Predicting First DOC Commitment from Prior Social Service Involvement

Prepared by
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Research & Evaluation
July 14, 2015

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Executive Summary

Purpose: This report is the second in a series of studies identifying where, when, and how individuals at highest risk for future DOC entry (i.e., first-time felony convictions) can be identified within other state-funded programs. The ultimate goal of this work is to reduce escalation to DOC by proactively directing additional prevention and intervention resources to those individuals who are at high risk of future DOC contact. The present report identifies which contacts with state-funded programs (among the Department of Human Services (DHS), the Oregon Health Authority (OHA), and the Oregon Youth Authority (OYA)) are the strongest predictors of future DOC entry. The results will suggest where additional prevention resources are most needed, and will help prioritize future attempts to identify which individuals within each program are most in need of additional prevention efforts.

Key Finding: The most important predictors of future DOC entry (including both probation and incarceration commitments) were contacts with **OYA** (4-fold increase in likelihood of DOC) and **Alcohol and Drug Treatment** (AD; 3-fold increase). Contacts with Self-Sufficiency (SS), Mental Health Services (MH), Medical Assistance (DMAP), and Foster Care (FC) also increased the risk of future DOC entry, but to a lesser extent (between 1.1- and 2-fold). Contact with Child Protective Services (CPS) was not a significant predictor of future DOC entry.

Interpretation: The present analyses assessed the unique impact of each program type after controlling for the impact of every other program. Thus, there are both similarities and differences with the purely descriptive results of the first report (Racer, 2015). The first report found that the rates of future DOC contact were highest among individuals who accessed Alcohol and Drug Treatment, Foster Care, and/or the Oregon Youth Authority. The current report confirmed that AD and OYA contacts are important predictors of future DOC entry, but found that the unique contribution of FC contacts was relatively small. Although OYA, and AD were the strongest predictors of future DOC entry, all program contacts other than CPS were statistically significant predictors of future DOC entry, and all will be examined in future attempts to identify individuals at high risk of future DOC entry.

Limitations: Only the youngest DOC entrants (i.e., up to age 25) had eligibility for both youth-limited services (CPS, FC, OYA) and DOC within the 14-year time span of the available records. Thus, DOC contacts after age 25 are not included in the present analyses. Similarly, in order to ensure age-eligibility for DOC by the end of the observation window, the present sample was no younger than 6 at the start of the CPS and FC records (1998), and 8 at the start of the remaining program records (2000); if an individual's only contacts with a program occurred before these ages, the contacts were not captured in the present analyses. Another limitation is that the present results are based upon simply the presence or absence of program contact; the pattern of results might be different if contact details (e.g., number of contacts, duration of services, timing of contacts) were included.

Future Directions: The next report will identify individual-level risk for future DOC entry at the time of first contact with OYA and AD, using a range of individual-level characteristics (e.g., gender, age at first service) and patterns of service utilization (e.g., length of service access, types of services received, number of programs accessed). Future work will also explore individual-level risk for future DOC entry at the time of first contact with SS, DMAP, MH, and FC, as contacts with each of these agencies were modest but significant predictors of future DOC entry.

Introduction

The Oregon Department of Corrections (DOC) supervises adults convicted of felony offenses, including those serving probation in the community and those incarcerated at DOC correctional facilities or local jails. This report is the second in a series examining *where, when,* and *how* individuals at highest risk for future DOC entry (i.e., first-time felony convictions) can be identified within other state-funded programs. The ultimate goal of this work is to reduce escalation to DOC by proactively directing additional prevention and intervention resources to the individuals who are at highest risk of future DOC contact.

The first report in the series (Racer, 2015) provided a descriptive overview of prior Department of Human Services (DHS), Oregon Health Authority (OHA), and Oregon Youth Authority (OYA) contacts among adults entering DOC for the first time between 2005 and 2013. The specific programs examined were Self-Sufficiency (SS), Medical Assistance (DMAP), Mental Health Treatment Services (MH), Alcohol and Drug Treatment Services (AD), Child Protective Services (CPS), Foster Care (FC), and Oregon Youth Authority (OYA) commitments. The first report found that no less than 68% of all first-time DOC entrants, and 80% of the youngest DOC entrants, had prior contacts with one or more of these services. These estimates are conservative, as they only include program contacts that occurred in or after the year 2000 (1998 for CPS and FC). The most common pre-DOC services were Self-Sufficiency (57% of new DOC entrants had previously accessed Self-Sufficiency) and Medical Assistance (44% of new DOC entrants had previously accessed Medical Assistance). The first report also found that, despite the high rates of prior program contacts among DOC entrants, most individuals who contact these programs never enter DOC. On average, only 10% of the individuals receiving DHS, OHA, or OYA services entered DOC within the next 13 years. However, the "density" of future DOC entrants varied by program, and for some programs it was much higher than 10%. The highest rates of future DOC entry were found among individuals who accessed OYA (57% later entered DOC), Foster Care (21% later entered DOC) and Alcohol and Drug Treatment Services (16% later entered DOC). Altogether, the first report confirmed that most DOC entrants can potentially be identified within other state agencies before their first contact with DOC; however, it also demonstrated that most individuals receiving services never enter DOC, so the challenge lies in differentiating those at highest risk of future DOC contact from the broader population of people receiving services.

