%	0.08%	0.78%
Historic indirect child sanctions: 1 previous	2,809	2.71%	0.28%	2.42%	0.25%	2.28%	1.96%	0.07%	0.28%
Historic indirect child sanctions: 2+ previous	125	8.80%	0.80%	8.80%	0.80%	8.00%	2.40%	0.00%	0.80%
Historic indirect child sanctions: None	19,297	1.12%	0.62%	0.54%	0.17%	0.41%	1.48%	0.23%	0.47%

Table B-2: Volumes of proven sexual reoffending in a two-year follow-up, not considering censoring: All Cases

Subgroup	Number of cases	Contact Sexual	Contact Adult	Contact Child	Direct Contact Child	Indirect Contact Child	Indecent Images	IIOC and Extreme Pornography	ONC
All	22,231	304	129	183	40	154	344	47	99
Age: 18 - 24	2,357	49	16	33	10	24	36	5	17
Age: 25 - 29	2,692	52	29	26	5	23	48	2	10
Age: 30 - 39	5,429	83	30	55	16	45	95	13	31
Age: 40 - 49	4,327	61	28	35	5	30	62	7	17
Age: 50 - 59	4,121	42	18	25	4	23	55	12	16
Age: 60 and Over	3,300	17	8	9	0	9	48	8	8
Ethnicity: Asian	1,149	14	11	5	1	4	4	0	4
Ethnicity: Black	1,255	33	29	4	2	2	3	0	20
Ethnicity: Mixed	442	8	7	2	1	1	7	1	4
Ethnicity: Not Known	760	7	4	3	1	3	5	2	3
Ethnicity: White	18,337	240	77	168	34	144	322	44	68
Disability: Does not have disability	13,861	148	65	87	22	71	190	24	46
Disability: Has disability	8,370	156	64	96	18	83	154	23	53
LDC: Likely LDC	5,030	120	58	68	13	57	75	8	42
LDC: Not likely LDC	14,850	158	60	100	25	83	249	38	45
DV Perpetrator: Current or Former DV Perpetrator	5,281	81	44	39	13	29	27	5	18

Subgroup	Number of cases	Contact Sexual	Contact Adult	Contact Child	Direct Contact Child	Indirect Contact Child	Indecent Images	IIOC and Extreme Pornography	ONC
DV Perpetrator: Never DV Perpetrator	15,662	206	80	132	25	114	306	41	71
OFM: 0 to 3 months	5,600	111	53	60	10	53	91	10	41
OFM: 4 to 9 months	5,971	91	40	55	14	45	93	14	30
OFM: 10 to 18 months	5,238	53	16	38	9	30	80	15	17
OFM: 19+ months	5,422	49	20	30	7	26	80	8	11
Fixed abode: No	3,030	53	30	25	7	21	40	2	24
Fixed abode: Yes	17,880	234	94	146	31	122	293	44	65
DV Perpetrator: No OASys	1,288	17	5	12	2	11	11	1	10
Historic indirect child sanctions: 1 previous	2,809	76	8	68	7	64	55	2	8
Historic indirect child sanctions: 2+ previous	125	11	1	11	1	10	3	0	1
Historic indirect child sanctions: None	19,297	217	120	104	32	80	286	45	90

Appendix C   Prediction of Proven Sexual Reoffending

Table C-1: Prediction (measured by concordance index) of proven sexual reoffending in a two year follow up for men with history in the June 2018 caseload by OSP/C and OSP/I

Subgroup	OSP/C: Contact Sex	OSP/C: Contact Adult	OSP/C: Contact Child	OSP/C: Direct Contact Child	OSP/C: Direct Contact Child or Contact Adult	OSP/C: Indirect Contact Child	OSP/I: Indirect Contact Child	OSP/I: Contact Sex	OSP/I: IIOC	OSP/I: IIOC or Indirect Contact Child
All	0.678	0.784	0.614	0.666	0.757	0.596	0.632	0.476	0.808	0.754
Ethnicity: Asian	0.825	0.859	0.775	0.946	0.867	0.731	0.407	0.395	0.939	0.676
Ethnicity: Black	0.744	0.766	0.585	0.601	0.755	0.568	0.557	0.405	0.964	0.804
Ethnicity: Mixed	0.713	0.740	0.584	0.614	0.740	0.555	0.649	0.309	0.840	0.807
Ethnicity: Not Known	0.740	0.838	0.610	0.890	0.848	0.610	0.728	0.426	0.863	0.806
Ethnicity: White	0.656	0.745	0.623	0.661	0.718	0.608	0.617	0.509	0.789	0.737
Disability: Does not have disability	0.630	0.744	0.553	0.618	0.715	0.531	0.672	0.488	0.816	0.777
Disability: Has disability	0.723	0.824	0.666	0.725	0.800	0.648	0.597	0.463	0.797	0.727
LDC: Likely LDC	0.654	0.751	0.590	0.710	0.743	0.560	0.657	0.499	0.858	0.772
LDC: Not likely LDC	0.680	0.788	0.619	0.633	0.745	0.609	0.647	0.486	0.787	0.753
Fixed abode: No	0.641	0.712	0.562	0.699	0.710	0.527	0.685	0.460	0.858	0.805

Subgroup	OSP/C: Contact Sex	OSP/C: Contact Adult	OSP/C: Contact Child	OSP/C: Direct Contact Child	OSP/C: Direct Contact Child or Contact Adult	OSP/C: Indirect Contact Child	OSP/I: Indirect Contact Child	OSP/I: Contact Sex	OSP/I: IIOC	OSP/I: IIOC or Indirect Contact Child
Fixed abode: Yes	0.690	0.795	0.633	0.657	0.762	0.619	0.627	0.479	0.796	0.747
OFM: 0 to 3 months	0.673	0.786	0.590	0.677	0.767	0.576	0.635	0.468	0.824	0.749
OFM: 10 to 18 months	0.658	0.745	0.624	0.732	0.739	0.596	0.628	0.496	0.813	0.763
OFM: 19+ months	0.610	0.699	0.559	0.440	0.641	0.582	0.600	0.484	0.777	0.736
OFM: 4 to 9 months	0.729	0.840	0.655	0.741	0.817	0.616	0.680	0.493	0.819	0.778
Age: 18 - 24	0.643	0.783	0.579	0.723	0.761	0.524	0.709	0.544	0.824	0.770
Age: 25 - 29	0.639	0.718	0.580	0.651	0.710	0.545	0.640	0.461	0.822	0.750
Age: 30 - 39	0.601	0.809	0.499	0.449	0.684	0.501	0.677	0.526	0.824	0.779
Age: 40 - 49	0.688	0.818	0.597	0.653	0.783	0.586	0.558	0.418	0.802	0.728
Age: 50 - 59	0.678	0.758	0.630	0.704	0.748	0.625	0.644	0.501	0.792	0.756
Age: 60 and Over	0.754	0.881	0.653	NaN	0.881	0.653	0.603	0.447	0.804	0.772
DV Perpetrator: Current or Former DV Perpetrator	0.638	0.699	0.581	0.641	0.681	0.529	0.700	0.521	0.892	0.798
DV Perpetrator: Never DV Perpetrator	0.701	0.810	0.644	0.665	0.779	0.637	0.601	0.458	0.772	0.726

Subgroup	OSP/C: Contact Sex	OSP/C: Contact Adult	OSP/C: Contact Child	OSP/C: Direct Contact Child	OSP/C: Direct Contact Child or Contact Adult	OSP/C: Indirect Contact Child	OSP/I: Indirect Contact Child	OSP/I: Contact Sex	OSP/I: IIOC	OSP/I: IIOC or Indirect Contact Child
DV Perpetrator: No OASys	0.556	0.839	0.453	0.689	0.810	0.429	0.661	0.555	0.826	0.717

Table C-2: Prediction (measured by concordance index) of proven sexual reoffending in a two year follow up for men with history in the June 2018 caseload by OSP/C and OSP/DC

Subgroup	OSP/C: Contact Sex	OSP/DC: Contact Sex	OSP/C: Contact Adult	OSP/DC: Contact Adult	OSP/C: Direct Contact Child	OSP/DC: Direct Contact Child	OSP/C: Direct Contact Child or Contact Adult	OSP/DC: Direct Contact Child or Contact Adult
All	0.678	0.654	0.784	0.786	0.666	0.668	0.757	0.760
Ethnicity: Asian	0.825	0.830	0.859	0.864	0.946	0.949	0.867	0.871
Ethnicity: Black	0.744	0.745	0.766	0.768	0.601	0.602	0.755	0.756
Ethnicity: Mixed	0.713	0.725	0.740	0.750	0.614	0.638	0.740	0.750
Ethnicity: Not Known	0.740	0.725	0.838	0.844	0.890	0.896	0.848	0.854
Ethnicity: White	0.656	0.626	0.745	0.745	0.661	0.663	0.718	0.719
Disability: Does not have disability	0.630	0.613	0.744	0.745	0.618	0.621	0.715	0.719
Disability: Has disability	0.723	0.693	0.824	0.828	0.725	0.727	0.800	0.804
LDC: Likely LDC	0.654	0.628	0.751	0.753	0.710	0.719	0.743	0.746
LDC: Not likely LDC	0.680	0.656	0.788	0.789	0.633	0.631	0.745	0.747
Fixed abode: No	0.641	0.627	0.712	0.722	0.699	0.710	0.710	0.719
Fixed abode: Yes	0.690	0.665	0.795	0.795	0.657	0.657	0.762	0.762

Subgroup	OSP/C: Contact Sex	OSP/DC: Contact Sex	OSP/C: Contact Adult	OSP/DC: Contact Adult	OSP/C: Direct Contact Child	OSP/DC: Direct Contact Child	OSP/C: Direct Contact Child or Contact Adult	OSP/DC: Direct Contact Child or Contact Adult
OFM: 0 to 3 months	0.673	0.648	0.786	0.795	0.677	0.685	0.767	0.776
OFM: 10 to 18 months	0.658	0.641	0.745	0.750	0.732	0.727	0.739	0.740
OFM: 19+ months	0.610	0.590	0.699	0.682	0.440	0.426	0.641	0.630
OFM: 4 to 9 months	0.729	0.701	0.840	0.846	0.741	0.752	0.817	0.824
Age: 18 - 24	0.643	0.605	0.783	0.780	0.723	0.737	0.761	0.764
Age: 25 - 29	0.639	0.609	0.718	0.718	0.651	0.659	0.710	0.711
Age: 30 - 39	0.601	0.566	0.809	0.818	0.449	0.448	0.684	0.690
Age: 40 - 49	0.688	0.659	0.818	0.825	0.653	0.667	0.783	0.792
Age: 50 - 59	0.678	0.640	0.758	0.741	0.704	0.662	0.748	0.733
Age: 60 and Over	0.754	0.703	0.881	0.886	NaN	NaN	0.881	0.886
DV Perpetrator: Current or Former DV Perpetrator	0.638	0.627	0.699	0.705	0.641	0.647	0.681	0.687
DV Perpetrator: Never DV Perpetrator	0.701	0.675	0.810	0.810	0.665	0.665	0.779	0.780
DV Perpetrator: No OASys	0.556	0.519	0.839	0.848	0.689	0.706	0.810	0.819

Table C-3: Prediction (measured by concordance index) of proven sexual reoffending in a two year follow up for men with history in the June 2018 caseload by OSP/I and OSP/IIC

Subgroup	OSP/I: IIOC	OSP/IIC: IIOC	OSP/C: Indirect Contact Child	OSP/I: Indirect Contact Child	OSP/IIC: Indirect Contact Child	OSP/I: IIOC or Indirect Contact Child	OSP/IIC: IIOC or Indirect Contact Child
All	0.808	0.794	0.596	0.632	0.697	0.754	0.765
Ethnicity: Asian	0.939	0.897	0.731	0.407	0.396	0.676	0.649
Ethnicity: Black	0.964	0.949	0.568	0.557	0.548	0.804	0.791
Ethnicity: Mixed	0.840	0.851	0.555	0.649	0.608	0.807	0.809
Ethnicity: Not Known	0.863	0.822	0.610	0.728	0.780	0.806	0.816
Ethnicity: White	0.789	0.774	0.608	0.617	0.692	0.737	0.750
Disability: Does not have disability	0.816	0.795	0.531	0.672	0.704	0.777	0.773
Disability: Has disability	0.797	0.791	0.648	0.597	0.689	0.727	0.754
LDC: Likely LDC	0.858	0.855	0.560	0.657	0.702	0.772	0.789
LDC: Not likely LDC	0.787	0.770	0.609	0.647	0.714	0.753	0.757
Fixed abode: No	0.858	0.856	0.527	0.685	0.763	0.805	0.834
Fixed abode: Yes	0.796	0.782	0.619	0.627	0.687	0.747	0.754
OFM: 0 to 3 months	0.824	0.813	0.576	0.635	0.718	0.749	0.776
OFM: 10 to 18 months	0.813	0.790	0.596	0.628	0.667	0.763	0.757
OFM: 19+ months	0.777	0.753	0.582	0.600	0.626	0.736	0.723
OFM: 4 to 9 months	0.819	0.817	0.616	0.680	0.747	0.778	0.796
Age: 18 - 24	0.824	0.778	0.524	0.709	0.721	0.770	0.751
Age: 25 - 29	0.822	0.830	0.545	0.640	0.701	0.750	0.773

Subgroup	OSP/I: IIOC	OSP/IIC: IIOC	OSP/C: Indirect Contact Child	OSP/I: Indirect Contact Child	OSP/IIC: Indirect Contact Child	OSP/I: IIOC or Indirect Contact Child	OSP/IIC: IIOC or Indirect Contact Child
Age: 30 - 39	0.824	0.801	0.501	0.677	0.729	0.779	0.781
Age: 40 - 49	0.802	0.793	0.586	0.558	0.644	0.728	0.750
Age: 50 - 59	0.792	0.782	0.625	0.644	0.678	0.756	0.759
Age: 60 and Over	0.804	0.788	0.653	0.603	0.781	0.772	0.787
DV Perpetrator: Current or Former DV Perpetrator	0.892	0.873	0.529	0.700	0.727	0.798	0.802
DV Perpetrator: Never DV Perpetrator	0.772	0.758	0.637	0.601	0.676	0.726	0.737
DV Perpetrator: No OASys	0.826	0.787	0.429	0.661	0.759	0.717	0.760

Table C-4: Prediction (measured by concordance index) of proven sexual reoffending in a two year follow up for men with history in the June 2018 caseload by OSP/C and OSP/DC with scored and banded versions

Subgroup	OSP/C Banded: Contact Sex	OSP/DC Banded: Contact Sex	OSP/C Banded: Contact Adult	OSP/DC Banded: Contact Adult	OSP/C Banded: Direct Contact Child	OSP/DC Banded: Direct Contact Child	OSP/C Banded: Direct Contact Child or Contact Adult	OSP/DC Banded: Direct Contact Child or Contact Adult
All	0.664	0.641	0.772	0.771	0.638	0.635	0.743	0.743
Ethnicity: Asian	0.802	0.806	0.834	0.838	0.970	0.971	0.845	0.849
Ethnicity: Black	0.730	0.732	0.743	0.744	0.680	0.681	0.739	0.740
Ethnicity: Mixed	0.628	0.641	0.664	0.676	0.421	0.435	0.664	0.676

Subgroup	OSP/C Banded: Contact Sex	OSP/DC Banded: Contact Sex	OSP/C Banded: Contact Adult	OSP/DC Banded: Contact Adult	OSP/C Banded: Direct Contact Child	OSP/DC Banded: Direct Contact Child	OSP/C Banded: Direct Contact Child or Contact Adult	OSP/DC Banded: Direct Contact Child or Contact Adult
Ethnicity: Not Known	0.736	0.743	0.869	0.874	0.902	0.907	0.875	0.881
Ethnicity: White	0.642	0.611	0.742	0.736	0.622	0.617	0.705	0.702
Disability: Does not have disability	0.624	0.604	0.741	0.737	0.597	0.587	0.712	0.710
Disability: Has disability	0.701	0.675	0.803	0.806	0.687	0.693	0.775	0.778
LDC: Likely LDC	0.635	0.617	0.738	0.739	0.677	0.678	0.728	0.729
LDC: Not likely LDC	0.674	0.645	0.787	0.781	0.607	0.599	0.739	0.737
Fixed abode: No	0.632	0.634	0.706	0.715	0.714	0.723	0.710	0.719
Fixed abode: Yes	0.677	0.649	0.786	0.782	0.622	0.615	0.748	0.746
OFM: 0 to 3 months	0.663	0.642	0.790	0.800	0.661	0.660	0.767	0.775
OFM: 10 to 18 months	0.626	0.617	0.708	0.700	0.695	0.704	0.709	0.706
OFM: 19+ months	0.606	0.585	0.702	0.670	0.439	0.390	0.637	0.613
OFM: 4 to 9 months	0.714	0.681	0.810	0.817	0.692	0.703	0.788	0.796
Age: 18 - 24	0.639	0.601	0.759	0.753	0.719	0.717	0.744	0.740
Age: 25 - 29	0.630	0.594	0.686	0.695	0.713	0.729	0.691	0.700
Age: 30 - 39	0.589	0.573	0.788	0.795	0.406	0.417	0.659	0.668
Age: 40 - 49	0.661	0.640	0.782	0.788	0.681	0.690	0.764	0.771
Age: 50 - 59	0.652	0.603	0.755	0.709	0.625	0.514	0.731	0.690
Age: 60 and Over	0.672	0.646	0.840	0.843	NaN	NaN	0.840	0.843

Subgroup	OSP/C Banded: Contact Sex	OSP/DC Banded: Contact Sex	OSP/C Banded: Contact Adult	OSP/DC Banded: Contact Adult	OSP/C Banded: Direct Contact Child	OSP/DC Banded: Direct Contact Child	OSP/C Banded: Direct Contact Child or Contact Adult	OSP/DC Banded: Direct Contact Child or Contact Adult
DV Perpetrator: Current or Former DV Perpetrator	0.629	0.615	0.686	0.691	0.622	0.628	0.672	0.678
DV Perpetrator: Never DV Perpetrator	0.686	0.660	0.804	0.799	0.634	0.624	0.767	0.764
DV Perpetrator: No OASys	0.509	0.492	0.733	0.741	0.538	0.550	0.694	0.703

Table C-5: Prediction (measured by concordance index) of proven sexual reoffending in a two year follow up for men with history in the June 2018 caseload by OSP/I and OSP/IIC with scored and banded versions

Subgroup	OSP/I Banded: IIOC	OSP/IIC Banded: IIOC	OSP/I Banded: Indirect Contact Child	OSP/IIC Banded: Indirect Contact Child	OSP/I Banded: IIOC or Indirect Contact Child	OSP/IIC Banded: IIOC or Indirect Contact Child
All	0.786	0.786	0.570	0.688	0.720	0.757
Ethnicity: Asian	0.939	0.897	0.440	0.400	0.692	0.651
Ethnicity: Black	0.964	0.949	0.464	0.449	0.767	0.752
Ethnicity: Mixed	0.788	0.851	0.401	0.363	0.721	0.766
Ethnicity: Not Known	0.863	0.822	0.660	0.780	0.772	0.816
Ethnicity: White	0.770	0.767	0.561	0.686	0.708	0.744
Disability: Does not have disability	0.798	0.787	0.636	0.698	0.753	0.766
Disability: Has disability	0.771	0.784	0.516	0.679	0.684	0.746
LDC: Likely LDC	0.802	0.834	0.560	0.687	0.701	0.771

Subgroup	OSP/I Banded: IIOC	OSP/IIC Banded: IIOC	OSP/I Banded: Indirect Contact Child	OSP/IIC Banded: Indirect Contact Child	OSP/I Banded: IIOC or Indirect Contact Child	OSP/IIC Banded: IIOC or Indirect Contact Child
LDC: Not likely LDC	0.775	0.766	0.608	0.712	0.734	0.754
Fixed abode: No	0.832	0.850	0.563	0.714	0.738	0.810
Fixed abode: Yes	0.774	0.774	0.575	0.683	0.718	0.748
OFM: 0 to 3 months	0.793	0.802	0.530	0.695	0.690	0.762
OFM: 10 to 18 months	0.806	0.786	0.595	0.658	0.749	0.751
OFM: 19+ months	0.758	0.742	0.583	0.635	0.720	0.718
OFM: 4 to 9 months	0.790	0.812	0.610	0.743	0.736	0.790
Age: 18 - 24	0.805	0.774	0.634	0.702	0.728	0.739
Age: 25 - 29	0.772	0.830	0.551	0.690	0.691	0.769
Age: 30 - 39	0.804	0.789	0.625	0.727	0.748	0.773
Age: 40 - 49	0.772	0.784	0.465	0.621	0.680	0.739
Age: 50 - 59	0.781	0.774	0.600	0.668	0.732	0.750
Age: 60 and Over	0.797	0.782	0.555	0.781	0.758	0.783
DV Perpetrator: Current or Former DV Perpetrator	0.825	0.823	0.630	0.712	0.730	0.765
DV Perpetrator: Never DV Perpetrator	0.755	0.753	0.548	0.669	0.701	0.733
DV Perpetrator: No OASys	0.843	0.800	0.548	0.750	0.660	0.762

Appendix D   Comparison of model predictive validity

Table D-1: Comparison of Predictive Validity for OSP/C and OSP/DC risk predictors

Outcome	Predictor 1	Predictor 2	C-Index Predictor 1 (Confidence Interval)	C-Index Predictor 2 (Confidence Interval)	Difference (Confidence Interval)	Predictor 2 Win Percentage (%)	P-Value
Contact Sexual	OSP/C	OSP/DC	0.6782 (0.6487:0.7075)	0.6542 (0.6239:0.6856)	-0.024 (-0.0322:-0.016)	0	1.00
Contact Sexual	OSP/C Banded	OSP/DC Banded	0.6639 (0.6358:0.6922)	0.641 (0.6101:0.6703)	-0.0227 (-0.0342:-0.0118)	0	1.00
Contact Adult	OSP/C	OSP/DC	0.7839 (0.7457:0.8205)	0.7864 (0.7465:0.8237)	0.0024 (-0.0035:0.0076)	80	0.20
Contact Adult	OSP/C Banded	OSP/DC Banded	0.7718 (0.7351:0.8061)	0.7708 (0.731:0.8072)	-0.0009 (-0.0128:0.0073)	48	0.52
Direct Contact Child	OSP/C	OSP/DC	0.6665 (0.5806:0.7515)	0.6684 (0.5857:0.7516)	0.0019 (-0.0104:0.0113)	66	0.34
Direct Contact Child	OSP/C Banded	OSP/DC Banded	0.6379 (0.5508:0.7206)	0.6345 (0.5445:0.7233)	-0.0032 (-0.0261:0.0107)	40	0.60
Direct Contact Child or Contact Adult	OSP/C	OSP/DC	0.7582 (0.721:0.7941)	0.7611 (0.7242:0.797)	0.0029 (-0.0021:0.0073)	87	0.13
Direct Contact Child or Contact Adult	OSP/C Banded	OSP/DC Banded	0.7428 (0.705:0.7766)	0.7433 (0.7044:0.7797)	0.0006 (-0.009:0.0074)	59	0.41

Table D-2 Comparison of predictive validity when predicting indirect contact child and indecent image offences for OSP/C, OSP/I and OSP/IIC risk predictors

Outcome	Predictor 1	Predictor 2	C-Index Predictor 1 (Confidence Interval)	C-Index Predictor 2 (Confidence Interval)	Difference (Confidence Interval)	Predictor 2 Win Percentage (%)	P-Value
Indirect Contact Child	OSP/C Banded	OSP/IIC Banded	0.5835 (0.5449:0.6251)	0.6883 (0.6528:0.7263)	0.1053 (0.0514:0.1594)	100.0	0.000
Indirect Contact Child	OSP/I	OSP/IIC	0.6323 (0.5961:0.6689)	0.6972 (0.6624:0.7339)	0.065 (0.0426:0.0879)	100.0	0.000
Indirect Contact Child	OSP/I Banded	OSP/IIC Banded	0.5697 (0.5273:0.6112)	0.6883 (0.6528:0.7263)	0.1188 (0.0843:0.1559)	100.0	0.000
Indecent Images	OSP/I	OSP/IIC	0.8077 (0.7911:0.8254)	0.7938 (0.7768:0.812)	-0.0137 (-0.0219:-0.0044)	0.1	0.999
Indecent Images	OSP/I Banded	OSP/IIC Banded	0.7862 (0.7658:0.807)	0.7864 (0.768:0.8059)	0.0004 (-0.0127:0.0155)	50.2	0.498
Indecent Images or Indirect Contact Child	OSP/I	OSP/IIC	0.754 (0.7341:0.772)	0.7649 (0.747:0.7824)	0.0109 (0.0014:0.0221)	98.7	0.013
Indecent Images or Indirect Contact Child	OSP/I Banded	OSP/IIC Banded	0.7202 (0.6965:0.7414)	0.7571 (0.7386:0.7762)	0.0371 (0.022:0.0547)	100.0	0.000

Appendix E   Sexual offence categories

Table E-1: Overview of sexual offences by different grouping methods

OSP sexual offence category	Mid-level sexual offence grouping	Broad offences examples based on statutes
1. Contact adult	Adult rape-sexual assault	(Attempted) buggery, (attempted) rape, and sexual assault, indecent assault Where possible, adult victims are defined as 18 years old and over, but some offences will relate to victims aged 16 and over due to the wording of their legal statutes
1. Contact adult	Direct sexual activity, abduction or incest with adult	Gross indecency by a male with another male, Causing a female/male person to engage in sexual activity without consent (penetration/no penetration), Sex with an adult relative, Abduction This group also includes sexual offences involving adult victims who have a mental disorder, where the disorder impedes choice or the offender is a care worker.
1. Contact adult	Sexual trafficking	Arranging or facilitating arrival/travel/departure of a person into/within/from the UK for sexual exploitation (trafficking)
1. Contact adult	With-intent-to-commit-sexual offence	Administering a substance with intent, committing an offence with intent to commit a sexual offence, trespass with intent to commit a sexual offence
2. Contact child	Child rape-sexual assault	(Attempted) buggery, (attempted) rape, and sexual assault, indecent assault Where possible, child victims are defined as under 18 years old, but some offences will relate to victims aged under 16 to the wording of their legal statutes

OSP sexual offence category	Mid-level sexual offence grouping	Broad offences examples based on statutes
2. Contact child	Direct child sexual activity	Gross indecency, Unlawful sexual intercourse, Abduction, Abuse of a position of trust – sexual activity, Sexual activity with a child under 13/16 (various offender ages, with/without penetration)
2. Contact child	Incest with child	Sexual activity with a male/female child family member, Inciting a male/female child family member to engage in sexual activity
2. Contact child	Paying for child sex	Paying for sex with a male/female child under 13/under 16/ aged 16-17
2. Contact child	Cause child to watch sexual activity	Engaging in sexual activity in the presence of a child under 13 or 16 (offender aged under 18 or 18 or over), Causing a child under 13 or 16 to watch a sexual act (offender aged under 18 or 18 or over)
2. Contact child	Cause-incite child sexual activity	Causing or inciting a female or male child under 13 or 16 to engage in sexual activity (penetration or no penetration, offender aged under 18 or 18 or over), Abuse of a position of trust: causing or inciting a female or male child to engage in sexual activity (offender aged 18 or over and victim aged 13 – 17 or under 13)
2. Contact child	Arrange child prostitution-pornography	Causing or inciting child prostitution or pornography (child aged 13-17 or under 13), Controlling a child prostitute or a child involved in pornography (child aged 13-17 or under 13), Arranging or facilitating child prostitution or pornography (child aged 13-17 or under 13)
2. Contact child	Arrange-facilitate child sexual offence	Abuse of children through prostitution and pornography, arranging or facilitating the commission of a child sex offence, the rape/ assault by penetration of a child under 13, a sexual offence committed by a child

OSP sexual offence category	Mid-level sexual offence grouping	Broad offences examples based on statutes
2. Contact child	Child sexual communication	Engage in sexual communication with a child
2. Contact child	Grooming	Possession of a paedophile manual, Meeting a male/female child following sexual grooming
3. Other noncontact	Exposure	Exposure, Exposing the person in any street etc or in view thereof or in any place or public resort with intent to insult any female
3. Other noncontact	Extreme pornography	Possession of extreme pornographic images, e.g. an act which threatens a person's life, images portraying rape, images of a person performing an act of intercourse or oral sex with an animal
3. Other noncontact	Residual noncontact/non-IIOC offences	Buggery or attempted buggery with an animal, Sex in a public lavatory, Sexual penetration of a corpse
3. Other noncontact	Voyeurism	
4. Indecent images	Indecent images of children (IIOC)	Possessing prohibited images of children, Possession of indecent photographs of a child
5. Sexual offending order breaches	Breach notification requirements	Failure to notify police of name(s)/home address or providing false information for these
5. Sexual offending order breaches	Breach orders	Breach of Risk of Sexual Harm Order, Breach of Foreign Travel Order

Appendix F   Co-occurrence of sexual offending behaviour

One of the research questions of this study was to consider whether OSP/C was still well suited as an umbrella predictor for contact sexual reoffending, when considering different types of sexual offending behaviours (direct and indirect contact child offences). To derive useful subgroups of sexual offending, preparatory analysis investigated patterns of offending behaviour that co-occurred.

There are currently just under 300 discrete statutory offences in UK legislation. According to current OSP implementation and guidance (HMPPS, 2021, Annex B), offences sexual in statute are broadly categorised into the following categories: (1) Contact sexual offences with child victims, (2) Contact sexual offences with adult victims, (3) Other noncontact offences, and (4) Indecent images of children. Furthermore, offences such as failure to notify police of name or address, notifying police with false information or breaches of Sexual Harm Prevention Order, Sexual Risk Order or Foreign Travel Order are not counted as sexual offences, and as such are not included in the sexual offence sanction counts for the OSP/C and OSP/I scores. Thus, for this report, they will be grouped together as (5) Sexual offending order breaches. As discussed earlier, the definition of a contact sexual offences in the OSP guidance encompasses both physical (direct) contact and non-physical contact-seeking (indirect) offences (see section 2.4 of the main report). To investigate OSP/C's predictive validity, it was however necessary to break with this guidance and consider an alternative approach.

Method

To investigate patterns of sexual offending behaviours independent of the OSP offence categories, using subject matter expert judgement (Howard, 2022 personal communication), the authors grouped sexual offences into 21 "mid-level" groups, aggregating offences into a typology of offending behaviour (see Appendix E, Table E-1 which illustrates how these map onto the OSP categories).

Next, a data-driven approach was taken with the aim to identify "clusters" of sexual offences. Counts of co-occurring sexual offences were analysed using the latest conviction data for male sexual offenders in the June 2022 England and Wales prison and probation caseload dataset (N = 30,462). The rationale was to gain insight from co-occurring sexual

offence convictions; i.e., offenders who had convictions for more than one of the sexual offence groups on the same sanction occasion. The analysis made no assumption about the type of contact. Instead, the hypothesis was that offences with similar type of contact or behavioural pattern would co-occur frequently with each other; i.e. co-occurrence should be high for offences in the same cluster.

For each unique pair of sexual offence groups (offence A and B), the number of offenders who were convicted of (1) only offence A, (2) only offence B, (3) both offences A and B, or (4) neither offence was counted. These counts were converted into odds ratios as a measure of likelihood of events. Finally, the odds ratios were analysed to infer groupings of offences. A particular focus was placed on co-occurrence of offences (1) involving only child victims, (2) adult victims, and (3) mixed victim type; i.e., where both adult and child victims were observed between offences A and B

Odds ratios (OR) are the ratios of likelihoods of events (here, pairs of offences). They provide a general sense of how often two offences A and B co-occur compared with only one of them occurring; providing an indicator for the strength of the association between them. OR greater than 1 indicates a tendency for two offences to co-occur whereas an OR less than 1 indicates a tendency for two offences to not co-occur, OR of 1 exactly indicates no relationship between two offences, while an OR of 0 means the two never co-occur. ORs were classified into moderate (1 to <1.5), strong (1.5 to < 2) and very strong (>2) based on the classification used in the recent MoJ study of escalation in offending severity (Howard et al., 2023).

For example, the following counts of offence co-occurrence are assumed: 2,000 individuals were convicted of Offence A but not Offence B. Vice versa 3,000 individuals were convicted of Offence B but not Offence A. 5,000 individuals were convicted of both of these offences, and 6,000 were convicted of neither. The OR is essentially comparing the likelihood of individuals committing both offences vs only Offence A (5,000 divided by 2,000) against the likelihood of individuals only committing Offence B vs neither offence (3,000 divided by 6,000). The resulting OR is 5 (the ratio of 2.5 to 0.5), which would indicate that these offences often co-occur.

Results

The below sections briefly summarise the results from the OR co-occurrence analyses. Table F-1, Table F-2, and Table F-3 provide detailed results for each pair of offences involving child, adult, and both child-adult victims respectively, detailing the OR, a classification of its size as well as the lower and upper bounds of the 95% confidence interval (CI) of the OR. In some cases, the CI overlapped with 1, which indicates a non-significant OR. However, it is assumed for this analysis that this was most likely due to small number of cases. Thus, in these instances, this is made explicit and reported as an association of interest.

Offences with child victims only

Offences that have traditionally been perceived as direct contact offences (Child rape-sexual assault, Direct child sexual activity, Incest with child) showed very strong and strong degrees of co-occurrence. This was also true when including `Paying for child sex` (classed in OSP as direct contact due to the clear intent to making contact), except for the association with child rape-sexual assault. Thus, this confirmed these offences as *direct contact child* offences.

There was a group of 6 offences that showed very strong tendency to co-occur for almost all possible offence pairings, except for one where co-occurrence was of a moderate degree and the CI overlapped with 1. These offences were (1) Arrange child prostitution-pornography, (2) Arrange-facilitate child sexual offence, (3) Cause child to watch sexual activity, (4) Cause-incite child sexual activity, (5) Child sexual communication, and (6) Grooming. Thus, the analysis found a strong degree of co-occurrence of offences that were discussed previously as offences that had been introduced more recently into legislation as new offence statutes. Discussion with subject matter experts confirmed that going forward these offences would be classed as *indirect contact child* offences for the purposes of this study.

There are several conclusions which could be drawn from examining the OR of these six indirect contact child offences with traditional direct contact child offences. Out of 18 comparisons, child rape-sexual assault co-occurred in two, incest with child in three, and direct child sexual activity in four out of six comparisons with indirect contact child offences (mean odds ratio for these 9 comparisons M ~1.66, SD = 0.53, for 3 of which the CI

overlapped with 1). However, compared to the mean odds ratio for co-occurrence of indirect contact child offences (M ~4.80 SD = 2.22), odds ratio sizes were overall much lower.

Additionally, the rare group 'Paying for child sex' had a moderate tendency to co-occur with all indirect contact child offences except for child sexual communication. However, this was an extremely rare offence in terms of conviction rate with less than 100 sanctions in the June 2022 caseload; i.e., of those offenders who committed multiple offence types (42.1%), less than 0.5% had an offence of this type.

Therefore, this evidence points to an offender group that perpetrates *mixed child contact* offences. This aligns with typologies of online offenders that are classed as contact-driven; i.e. instead of just "enacting" their sexual fantasies online (fantasy-driven), contact-driven offenders' ultimate motivation is to engage in offline sexual behaviour (Briggs & Simonsen, 2011). Despite this evidence, this report did not focus on studying sexual reoffending for this group specifically as it was beyond the scope of this study.

IIOC offences did not co-occur frequently with traditional direct contact offences. Odds ratios indicated that these offences most often occurred separately, except for some level of co-occurrence with 'Paying for child sex'. In contrast, a strong to very strong degree of co-occurrence was found for IIOC and some indirect contact child offences (arranging/ facilitating child sexual offences or child prostitution/pornography), as well as moderate level of co-occurrence with causing child to watch sexual activity. Weak to no relationship was found for grooming, cause-incite child sexual activity and child sexual communication (all CIs overlapping with 1 as well).

Table F-1: Odds ratio for co-occurrence of sexual offences (mid-level grouping) involving children

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Arrange child prostitution-pornography	Paying for child sex	23.43	very strong	11.00	49.90
Paying for child sex	Arrange-facilitate child sexual offence	9.84	very strong	4.97	19.45
Cause-incite child sexual activity	Cause child to watch sexual activity	9.41	very strong	8.45	10.49
Cause child to watch sexual activity	Child sexual communication	8.18	very strong	7.30	9.18
Child sexual communication	Grooming	7.51	very strong	6.41	8.79
Child sexual communication	Arrange-facilitate child sexual offence	6.21	very strong	5.21	7.40
Arrange child prostitution-pornography	Arrange-facilitate child sexual offence	5.46	very strong	3.38	8.82
Child rape-sexual assault	Direct child sexual activity	5.12	very strong	4.81	5.46
Cause-incite child sexual activity	Arrange child prostitution-pornography	4.95	very strong	3.74	6.57
Grooming	Arrange-facilitate child sexual offence	4.88	very strong	3.68	6.47
Cause-incite child sexual activity	Child sexual communication	4.16	very strong	3.81	4.56
Arrange child prostitution-pornography	Grooming	4.00	very strong	2.42	6.62
Cause child to watch sexual activity	Paying for child sex	3.75	very strong	1.90	7.40
Paying for child sex	Grooming	3.71	very strong	1.48	9.29
Indecent images	Arrange child prostitution-pornography	3.67	very strong	2.77	4.86

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Cause-incite child sexual activity	Grooming	3.66	very strong	3.12	4.28
Cause child to watch sexual activity	Grooming	3.65	very strong	2.95	4.52
Cause child to watch sexual activity	Arrange-facilitate child sexual offence	3.58	very strong	2.84	4.52
Cause child to watch sexual activity	Arrange child prostitution-pornography	3.22	very strong	2.15	4.82
Child rape-sexual assault	Incest with child	2.79	very strong	2.37	3.28
Direct child sexual activity	Cause-incite child sexual activity	2.73	very strong	2.53	2.93
Incest with child	Paying for child sex	2.55	very strong	0.80	8.16
Cause-incite child sexual activity	Arrange-facilitate child sexual offence	2.50	very strong	2.08	3.00
Cause-incite child sexual activity	Paying for child sex	2.37	very strong	1.36	4.15
Child rape-sexual assault	Cause-incite child sexual activity	2.27	very strong	2.13	2.43
Indecent images	Paying for child sex	2.23	very strong	1.35	3.68
Direct child sexual activity	Paying for child sex	2.21	very strong	1.29	3.80
Direct child sexual activity	Grooming	1.80	strong	1.52	2.13
Indecent images	Arrange-facilitate child sexual offence	1.76	strong	1.49	2.08
Incest with child	Cause child to watch sexual activity	1.76	strong	1.31	2.37
Direct child sexual activity	Incest with child	1.59	strong	1.31	1.92
Child sexual communication	Arrange child prostitution-pornography	1.48	moderate	0.96	2.29

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Child rape-sexual assault	Cause child to watch sexual activity	1.38	moderate	1.24	1.54
Direct child sexual activity	Arrange child prostitution-pornography	1.30	moderate	0.92	1.83
Incest with child	Arrange child prostitution-pornography	1.29	moderate	0.53	3.15
Direct child sexual activity	Cause child to watch sexual activity	1.28	moderate	1.12	1.46
Indecent images	Cause child to watch sexual activity	1.23	moderate	1.10	1.38
Cause-incite child sexual activity	Incest with child	1.10	moderate	0.88	1.38
Indecent images	Grooming	1.07	moderate	0.90	1.26
Indecent images	Cause-incite child sexual activity	1.04	moderate	0.97	1.12
Indecent images	Child sexual communication	0.94	below 1	0.85	1.03
Child sexual communication	Paying for child sex	0.78	below 1	0.28	2.15
Indecent images	Incest with child	0.64	below 1	0.52	0.79
Child rape-sexual assault	Arrange child prostitution-pornography	0.59	below 1	0.42	0.84
Direct child sexual activity	Indecent images	0.39	below 1	0.36	0.43
Direct child sexual activity	Arrange-facilitate child sexual offence	0.37	below 1	0.27	0.50
Child rape-sexual assault	Paying for child sex	0.34	below 1	0.16	0.71
Child rape-sexual assault	Indecent images	0.31	below 1	0.29	0.33
Direct child sexual activity	Child sexual communication	0.31	below 1	0.26	0.36
Child rape-sexual assault	Grooming	0.22	below 1	0.17	0.29

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Child rape-sexual assault	Arrange-facilitate child sexual offence	0.17	below 1	0.13	0.23
Incest with child	Arrange-facilitate child sexual offence	0.17	below 1	0.04	0.67
Incest with child	Grooming	0.07	below 1	0.01	0.49
Incest with child	Child sexual communication	0.06	below 1	0.02	0.17
Child rape-sexual assault	Child sexual communication	0.04	below 1	0.03	0.06

Offences with adult victims only

Direct contact sexual offences with adult victims (rape/ sexual assault, offences with intent to commit a sexual offence, and offences involving direct sexual activity, abduction, or incest) had a strong degree of co-occurrence. There was some evidence for these offences also co-occurring with sexual trafficking, however due to the rare nature of this offence caution in interpretation is advised as the CI also overlapped with 1 in these cases.

Unsurprisingly, sexual offending order breaches co-occurred to a strong degree.

Residual NCNI offences co-occurred to a strong degree with all other noncontact offences, though this was an extremely rare offence so no general conclusions about offending behaviour can easily be drawn (CI overlapped with 1 in one case). Nonetheless, the co-occurrence with extreme pornography is most noteworthy. This relationship suggests that people who possess images of animal-related activity might also be actual perpetrators of those offences, including assisting committal of those offences. Voyeurism was also related to extreme pornography (though the CI overlapped with 1).

Table F-2: Odds ratio for co-occurrence of sexual offences (mid-level grouping) involving adults

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Extreme pornography (ONC)	Residual NCNI offences (ONC)	14.81	very strong	6.53	33.61
Residual NCNI offences (ONC)	Voyeurism (ONC)	5.81	very strong	1.36	24.84
With-intent-to-commit-SO	Residual NCNI offences (ONC)	4.22	very strong	0.57	31.44
Breach orders	Breach notification requirements	3.05	very strong	2.71	3.43
Adult rape-sexual assault	With-intent-to-commit-SO	2.55	very strong	2.05	3.17
With-intent-to-commit-SO	Sexual trafficking	2.51	very strong	0.34	18.36
Adult rape-sexual assault	Direct sexual activity, abduction or incest with adult	2.35	very strong	2.00	2.76
Direct sexual activity, abduction or incest with adult	Residual NCNI offences (ONC)	2.20	very strong	0.30	16.33
With-intent-to-commit-SO	Voyeurism (ONC)	2.16	very strong	1.17	3.96
Exposure (ONC)	Residual NCNI offences (ONC)	1.98	strong	0.27	14.74
Direct sexual activity, abduction or incest with adult	With-intent-to-commit-SO	1.70	strong	0.93	3.13
With-intent-to-commit-SO	Exposure (ONC)	1.68	strong	0.94	3.01
Extreme pornography (ONC)	Voyeurism (ONC)	1.68	strong	1.26	2.24
Adult rape-sexual assault	Sexual trafficking	1.59	strong	0.82	3.08
Direct sexual activity, abduction or incest with adult	Sexual trafficking	1.31	moderate	0.18	9.53

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Direct sexual activity, abduction or incest with adult	Voyeurism (ONC)	1.21	moderate	0.68	2.16
Exposure (ONC)	Voyeurism (ONC)	0.72	below 1	0.35	1.45
Breach orders	Extreme pornography (ONC)	0.61	below 1	0.50	0.75
Breach notification requirements	Residual NCNI offences (ONC)	0.59	below 1	0.08	4.40
Adult rape-sexual assault	Residual NCNI offences (ONC)	0.57	below 1	0.20	1.69
Adult rape-sexual assault	Voyeurism (ONC)	0.48	below 1	0.38	0.62
Direct sexual activity, abduction or incest with adult	Extreme pornography (ONC)	0.42	below 1	0.27	0.67
Adult rape-sexual assault	Exposure (ONC)	0.40	below 1	0.32	0.50
Breach orders	With-intent-to-commit-SO	0.38	below 1	0.20	0.71
Direct sexual activity, abduction or incest with adult	Exposure (ONC)	0.28	below 1	0.10	0.75
Breach orders	Direct sexual activity, abduction or incest with adult	0.25	below 1	0.15	0.44
Breach orders	Exposure (ONC)	0.19	below 1	0.11	0.35
Breach orders	Voyeurism (ONC)	0.17	below 1	0.08	0.36
With-intent-to-commit-SO	Breach notification requirements	0.16	below 1	0.06	0.43
Breach notification requirements	Exposure (ONC)	0.11	below 1	0.05	0.25
Direct sexual activity, abduction or incest with adult	Breach notification requirements	0.08	below 1	0.03	0.22
With-intent-to-commit-SO	Extreme pornography (ONC)	0.08	below 1	0.02	0.33

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Breach notification requirements	Extreme pornography (ONC)	0.08	below 1	0.04	0.13
Breach orders	Adult rape-sexual assault	0.07	below 1	0.05	0.09
Adult rape-sexual assault	Extreme pornography (ONC)	0.06	below 1	0.05	0.08
Extreme pornography (ONC)	Exposure (ONC)	0.06	below 1	0.02	0.18
Adult rape-sexual assault	Breach notification requirements	0.05	below 1	0.04	0.07
Breach notification requirements	Voyeurism (ONC)	0.03	below 1	0.00	0.19
Voyeurism (ONC)	Sexual trafficking	0.00	below 1	0.00	
Exposure (ONC)	Sexual trafficking	0.00	below 1	0.00	
Extreme pornography (ONC)	Sexual trafficking	0.00	below 1	0.00	
Residual NCNI offences (ONC)	Sexual trafficking	0.00	below 1	0.00	
Breach notification requirements	Sexual trafficking	0.00	below 1	0.00	
Breach orders	Sexual trafficking	0.00	below 1	0.00	
Breach orders	Residual NCNI offences (ONC)	0.00	below 1	0.00	

Offences with mixed victims

Odds ratio indicated co-occurrence of IIOC offences with three types of other noncontact offences; i.e. extreme pornography, voyeurism, as well as the rare offence group of residual NCNI (CI overlapped with 1 in this case). In contrast IIOC was not associated with direct contact adult sexual offences.

Other notable findings were

- A moderate to strong level of co-occurrence was found between direct sexual activity, abduction or incest with adult victims and both direct contact child (Direct child sexual activity, Incest with child victims) and indirect contact child

(Arrange child prostitution-pornography, Cause child to watch sexual activity –
CI overlapped with 1 for this pair) offences.

- Sexual trafficking, another rare offence, showed a strong tendency to co-occur
  with some indirect child contact offences (Arrange child prostitution-pornography
  and grooming) as well as with direct contact child rape/sexual assault.

Table F-3: Odds ratio for co-occurrence of sexual offences (mid-level grouping) involving adults in one and children in the other offence

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Indecent images	Extreme pornography (ONC)	39.58	very strong	33.92	46.19
Arrange child prostitution-pornography	Sexual trafficking	23.61	very strong	9.12	61.12
Grooming	Sexual trafficking	4.97	very strong	1.76	14.05
Child rape-sexual assault	Sexual trafficking	3.17	very strong	1.66	6.03
Direct sexual activity, abduction or incest with adult	Incest with child	2.83	very strong	1.96	4.08
Direct sexual activity, abduction or incest with adult	Arrange child prostitution-pornography	2.58	very strong	1.36	4.90
Indecent images	Voyeurism (ONC)	2.56	very strong	2.14	3.07
Breach orders	Grooming	1.76	strong	1.41	2.21
Direct sexual activity, abduction or incest with adult	Cause child to watch sexual activity	1.58	strong	1.16	2.14
Arrange child prostitution-pornography	Voyeurism (ONC)	1.57	strong	0.64	3.84
Indecent images	Residual NCNI offences (ONC)	1.54	strong	0.65	3.62
Direct sexual activity, abduction or incest with adult	Direct child sexual activity	1.37	moderate	1.12	1.66

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Arrange-facilitate child sexual offence	Sexual trafficking	1.36	moderate	0.19	9.94
Extreme pornography (ONC)	Arrange-facilitate child sexual offence	1.33	moderate	1.00	1.78
Breach orders	Paying for child sex	1.29	moderate	0.56	3.00
Extreme pornography (ONC)	Arrange child prostitution-pornography	1.26	moderate	0.77	2.08
Breach orders	Arrange-facilitate child sexual offence	1.16	moderate	0.87	1.55
Direct sexual activity, abduction or incest with adult	Child rape-sexual assault	1.15	moderate	0.97	1.36
Breach orders	Child sexual communication	1.15	moderate	0.99	1.33
Incest with child	Voyeurism (ONC)	1.14	moderate	0.63	2.09
Direct sexual activity, abduction or incest with adult	Cause-incite child sexual activity	1.10	moderate	0.88	1.38
Cause child to watch sexual activity	Sexual trafficking	1.08	moderate	0.26	4.48
Paying for child sex	Voyeurism (ONC)	1.00	below 1	0.14	7.20
Cause child to watch sexual activity	Exposure (ONC)	0.95	below 1	0.67	1.36
With-intent-to-commit-SO	Arrange child prostitution-pornography	0.94	below 1	0.23	3.81
Direct child sexual activity	Sexual trafficking	0.94	below 1	0.39	2.24
Breach orders	Indecent images	0.90	below 1	0.81	0.99
Cause child to watch sexual activity	Extreme pornography (ONC)	0.85	below 1	0.68	1.06
Child sexual communication	Extreme pornography (ONC)	0.83	below 1	0.70	0.99
Cause-incite child sexual activity	Voyeurism (ONC)	0.82	below 1	0.62	1.08

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Cause child to watch sexual activity	Voyeurism (ONC)	0.82	below 1	0.52	1.28
Extreme pornography (ONC)	Grooming	0.81	below 1	0.58	1.11
Direct sexual activity, abduction or incest with adult	Child sexual communication	0.80	below 1	0.58	1.10
Direct sexual activity, abduction or incest with adult	Paying for child sex	0.79	below 1	0.11	5.72
Direct child sexual activity	Residual NCNI offences (ONC)	0.75	below 1	0.22	2.52
Cause-incite child sexual activity	Sexual trafficking	0.74	below 1	0.26	2.08
Adult rape-sexual assault	Incest with child	0.70	below 1	0.57	0.85
Breach orders	Cause child to watch sexual activity	0.70	below 1	0.56	0.87
Breach orders	Arrange child prostitution-pornography	0.70	below 1	0.38	1.29
Direct sexual activity, abduction or incest with adult	Grooming	0.69	below 1	0.37	1.29
Extreme pornography (ONC)	Paying for child sex	0.69	below 1	0.21	2.19
Cause-incite child sexual activity	Extreme pornography (ONC)	0.66	below 1	0.57	0.76
Child rape-sexual assault	Voyeurism (ONC)	0.64	below 1	0.52	0.79
Child rape-sexual assault	Residual NCNI offences (ONC)	0.64	below 1	0.24	1.72
Adult rape-sexual assault	Child rape-sexual assault	0.57	below 1	0.53	0.60
Direct sexual activity, abduction or incest with adult	Arrange-facilitate child sexual offence	0.57	below 1	0.27	1.21
Breach orders	Cause-incite child sexual activity	0.56	below 1	0.49	0.65

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Indecent images	Sexual trafficking	0.54	below 1	0.23	1.29
Adult rape-sexual assault	Direct child sexual activity	0.48	below 1	0.44	0.52
With-intent-to-commit-SO	Arrange-facilitate child sexual offence	0.47	below 1	0.15	1.46
Direct child sexual activity	Voyeurism (ONC)	0.47	below 1	0.35	0.65
Adult rape-sexual assault	Arrange child prostitution-pornography	0.44	below 1	0.30	0.66
Direct sexual activity, abduction or incest with adult	Indecent images	0.42	below 1	0.33	0.53
Child rape-sexual assault	With-intent-to-commit-SO	0.40	below 1	0.30	0.55
Adult rape-sexual assault	Paying for child sex	0.35	below 1	0.16	0.76
Incest with child	Extreme pornography (ONC)	0.34	below 1	0.21	0.57
Cause-incite child sexual activity	With-intent-to-commit-SO	0.30	below 1	0.18	0.51
Breach notification requirements	Arrange-facilitate child sexual offence	0.29	below 1	0.17	0.50
Adult rape-sexual assault	Cause-incite child sexual activity	0.27	below 1	0.25	0.30
Breach notification requirements	Arrange child prostitution-pornography	0.27	below 1	0.10	0.72
With-intent-to-commit-SO	Grooming	0.26	below 1	0.06	1.04
Grooming	Voyeurism (ONC)	0.25	below 1	0.08	0.79
Adult rape-sexual assault	Cause child to watch sexual activity	0.24	below 1	0.20	0.29
Incest with child	Exposure (ONC)	0.22	below 1	0.07	0.68
Direct child sexual activity	Extreme pornography (ONC)	0.22	below 1	0.18	0.28
Breach notification requirements	Paying for child sex	0.21	below 1	0.03	1.54

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Indecent images	With-intent-to-commit-SO	0.20	below 1	0.13	0.31
Breach notification requirements	Grooming	0.20	below 1	0.11	0.37
Breach notification requirements	Child sexual communication	0.20	below 1	0.15	0.27
Arrange-facilitate child sexual offence	Voyeurism (ONC)	0.20	below 1	0.05	0.81
With-intent-to-commit-SO	Cause child to watch sexual activity	0.18	below 1	0.06	0.56
Cause-incite child sexual activity	Exposure (ONC)	0.18	below 1	0.11	0.28
Breach orders	Direct child sexual activity	0.17	below 1	0.13	0.21
Child rape-sexual assault	Extreme pornography (ONC)	0.17	below 1	0.15	0.21
Indecent images	Breach notification requirements	0.15	below 1	0.13	0.18
Child rape-sexual assault	Exposure (ONC)	0.15	below 1	0.11	0.21
Incest with child	With-intent-to-commit-SO	0.15	below 1	0.02	1.09
Adult rape-sexual assault	Grooming	0.14	below 1	0.10	0.19
Child sexual communication	Voyeurism (ONC)	0.14	below 1	0.06	0.31
Direct child sexual activity	Exposure (ONC)	0.13	below 1	0.08	0.21
Cause child to watch sexual activity	Breach notification requirements	0.13	below 1	0.08	0.22
Direct child sexual activity	With-intent-to-commit-SO	0.11	below 1	0.05	0.23
Cause-incite child sexual activity	Breach notification requirements	0.10	below 1	0.07	0.14
Adult rape-sexual assault	Indecent images	0.07	below 1	0.06	0.08
Breach orders	Child rape-sexual assault	0.07	below 1	0.06	0.09
Indecent images	Exposure (ONC)	0.06	below 1	0.04	0.10

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Exposure (ONC)	Grooming	0.06	below 1	0.01	0.43
Direct child sexual activity	Breach notification requirements	0.06	below 1	0.04	0.09
Adult rape-sexual assault	Arrange-facilitate child sexual offence	0.05	below 1	0.03	0.10
Child rape-sexual assault	Breach notification requirements	0.03	below 1	0.02	0.04
Child sexual communication	Exposure (ONC)	0.03	below 1	0.01	0.13
Adult rape-sexual assault	Child sexual communication	0.02	below 1	0.01	0.03
Incest with child	Breach notification requirements	0.02	below 1	0.00	0.15
With-intent-to-commit-SO	Paying for child sex	0.00	below 1	0.00	
With-intent-to-commit-SO	Child sexual communication	0.00	below 1	0.00	
Exposure (ONC)	Paying for child sex	0.00	below 1	0.00	
Exposure (ONC)	Arrange-facilitate child sexual offence	0.00	below 1	0.00	
Exposure (ONC)	Arrange child prostitution-pornography	0.00	below 1	0.00	
Residual NCNI offences (ONC)	Arrange-facilitate child sexual offence	0.00	below 1	0.00	
Breach orders	Incest with child	0.00	below 1	0.00	
Paying for child sex	Sexual trafficking	0.00	below 1	0.00	
Paying for child sex	Residual NCNI offences (ONC)	0.00	below 1	0.00	
Incest with child	Sexual trafficking	0.00	below 1	0.00	
Incest with child	Residual NCNI offences (ONC)	0.00	below 1	0.00	
Cause-incite child sexual activity	Residual NCNI offences (ONC)	0.00	below 1	0.00	
Cause child to watch sexual activity	Residual NCNI offences (ONC)	0.00	below 1	0.00	

Offence A	Offence B	Odds ratio (OR)	OR strength	OR Lower CI	OR Upper CI
Grooming	Residual NCNI offences (ONC)	0.00	below 1	0.00	
Child sexual communication	Sexual trafficking	0.00	below 1	0.00	
Child sexual communication	Residual NCNI offences (ONC)	0.00	below 1	0.00	
Arrange child prostitution-pornography	Residual NCNI offences (ONC)	0.00	below 1	0.00	

Appendix G   Statistical summary of survival models

Table G-1: Overfitting analysis for survival models reported in Tables G-3 to G-18

Reoffending outcome	Number of Risk factors in operational model	Number of Risk factors in revised model	Number of reoffending events	Overfitting issues in operational model	Overfitting issues in revised model
Contact sex	7	8	291	No	No
Contact adult	7	8	120	No	Yes
Contact child	7	8	179	No	No
Direct contact child	7	8	38	Yes	Yes
Indirect contact child	7	8	151	No	No
IIOC and Extreme Pornography	6	9	46	Yes	Yes
IIOC not Extreme Pornography	7	9	296	No	No
IIOC only	7	9	223	No	No

Table G-2: Goodness of fit of survival models using concordance indices

Reoffending outcome	Operational model concordance	Revised model concordance
Contact sex	0.676	0.701
Contact adult	0.795	0.795
Contact child	0.692	0.718
Direct contact child	0.701	0.717
Indirect contact child	0.700	0.733
IIOC and Extreme Pornography	0.754	0.853

Reoffending outcome	Operational model concordance	Revised model concordance
IIOC not Extreme Pornography	0.733	0.803
IIOC only	0.732	0.795

Operational and revised survival model summary tables

The below tables summarise the results of the Cox regression survival models (operational and revised models) for each reoffending outcome.

Table abbreviations explained

coef: Cox regression coefficient for a given predictor - SE coef: Standard error of regression coefficient - p: p-value indicating statistical significance of regression coefficient - HR: Hazard ratio - HR Lower and Upper CI: Lower and upper bounds of the 95% confidence interval for the HR

Table G-3: Summary of operational survival model: Prediction of contact sexual reoffending

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Under 18 at last sexual sanction	-0.97	0.29	0.00	0.38	0.22	0.67
Number of sanctions for contact adult offences (as per original OSP definition)	0.39	0.07	0.00	1.48	1.30	1.68
Number of contact child sanction occasions (prioritised counting logic)	0.36	0.07	0.00	1.43	1.25	1.64
Number of contact child sanction occasions (prioritised counting logic)	-0.02	0.07	0.77	0.98	0.86	1.12
Age at discharge	-0.03	0.00	0.00	0.97	0.96	0.98
Not first-time offender	0.58	0.15	0.00	1.79	1.32	2.41
Current contact sexual offence against a stranger	0.23	0.17	0.17	1.26	0.90	1.76

Table G-4: Summary of revised survival model: Prediction of contact sexual reoffending

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Under 18 at last sexual sanction	-0.78	0.29	0.01	0.46	0.26	0.81
Number of sanctions for contact adult offences (as per original OSP definition)	0.46	0.07	0.00	1.58	1.38	1.82
Number of direct contact child sanction occasions (new counting logic)	-0.11	0.10	0.27	0.89	0.73	1.09
Number of indirect contact child sanction occasions (new counting logic)	0.98	0.11	0.00	2.66	2.14	3.30
Number of other noncontact sanction occasions (new counting logic)	-0.07	0.07	0.35	0.94	0.82	1.08
Age at discharge	-0.02	0.00	0.00	0.98	0.97	0.98
Not first-time offender	0.68	0.15	0.00	1.97	1.46	2.66
Current contact sexual offence against a stranger	0.08	0.17	0.63	1.09	0.78	1.52

Table G-5: Summary of operational survival model: Prediction of contact sexual reoffending with adult victims

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Under 18 at last sexual sanction	-1.30	0.52	0.01	0.27	0.10	0.75
Number of sanctions for contact adult offences (as per original OSP definition)	0.73	0.07	0.00	2.08	1.81	2.38
Number of contact child sanction occasions (prioritised counting logic)	-0.18	0.17	0.28	0.84	0.60	1.16
Number of contact child sanction occasions (prioritised counting logic)	-0.21	0.09	0.01	0.81	0.68	0.96
Age at discharge	-0.03	0.01	0.00	0.97	0.96	0.98
Not first-time offender	1.54	0.35	0.00	4.68	2.35	9.33
Current contact sexual offence against a stranger	0.18	0.25	0.48	1.19	0.73	1.94

Table G-6: Summary of revised survival model: Prediction of contact sexual reoffending with adult victims

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Under 18 at last sexual sanction	-1.30	0.52	0.01	0.27	0.10	0.75
Number of sanctions for contact adult offences (as per original OSP definition)	0.74	0.07	0.00	2.09	1.82	2.40
Number of direct contact child sanction occasions (new counting logic)	-0.16	0.16	0.34	0.86	0.62	1.18
Number of indirect contact child sanction occasions (new counting logic)	-0.18	0.32	0.57	0.84	0.45	1.56
Number of other noncontact sanction occasions (new counting logic)	-0.18	0.07	0.01	0.84	0.73	0.96
Age at discharge	-0.03	0.01	0.00	0.97	0.96	0.98
Not first-time offender	1.55	0.35	0.00	4.70	2.36	9.37
Current contact sexual offence against a stranger	0.19	0.25	0.45	1.20	0.74	1.96

Table G-7: Summary of operational survival model: Prediction of contact sexual reoffending with child victims

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Under 18 at last sexual sanction	-0.84	0.35	0.02	0.43	0.22	0.86
Number of sanctions for contact adult offences (as per original OSP definition)	-0.34	0.16	0.03	0.71	0.51	0.98
Number of contact child sanction occasions (prioritised counting logic)	0.57	0.10	0.00	1.77	1.47	2.14
Number of contact child sanction occasions (prioritised counting logic)	0.04	0.13	0.77	1.04	0.80	1.35
Age at discharge	-0.03	0.01	0.00	0.97	0.96	0.98
Not first-time offender	0.30	0.18	0.09	1.35	0.95	1.92
Current contact sexual offence against a stranger	0.30	0.23	0.20	1.35	0.86	2.14

Table G-8: Summary of revised survival model: Prediction of contact sexual reoffending with child victims

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Under 18 at last sexual sanction	-0.54	0.35	0.12	0.58	0.29	1.16
Number of sanctions for contact adult offences (as per original OSP definition)	-0.35	0.17	0.04	0.71	0.51	0.98
Number of direct contact child sanction occasions (new counting logic)	-0.11	0.13	0.42	0.90	0.70	1.16
Number of indirect contact child sanction occasions (new counting logic)	1.18	0.12	0.00	3.27	2.56	4.17
Number of other noncontact sanction occasions (new counting logic)	-0.18	0.19	0.36	0.84	0.57	1.23
Age at discharge	-0.02	0.01	0.00	0.98	0.97	0.99
Not first-time offender	0.49	0.18	0.01	1.64	1.16	2.33
Current contact sexual offence against a stranger	0.05	0.24	0.83	1.05	0.66	1.67

Table G-9: Summary of operational survival model: Prediction of direct contact child sexual reoffending

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Under 18 at last sexual sanction	-0.51	0.62	0.41	0.60	0.18	2.02
Number of sanctions for contact adult offences (as per original OSP definition)	0.10	0.26	0.70	1.11	0.66	1.85
Number of contact child sanction occasions (prioritised counting logic)	0.46	0.22	0.04	1.59	1.02	2.45
Number of contact child sanction occasions (prioritised counting logic)	0.14	0.23	0.55	1.15	0.73	1.82
Age at discharge	-0.06	0.01	0.00	0.95	0.92	0.97
Not first-time offender	0.37	0.40	0.36	1.44	0.66	3.16
Current contact sexual offence against a stranger	0.44	0.46	0.34	1.56	0.63	3.85

Table G-10: Summary of revised survival model: Prediction of direct contact child sexual reoffending

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Under 18 at last sexual sanction	-0.62	0.62	0.32	0.54	0.16	1.82
Number of sanctions for contact adult offences (as per original OSP definition)	0.01	0.27	0.98	1.01	0.59	1.71
Number of direct contact child sanction occasions (new counting logic)	0.60	0.21	0.00	1.82	1.21	2.72
Number of indirect contact child sanction occasions (new counting logic)	-0.15	0.43	0.72	0.86	0.37	2.00
Number of other noncontact sanction occasions (new counting logic)	-0.06	0.40	0.87	0.94	0.43	2.04
Age at discharge	-0.06	0.01	0.00	0.94	0.92	0.97
Not first-time offender	0.34	0.40	0.40	1.40	0.64	3.08
Current contact sexual offence against a stranger	0.57	0.47	0.22	1.77	0.71	4.40

Table G-11: Summary of operational survival model: Prediction of indirect contact child sexual reoffending

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Under 18 at last sexual sanction	-0.77	0.37	0.04	0.46	0.22	0.96
Number of sanctions for contact adult offences (as per original OSP definition)	-0.57	0.20	0.00	0.57	0.38	0.84
Number of contact child sanction occasions (prioritised counting logic)	0.56	0.11	0.00	1.76	1.43	2.16
Number of contact child sanction occasions (prioritised counting logic)	0.00	0.16	0.99	1.00	0.73	1.36
Age at discharge	-0.03	0.01	0.00	0.97	0.96	0.99
Not first-time offender	0.32	0.20	0.10	1.38	0.94	2.02
Current contact sexual offence against a stranger	0.20	0.27	0.46	1.22	0.72	2.08

Table G-12: Summary of revised survival model: Prediction of indirect contact child sexual reoffending

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Under 18 at last sexual sanction	-0.34	0.38	0.37	0.71	0.34	1.50
Number of sanctions for contact adult offences (as per original OSP definition)	-0.57	0.20	0.01	0.57	0.38	0.85
Number of direct contact child sanction occasions (new counting logic)	-0.36	0.15	0.02	0.70	0.52	0.95
Number of indirect contact child sanction occasions (new counting logic)	1.35	0.13	0.00	3.86	2.99	4.97
Number of other noncontact sanction occasions (new counting logic)	-0.28	0.23	0.23	0.76	0.48	1.19
Age at discharge	-0.02	0.01	0.01	0.98	0.97	1.00
Not first-time offender	0.55	0.19	0.00	1.73	1.19	2.53
Current contact sexual offence against a stranger	-0.18	0.27	0.52	0.84	0.49	1.43

Table G-13: Summary of operational survival model: Prediction of IIOC and extreme pornography reoffending

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Number of sanctions for contact adult offences (as per original OSP definition)	-1.78	0.56	0.00	0.17	0.06	0.50
Number of contact child sanction occasions (prioritised counting logic)	-0.87	0.36	0.02	0.42	0.21	0.85
Any history of other noncontact sanctions	0.41	0.34	0.23	1.51	0.77	2.96
Age at discharge	0.01	0.01	0.30	1.01	0.99	1.03
Not first-time offender	0.50	0.33	0.13	1.65	0.87	3.14
Current contact sexual offence against a stranger	-0.44	1.04	0.67	0.64	0.08	4.94

Table G-14: Summary of revised survival model: Prediction of IIOC and extreme pornography reoffending

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Number of sanctions for contact adult offences (as per original OSP definition)	-0.85	0.54	0.11	0.43	0.15	1.23
Any history of direct contact child sanctions	-0.27	0.39	0.48	0.76	0.36	1.63
Number of indirect contact child sanction occasions (new counting logic)	-0.99	0.73	0.18	0.37	0.09	1.55
Number of other noncontact sanction occasions (new counting logic)	0.32	0.14	0.03	1.38	1.04	1.83
Age at discharge	0.00	0.01	0.74	1.00	0.98	1.02
Not first-time offender	0.14	0.34	0.69	1.15	0.59	2.24
Current contact sexual offence against a stranger	-0.13	1.06	0.91	0.88	0.11	7.07
Number of sanction occasions with both IIOC and extreme pornography sanctions (new counting logic)	1.67	0.26	0.00	5.33	3.20	8.88
Number of IIOC sanction occasions without extreme pornography sanctions (new counting logic)	1.04	0.12	0.00	2.83	2.23	3.59

Table G-15: Summary of operational survival model: Prediction of IIOC without extreme pornography reoffending

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Under 18 at last sexual sanction	-3.20	1.00	0.00	0.04	0.01	0.29
Number of sanctions for contact adult offences (as per original OSP definition)	-2.17	0.24	0.00	0.11	0.07	0.18
Number of contact child sanction occasions (prioritised counting logic)	-0.63	0.12	0.00	0.53	0.42	0.68
Any history of other noncontact sanctions	-0.22	0.15	0.13	0.80	0.60	1.07
Age at discharge	-0.01	0.00	0.01	0.99	0.98	1.00

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Not first-time offender	0.41	0.13	0.00	1.51	1.18	1.93
Current contact sexual offence against a stranger	0.11	0.28	0.68	1.12	0.65	1.93

Table G-16: Summary of revised survival model: Prediction of IIOC without extreme pornography reoffending

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Number of sanctions for contact adult offences (as per original OSP definition)	-1.23	0.23	0.00	0.29	0.18	0.46
Any history of direct contact child sanctions	-0.42	0.15	0.01	0.66	0.49	0.89
Number of indirect contact child sanction occasions (new counting logic)	0.33	0.15	0.02	1.39	1.04	1.85
Number of other noncontact sanction occasions (new counting logic)	-0.15	0.21	0.47	0.86	0.56	1.30
Age at discharge	-0.01	0.00	0.00	0.99	0.98	0.99
Not first-time offender	0.17	0.13	0.19	1.19	0.92	1.53
Current contact sexual offence against a stranger	0.02	0.28	0.96	1.02	0.58	1.77
Number of sanction occasions with both IIOC and extreme pornography sanctions (new counting logic)	1.21	0.13	0.00	3.34	2.58	4.31
Number of IIOC sanction occasions without extreme pornography sanctions (new counting logic)	0.89	0.06	0.00	2.45	2.18	2.75

Table G-17: Summary of operational survival model: Prediction of IIOC only reoffending

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Under 18 at last sexual sanction	-2.93	1.01	0.00	0.05	0.01	0.38
Number of sanctions for contact adult offences (as per original OSP definition)	-1.97	0.26	0.00	0.14	0.08	0.23
Number of contact child sanction occasions (prioritised counting logic)	-0.65	0.14	0.00	0.52	0.39	0.69
Any history of other noncontact sanctions	-0.21	0.17	0.21	0.81	0.58	1.12
Age at discharge	-0.01	0.00	0.01	0.99	0.98	1.00
Not first-time offender	0.41	0.15	0.00	1.51	1.13	2.01
Current contact sexual offence against a stranger	0.05	0.32	0.87	1.05	0.56	1.98

Table G-18: Summary of revised survival model: Prediction of IIOC only reoffending

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Number of sanctions for contact adult offences (as per original OSP definition)	-1.10	0.25	0.00	0.33	0.20	0.54
Any history of direct contact child sanctions	-0.41	0.18	0.02	0.67	0.47	0.94
Number of indirect contact child sanction occasions (new counting logic)	0.16	0.18	0.38	1.17	0.82	1.66
Number of other noncontact sanction occasions (new counting logic)	-0.03	0.21	0.87	0.97	0.64	1.45
Age at discharge	-0.02	0.00	0.00	0.98	0.97	0.99
Not first-time offender	0.17	0.15	0.26	1.19	0.88	1.59
Current contact sexual offence against a stranger	0.03	0.33	0.93	1.03	0.54	1.97
Number of sanction occasions with both IIOC and extreme pornography sanctions (new counting logic)	1.11	0.15	0.00	3.02	2.24	4.08
Number of IIOC sanction occasions without extreme pornography sanctions (new counting logic)	0.87	0.07	0.00	2.39	2.08	2.75

Appendix H   Survival model assumption tests

As part of the development and construction of survival models, several assumptions about Cox proportional hazards models were checked to ensure that they hold for this analysis. These checks were:

- That the covariates are not collinear, that is where one covariate is simply a linear transformation of another. When this is the case regression models, such as Cox proportional hazards, will be unable to estimate coefficients for either covariate. This was tested for each model by computing the variance inflation factor (VIF) of all covariate pairs for each model, which measures how much the variance of the regression coefficient estimate is inflated due to correlation between that predictor and others;

- That the proportional hazards assumption holds. This assumption is that the ratio of hazards for any two individuals with different covariate values remains constant over time. This assumption is tested with the Grambsch and Therneau test (*Grambsch & Therneau, 1994*), which involves testing the correlation beteen the scaled Schoenfeld residuals and transformed survival times. If this assumption holds, the effect of predictor variables on the hazard rate is consistent throughout the duration of the study;

- That the linearity assumption holds, this assumption is that the logarithm of the relationship between the logarithm of the hazard rate and the continuous predictor variables is linear. This was done by plotting the Martingale residuals against the continuous covariates, the Martingale residual at a specific time is calculated by taking the difference between the observed number of events up to that time and the expected number of events given the individual's covariate values up to that time. Similarly to the proportional hazard assumption, if this assumption is violated it means that the effect of continuous predictors changes throughout the follow up period;

- Checks for outliers and influential observations. These checks are to see if there are any individual observations which could exert undue influence on the coefficient estimates. These tests were carried out by identifying individuals with large deviance residuals, which are the normalised transformations of martingale

residuals. For influential individuals, DFBetas were calculated, which were the differences for each coefficients with and without each individual in the dataset, where the difference in coefficients was greater than 0.2 a benchmark specified in *Harrel 2015, p504*. As part of our investigations, we checked whether there were any influential observations noted;

- Risk of overfitting. These checks are to see if there are enough reoffending events for the model to learn from in a way that is generalisable. If there are too few reoffending events in contrast to the number of predictors, then the model may simply learn the specific patterns in our sample of data as opposed to broader reoffending patterns.

Most of the assumption checks were passed by all models, though there were some minor violations. These include some issues with the proportional hazards assumption. For models targeting contact child reoffending and indirect contact child offending, there was a slight negative linear relationship between the predictor indicating whether this was an offender's first offence and their log-hazard. This predictor therefore may have had less of an impact on an offender's hazard over time.

Furthermore, the operational model for indecent images of children showed a slight positive linear relationship between the predictor indicating the victim of the offence was a stranger and an offender's log hazard, so this may have had a slightly larger impact on an offender's hazard over time.

The survival models targeting direct contact child reoffending showed some signs of being overfitted. This was caused by the rarity of proven reoffending instances in the caseload. So rare were reoffending events that any model with more than two predictors would have failed this check. Despite the potential overfitting, the models observed here are still of inferential value when it comes to understanding the causal factors behind direct contact child reoffending.

Finally a small number of influential observations were noted, between 3-10 for each predictive model. These observations have been left in the modelling dataset, as they allow causes of early reoffending to be better captured by the survival models. These observations appeared to have the highest, or in a few cases the lowest estimated hazards of reoffending.

Appendix I Reoffending rate standardisation & concordance

Compared to the original OSP/C validation study (Howard & Wakeling, 2021), the overall rate of reoffending and the distribution of reoffending rates across the OSP/C bands are markedly lower in the present study cohort (see Table I-1 below). These discrepancies are particularly high for the overall rate of contact sexual reoffending as well as those individuals in the high and very high OSP/C risk bands.

Table I-1. Comparison of number of cases and contact sexual proven reoffending rate by OSP/C risk bands for the current study with the original OSP/C validation study

Study	OSP/C band	Number of cases	Contact sexual reoffending rate
Current study	N/A	22,231	1.37%
	Low	7,467	0.50%
	Medium	9,594	1.39%
	High	4,243	2.22%
	Very High	927	4.31%
Howard & Wakeling, 2021	N/A	2,728	2.30%
	Low	993	0.70%
	Medium	1030	1.90%
	High	526	4.40%
	Very High	179	12.60%

One way to explore whether differences in reoffending rate distribution may have affected the concordance of risk scores is to use direct standardisation, a method often applied in a public health statistics context (for example when comparing mortality rates of two different countries across several age groups, Naing, 2000). Essentially, reoffending rates of the Howard & Wakeling study were directly applied to the number of cases in each OSP/C band to calculate how many people would have reoffended, had the reoffending rate been higher. For example, in the current study ~40 out of 927 people reoffended in the very high OSP/C band group (927 × 0.0431). If the reoffending rate had been 12.6% as reported by Howard & Wakeling, then around 117 people would have reoffended. Direct standardisation means repeating this calculation across all OSP/C bands. To estimate how concordance would change in the current study had there been the reoffending rates of

Howard & Wakeling, that distribution of reoffending rates is applied to the current number of offenders in each band. This process could also be applied in reverse to evaluate the impact of lower reoffending rates on the sample of Howard & Wakeling.

Finally, concordance can be calculated as the area under the curve (AUC) by counting the number of concordant, tied, and discordant pairs for each OSP/C risk band. AUC concordance is measure of goodness of fit for binary outcomes (reoffender/non-reoffender) in a logistic regression model and its interpretation is the same as Harrell's c-index (Uno et al., 2011). However, these do not take into account censoring of individuals and thus require cautious interpretation in the context of this study.

This analysis found that increased rates of reoffending would have increased AUC concordance from 0.66 to 0.72. In the reverse case, decreased rates of reoffending would have negatively impacted the AUC reported in Howard & Wakeling changing from 0.74 to 0.68. Thus, in both cases reoffending rates had a significant impact, changing the rating of the AUC from moderate to good and vice versa.

Appendix J   Consideration of a Separate Indirect Contact Child Reoffending Predictor

As part of the investigation into prediction of the Indirect child contact offending, a separate model was considered, which would only target indirect child offences, separate from either direct contact or indecent image-based offending. In this appendix, the formulation of that algorithm through survival modelling is outlined, and its performance assessed against the other policy options set out in this paper.

Survival Modelling

The starting point for an 'indirect only' survival model were the operational and revised OSP/C survival models for indirect contact child offences summarised in Appendix G. These models showed four covariates which were significant and were positive indicators of indirect contact child reoffending, these were:

- The number of indirect contact child offence sanctions (used in preference to all contact child sanction count observed as significant on the operational model)
- The offender not being a first time offender
- If the offender was over the age of 18 at the time of their most recent sexual sanction, which was significant only on the operational model
- The offender being younger at discharge (chance of reoffending was higher at younger ages).

In order to see the relative contribution of each of these factors to the hazard of an offender, a survival model looking at these covariates was built. The performance for OSP/IIC showed that there was some potential for the number of prior indecent images of children sanctions to be of some significance here, so this covariate was also included, yielding the following results. A brief explainer of the headings in the table can be found below:

- coef: Cox regression coefficient for a given predictor
- SE coef: Standard error of regression coefficient
- p: p-value indicating statistical significance
- HR: Hazard ratio

- HR Lower and Upper CI: Lower and upper bounds of the confidence interval for the Hazard Ratio

Table J-1: Summary of revised survival model: Prediction of indirect contact child offences only

Predictor	coef	SE coef	p val	HR	HR Lower CI	HR Upper CI
Under 18 at last sexual sanction	-0.25	0.38	0.50	0.78	0.37	1.62
Number of indirect contact child sanction occasions (new counting logic)	1.38	0.12	0.00	3.97	3.17	4.98
Age at discharge	-0.02	0.01	0.00	0.98	0.97	0.99
Not first-time offender	0.35	0.19	0.06	1.43	0.99	2.06
Number of IIOC sanction occasions without extreme pornography sanctions (new counting logic)	0.49	0.12	0.00	1.64	1.30	2.06

This model shows the indirect sanctions and indecent images sanctions were significant, as were all other covariates with the exception of the age at last sexual sanction. Using the ratios of those coefficients it is possible to derive a scoring method which allocates points to offenders, in a similar style to OSP/C. This model had a concordance index of 0.761 (Table J-4).

Scoring

The scoring method for an Indirect Only algorithm would look like follows:

- Add 8 points for each indirect contact child sanction, up to a maximum of 24 points;
- Add 3 points for each indecent images of children sanction, up to a maximum of 9 points;
- Add 2 points if the offender is not a first-time offender, otherwise add 0
- Add points corresponding to the age at discharge as follows
  - 18-26 – 5 points;
  - 27-35 – 4 points;
  - 36-44 – 3 points;
  - 45-53 – 2 points;
  - 54-62 – 1 point and
  - 63+ - 0 points

This gives a potential 40-point scoring system, which was evaluated on the 2018 caseload in a similar way to OSP/DC and OSP/IIC. C-indices were generated to understand how well this scoring system discriminates between high risk and low risk offenders. This was compared to two different options for an 'indirect only' scoring system;

- The first of these was an indirect only sanction count method, which worked in a similar way to OSP/I and OSP/IIC, except instead of counting only indecent images of childrent offences as in OSP/I or both indecent images of children and indirect contact child offences as in OSP/IIC, this algorithm counted only indirect contact child offences before labelling people as low, medium or high risk. Table J-2 illustrates how offenders were placed into low, medium or high bandings;

Table J-2: Outline of different risk band levels for a proposed indirect only contact child risk predictor

Risk band	Indirect contact child only
High	Multiple sanctions involving indirect contact child offences
Medium	One sanction involving indirect contact child offences
Low	Any other male with a sexual offending history

- The second of these methods was a banded indirect only scoring system, using the percentiles of offenders with 0, 1 or 2+ indirect contact child sanctions in the 2022 caseload to allocate people into low, medium or high risk bands based on their 40-point score. For comparison, the percentage of offenders within 2018 and 2022 caseloads and their counts of indirect contact child offences can be found inT able J-3. That is, 80.6% of 2022 cases had zero indirect contact chid sanctions and creating a Low risk band of 0-9 points replicated this most closely, then, 18.1% had one sanction, replicated by a medium risk band of 10-17 points, and finally the 1.3% with 2 or more sanctions replicated by a high risk band of 18-40 points.

Table J-3: Comparison 2018 vs 2022: Proportion caseload by number of previous indirect child sanctions

Number of ICC sanction occasions	% 2018	% 2022
0	86.802%	80.578%
1	12.636%	18.091%

Number of ICC sanction occasions	% 2018	% 2022
2	0.522%	1.192%
3	0.04%	0.112%
4	0%	0.022%
5	0%	0.004%

In a similar fashion as the comparisons made in section 4.3 of the main report, the OSP/Indirect only 40 point scale has been compared to the OSP/C, OSP/I and OSP/IIC to examine how well it discriminates between high and low risk individuals. The result of those comparisons can be seen in Table J-4.

Table J-4: Comparison of predictive validity of OSP/Indirect only against other predictors for indirect contact child reoffending

Outcome	Predictor 1	Predictor 2	C-Index Predictor 1 (Confidence Interval)	C-Index Predictor 2 (Confidence Interval)	Difference (Confidence Interval)	Predictor 2 Win Percentage (%)	P-Value
Indirect Contact Child	OSP/C	OSP Indirect only 40 point	0.5958 (0.5573:0.6356)	0.7613 (0.7236:0.7993)	0.1659 (0.1178:0.2129)	100	0.00
Indirect Contact Child	OSP/C Banded	OSP Indirect only 40 point banded	0.5835 (0.5449:0.6251)	0.6864 (0.6481:0.7264)	0.1032 (0.0547:0.1521)	100	0.00
Indirect Contact Child	OSP/IIC	OSP Indirect only 40 point	0.6972 (0.6624:0.7339)	0.7613 (0.7236:0.7993)	0.064 (0.038:0.091)	100	0.00
Indirect Contact Child	OSP/IIC Banded	OSP Indirect only 40 point banded	0.6883 (0.6528:0.7263)	0.6864 (0.6481:0.7264)	-0.002 (-0.0358:0.0311)	44	0.56
Indirect Contact Child	OSP indirect only sanction count	OSP Indirect only 40 point	0.692 (0.6455:0.7362)	0.7613 (0.7236:0.7993)	0.0699 (0.0266:0.1111)	100	0.00
Indirect Contact Child	OSP indirect only sanction count	OSP Indirect only 40 point banded	0.692 (0.6455:0.7362)	0.6864 (0.6481:0.7264)	-0.0051 (-0.0438:0.0299)	41	0.59

It can be seen above that the 40 point scale outperforms OSP/C and OSP/IIC. Of the 1000 bootstrapped samples it outperforms them 100% of the time. However, this uplift in performance is largely eliminated in the more operationally realistic setting of using the risk bands rather than the raw scores. In this case the 40-point score performs in a similar fashion to OSP/IIC, only outperforming it 44% of the time and with largely overlapping confidence intervals.

Tables J-5 and J-6 below show the potential advantage of having a risk predictor solely dedicated to predicting the risk of indirect contact child reoffending. Those labelled high risk in the 40 point scale reoffend at almost three times the rate of those labelled high risk in the OSP/IIC scale.

Table J-5: Reoffending rates by risk bands for an OSP/IIC risk predictor

Subgroup	Number of cases	Indirect Contact Child
All	22,231	0.69%
OSP/IIC: Low	12,783	0.27%
OSP/IIC: Medium	8,352	1.08%
OSP/IIC: High	1,096	2.65%

Table J-6: Reoffending rates by risk bands for 40 point indirect contact child risk predictor

Subgroup	Number of cases	Indirect Contact Child
All	22,231	0.69%
Indirect only 40 point band: Low	18,629	0.39%
Indirect only 40 point band: Medium	3,335	1.92%
Indirect only 40 point band: High	267	6.37%

It should be noted however, that this 40-point scale would need further work before it could be deployed. This model has been trained and evaluated on the same data, and so the strong performance observed here could be due to overfitting. Further work will be undertaken looking at this potential solution, alongside the policy impact analysis work to understand the implications of implementing the remedies presented in the body of this paper. However, deploying an additional algorithm such as this 40-point scale would be more operationally demanding than amending the scoring rules and user guidance for an

existing algorithm (e.g., by replacing OSP/C with OSP/DC). An update on the potential implementation of this solution is provided in the addendum mentioned in section 5.3 of the main report.

Table J-7: Prediction (measured by concordance index) of proven sexual reoffending in a two year follow up for men with history of sexual offending in the June 2018 caseload by OSP/C, OSP/I, OSP/IIC and OSP Indirect Only model

Subgroup	OSP/C: Indirect Contact Child	OSP/I: Indirect Contact Child	OSP/IIC: Indirect Contact Child	OSP/Indirect only 40 point scale	OSP/Indirect only banded 40 pt scale	OSP/Indirect only sanction count
All	0.596	0.632	0.697	0.761	0.686	0.692
Ethnicity: Asian	0.731	0.407	0.396	0.523	0.451	0.459
Ethnicity: Black	0.568	0.557	0.548	0.653	0.477	0.598
Ethnicity: Mixed	0.555	0.649	0.608	0.724	0.438	0.786
Ethnicity: Not Known	0.610	0.728	0.780	0.874	0.767	0.553
Ethnicity: White	0.608	0.617	0.692	0.762	0.691	0.697
Disability: Does not have disability	0.531	0.672	0.704	0.731	0.661	0.641
Disability: Has disability	0.648	0.597	0.689	0.785	0.705	0.732
LDC: Likely LDC	0.560	0.657	0.702	0.725	0.655	0.680
LDC: Not likely LDC	0.609	0.647	0.714	0.784	0.721	0.691
Fixed abode: No	0.527	0.685	0.763	0.777	0.702	0.710
Fixed abode: Yes	0.619	0.627	0.687	0.755	0.689	0.686
OFM: 0 to 3 months	0.576	0.635	0.718	0.804	0.711	0.732
OFM: 10 to 18 months	0.596	0.628	0.667	0.720	0.673	0.687
OFM: 19+ months	0.582	0.600	0.626	0.682	0.587	0.554
OFM: 4 to 9 months	0.616	0.680	0.747	0.784	0.719	0.721
Age: 18 - 24	0.524	0.709	0.721	0.756	0.698	0.720
Age: 25 - 29	0.545	0.640	0.701	0.688	0.660	0.632
Age: 30 - 39	0.501	0.677	0.729	0.786	0.737	0.686

Subgroup	OSP/C: Indirect Contact Child	OSP/I: Indirect Contact Child	OSP/IIC: Indirect Contact Child	OSP/Indirect only 40 point scale	OSP/Indirect only banded 40 pt scale	OSP/Indirect only sanction count
Age: 40 - 49	0.586	0.558	0.644	0.681	0.644	0.694
Age: 50 - 59	0.625	0.644	0.678	0.702	0.617	0.693
Age: 60 and Over	0.653	0.603	0.781	0.888	0.677	0.807
DV Perpetrator: Current or Former DV Perpetrator	0.529	0.700	0.727	0.745	0.670	0.678
DV Perpetrator: Never DV Perpetrator	0.637	0.601	0.676	0.757	0.692	0.691
DV Perpetrator: No OASys	0.429	0.661	0.759	0.837	0.639	0.738

Appendix K   OSP/DC and OSP/IIC and their Contributions to RSR Scores – A consideration of Offence Free Months

Background

In addition to their operational use in computing the specific risk of sexual reoffending, OSP scores form part of an individual's Risk of Serious Recidivism (RSR). This tool is used by MoJ to calculate risk of serious non sexual violence as well as the reoffending predicted by OSP. In order to calculate this the MoJ simply sums together the RSR Serious Non Sexual Violence (SNSV) score with the probability of reoffending calculated from the OSP/C scores and and OSP/I scores. In this appendix, models are presented which calculate the new contributions to the RSR score derived from OSP/DC and OSP/IIC.

Operationally, OSP/C has a '5-year rule' (HMPPS, 2022), which is derived from evidence that with offence free time in the community an individual's risk of reoffending for contact offending is reduced (Hanson et al, 2017, Thornton et al , 2021). In accordance with this evidence an individual who has been offence free in the community for over 5 years will have their OSP/C risk category reduced by one band. That is, an individual who has been in the community for 5 years who was initially in OSP/C's Medium category would move into OSP/C's Low category.

In Howard and Wakeling (2021) the 5-year rule was tested by following individuals for the first 5-years and the following 5-years after release. The evidence presented there showed that individual risk of contact reoffending did reduce after 5 years, although a limitation of this study was the very small number of offenders who reoffended beyond the initial 5-year follow up point. Similarly, no evidence could be obtained on the relevance of the 5-year rule to IIOC reoffending, as too few reoffences occurred or would be expected to occur beyond the 5-year reoffending point.

Given the change in reoffending patterns noted in this study as well as the recategorization of sexual offences, work has been undertaken to see if there is evidence of a reduction in risk of reoffending as an individual spends time offence free in the community. This has been done for both direct contact offending, as predicted by OSP/DC, and IIOC and indirect contact child offending, as predicted by OSP/IIC. The results can be found below.

In this section the probabilities of reoffending derived from OSP/DC and OSP/IIC are calculated. Simultaneously, work is presented to assess if the number of months that an offender has been offence-free in the community is a significant factor in their probability of reoffending.

Deriving Probability from OSP Scores

OSP/DC

In order to calculate probability from OSP scores, logistic regression models have been used. To calculate the probability of direct contact reoffending, as predicted by OSP/DC, a logistic regression model with the below formula is fitted.

$$logodds(Direct\ Contact\ Reoffending)$$
$$= Intercept + OSPDC\ Score + Offence\ Free\ Months$$

As well as calculating the log-odds, which can then be used to derive probability, the model will indicate whether offence-free months is a significant predictor of direct contact reoffending. The log-odds can be converted to a probability estimate via an inverse logit function. If so, it provides evidence to support the implementation of a 5 year rule on OSP/DC in a similar manner as there was for OSP/C. The model was fitted with train, validate and test data, with model weights tuned to obtain a mean probability prediction for the validation dataset as close as possible to the reoffending rate of that dataset.

The results of the model for OSP/DC can be seen below. The headings for each column mean as follows

- Estimate – Regression Coefficient for a given predictor
- Standard error – The standard error of the regression coefficient
- P.value – The p-value for the regression coefficient, a value of less than 0.05 here indicates strong evidence that the predictor is a significant predictor of the outcome, in this case direct contact reoffending.

Table K-1: Coefficients of OSP/DC Logistic Regression Model

Predictor	Estimate	Standard Error	p.value
(Intercept)	-8.633	0.716	0.000
OSP/DC 64 point score	0.160	0.023	0.000
Offence-free months	-0.031	0.014	0.024

Given the rarity of the outcome variable here, the model performance was tested by checking the mean probability estimate against the reoffending rate for a test dataset. In this case the model gave a mean probability estimate of 0.9%, whereas the reoffending rate was 0.7%. A simple binomial proportion test shows that the confidence interval for the reoffending rate is 0.5% and 1%, so the mean probability estimated by the model is within an acceptable range.

The fact that offence-free months are a significant predictor of direct contact reoffending provides evidence that individual risk of reoffending reduces over time. It is therefore recommended to HMPPS that the 5 year rule be administered for OSP/DC in the same fashion as it was for OSP/C.

The probability of the risk of reoffending calculated by the model for an individual with the mean 64 point score for each OSP/DC band is shown in table K-2. It should be noted that the changes in probability over 5 years for each risk band far exceed the amount needed to fall into the next risk band and contradict the known literature which states that they should fall by half (Thornton et al 2021, Hanson et al, 2017). For example, the mean person in the medium band sees their probability fall to under a fifth of it's original value over the space of 5 years offence free time.

The 95% confidence interval of the offence free month coefficient was used to check these tables, and although the expected halving of 2 year reoffending does fall within this confidence interval, it should also be noted that the confidence interval is very wide. The median 64 point OSP score sees their risk fall from 0.00818 to 0.00025, a fall of 97% if the lower confidence limit is used whereas this falls from 0.00818 to 0.00660, a fall of just 20% if the upper confidence limit is used. Given the width of this confidence interval, there is insufficient evidence for deviation from the known literature. MoJ will undertake further research to understand the changes in risk of reoffending over time.

Operationally, all covariates in the above logistic regression model will be used to calculate the OSP/DC contribution to the RSR score. (This distinction is made because key HMPPS processes, such as targeting of rehabilitative interventions, refer not to the percentage RSR score but the OSP category. Therefore, to operate the 5-year rule effectively, the OSP/DC category will be changed at that point, whereas OSP/DC's contribution to the RSR score will change more continuously during time in the community using the above logistic regression equation.)

Table K-2 Probability of the risk of reoffending for an individual with the mean 64 point score for each OSP/DC band and varying offence free time

Offence Free Months	Low OSP/DC - 17/64	Medium OSP/DC - 25/64	High OSP/DC - 32/64	Very High OSP/DC - 38/64
0	0.00269	0.00958	0.02876	0.07170
12	0.00185	0.00662	0.02000	0.05055
24	0.00128	0.00458	0.01387	0.03540
36	0.00088	0.00316	0.00961	0.02468
48	0.00061	0.00218	0.00664	0.01714
60	0.00042	0.00150	0.00459	0.01188

OSP/IIC

In a similar fashion, logistic regression models were fitted to calculate the probability of reoffending for OSP/IIC. However, in line with the methodology used in calculations for OSP/I, a separate model was fitted to different groups within the sample, based on their offending history and OSP/IIC risk band. The groups were as follows.

- Those with two or more IIOC or indirect contact child offences in their history: High OSP/IIC.
- Those with one IIOC or indirect contact child offence in their history: Medium OSP/IIC.
- Those with two or more direct contact child offences in their history: Low OSP/IIC.
- Those with one or more direct contact child offences in their history: Low OSP/IIC.
- All other men with sexual offences in their history: Low OSP/IIC.
- Men with no sexual sanctions in their history, these men had no OSP/DC score, but would still have a contribution from OSP/IIC towards their RSR score.

For each of these models the logistic regression formula was as follows:

$$logodds(IIOC\ or\ indirect\ contact\ reoffending) = Intercept + Offence\ free\ months$$

The models are presented below. The same method was used as for the OSP/DC models: the data used to train the models was split into train, validate and test subsets; model weights were used to train the model so that the mean reoffending probability for each individual in the validation dataset was as close to the reoffending rate for the test set as possible, and a similar comparison is made here as a test of model accuracy and validity.

The models for each of the separate bandings within OSP/IIC are shown in the tables below. The final table presents the mean probability of reoffending for each group, compared to the actual reoffending rate for the test dataset.

Table K-3 to Table K-8 show that offence free time is not a significant predictive factor for any of the models. This means there is no evidence that the risk of IIOC or indirect contact child offending reduces over time and therefore no 5 year rule or change over time in the contribution to the RSR score will be implemented for OSP/IIC.

Table K-3: Table of Coefficients for OSP/IIC Logistic Regression Model for those with 2+ IIOC or Indirect Contact Sanctions

Covariate	Estimate	Standard Error	p.value
(Intercept)	-1.8025	0.245	0.00
Offence Free Months	-0.0055	0.013	0.67

Table K-4: Table of Coefficients for OSP/IIC Logistic Regression Model for those with 1 IIOC or Indirect Contact Sanction

Covariate	Estimate	Standard Error	p.value
(Intercept)	-3.091	0.172	0.000
Offence Free Months	-0.019	0.011	0.086

Table K-5: Table of Coefficients for OSP/IIC Logistic Regression Model for those with 2+ Direct Contact Sanctions

Covariate	Estimate	Standard Error	p.value
(Intercept)	-3.5714	0.864	0.00004
Offence Free Months	-0.0075	0.032	0.81180

Table K-6: Table of Coefficients for OSP/IIC Logistic Regression Model for those with 1 Direct Contact Sanction

Covariate	Estimate	Standard Error	p.value
(Intercept)	-4.87901	0.381	0.00
Offence Free Months	-0.00069	0.011	0.95

Table K-7: Table of Coefficients for OSP/IIC Logistic Regression Model for All Other Men with a Sexual Offence Sanction

Covariate	Estimate	Standard Error	p.value
(Intercept)	-4.947	0.418	0.00
Offence Free Months	-0.009	0.019	0.64

Table K-8: Table of Coefficients for OSP/IIC Logistic Regression Model for men with no Sexual Offence Sanctions

Covariate	Estimate	Standard Error	p.value
(Intercept)	-7.835	0.282	0.00
Offence Free Months	-0.007	0.017	0.69

Given that the offence free months were insignificant for all OSP/IIC models. It has been decided to use the reoffending rates for each of the groups as the contribution from OSP/IIC to the RSR. This is the equvalent of using just the log odds of the intercept of these logistic regression models, without offence free months as a confounding variable.

The new contributions to RSR score for each of the IIC banding groups are shown below.

Table K-9: Table of Model Performance for each of the OSP/IIC Logistic Regression Models

IIC Banding Group	Reoffending Rate
Men with 2 or more IIOC or indirect contact offences	0.10310
Men with 1 IIOC or indirect contact offences	0.03328
Men with 2+ direct contact offences	0.00926
Men with 1 direct contact offences	0.00634
All other men	0.00281
Men with no sexual sanctions	0.00062

Appendix L   Rates of Reoffending for IIOC Offenders

During the investigation into this project a request was made to MoJ by academic researchers to provide the rates of reoffending for different sexual offence types by those who have committed Indecent Images of Children (IIOC) based offending for use in meta-analysis. Tables containing these rates can be found below. Note that the rates are provided for each of the following cohorts.

- IIOC only – Those whose only sexual offence convictions have involved indecent images of children.

- IIOC and extreme pornography – Those whose only sexual offences other than IIOC offences have been those which involve extreme pornography.

- IIOC and any other sexual offence – Those whose have any other type of sexual offending in their history as well as IIOC offending.

Table L-1: Rates of proven reoffending in a two-year follow-up for male sexual offenders, split by type of original sexual offence, 30 June 2018 caseload

Type of reoffending	IIOC only: Count	IIOC only: Percentage	IIOC and extreme pornography only: Count	IIOC and extreme pornography only: Percentage	IIOC and any other sexual offence: Count	IIOC and any other sexual offence: Percentage
All reoffending	462	12.07%	188	11.65%	342	17.67%
Nonsexual violence	56	1.46%	18	1.12%	54	2.79%
Combined sexual and nonsexual violence	431	11.26%	180	11.15%	326	16.85%
All sexual	388	10.14%	167	10.35%	290	14.99%
IIOC	140	3.66%	77	4.77%	78	4.03%
Direct contact	5	0.13%	4	0.25%	9	0.47%
ICC	23	0.60%	10	0.62%	40	2.07%
All contact sexual	26	0.68%	13	0.81%	47	2.43%

Sample sizes: IIOC only = 3,827; IIOC and EP only = 1,614; IIOC and any other (non-EP) sexual offence = 1,935