The descriptive findings of the first report provide key information about the landscape of prior service access among DOC entrants. However, descriptives alone cannot determine which program contacts are the best predictors of future DOC entry. Individuals often have contact with multiple programs, so statistical methods that isolate the effects of each program are needed in order to quantify the relative importance of contact with each type of program for predicting future DOC entry. In the present study, logistic regression was used to statistically examine the relative contributions of SS, DMAP, MH, AD, CPS, FC, and OYA contacts in predicting future DOC entry. Logistic regression allows us to predict DOC contact on the basis of contact (or not) with each other program. It produces *Odds Ratios* for each program that indicate the extent to which contact with that particular program increases or decreases the likelihood of future DOC entry, after taking into account (statistically controlling for) the influence of every other program.

The purpose of the present report is to answer the following research question: Which program contacts are the strongest predictors of future DOC entry? The analyses will identify which program contacts carry the most weight in predicting future DOC entry. The results will suggest where additional prevention resources are most needed, and will help prioritize future efforts to identify which individuals within each program are at the highest risk of future DOC entry (i.e., we will concentrate on the programs that are the best predictors of DOC entry).

Method

Source Data

The data available for the present analyses were identical to those of the first report in this series. Table 1 provides a full list of the programs and service dates available. Enrollment records for OYA, DOC, DMAP, SS, MH, and AD services were available between January 2, 2000 and December 31, 2013. Records for CPS and FC were available between January 2, 1998 and December 31, 2010. Note that CPS and FC records are at the child level; thus, CPS or FC histories among DOC entrants indicate that the DOC entrant was the recipient of Child Protective Services or Foster Care services before the age of 18.

To allow us to combine records across agencies, the Department of Human Services Integrated Client Services (ICS) Team used probabilistic matching of names and dates of birth to identify individuals across datasets, and then assigned the same unique numeric identifier to every record for a given individual. We used these identifiers to match records across all programs for every individual.

For OYA and DOC, codes within the records enabled identification of each individual's very first contact with the agency; only these first-ever contacts were retained for the analyses. For DHS and OHA services, the "first" date of service is the earliest service date within the years covered by our records; it may or may not have been the individual's first-ever contact with that program (i.e., any pre-1998 CPS/FC contacts would be missed, as would any pre-2000 SS, DMAP, MH or AD contacts). To identify services received *before* DOC, the earliest dates for each service were compared against each individual's first-ever DOC sentencing date.

Table 1. Full list of available source data.

Agency	Program	Acronym	Ages of Eligibility	Enrollment Dates	Number of Unique Individuals
DHS	Self-Sufficiency	SS	0-100+	2000-2013	2,046,969
OHA	Medical Assistance	DMAP	0-100+	2000-2013	1,789,174
OHA	Mental Health	MH	0-100+	2000-2013	430,990
OHA	Alcohol and Drug Treatment	AD	0-100+	2000-2013	386,535
DHS	Substantiated Child Protective Services Claims	CPS	0-17	1998-2010	108,536
DHS	Foster Care Placements	FC	0-17	1998-2010	53,128
OYA	Oregon Youth Authority (First Contacts Only)	OYA	12-19	2000-2013	10,275
DOC	Department of Corrections (First Contacts Only)	DOC	15-100+	2000-2013	166,774

Sample

The source data spans a 14-year period from 2000 (1998 for CPS and FC) to 2013 (2010 for CPS and FC). The full dataset includes individuals of all ages (from 0 to 100+); thus, many individuals within the full dataset are too young to have any eligibility for DOC within the time window. Furthermore, three of the seven programs serve only youth (i.e., CPS, FC, OYA), and many individuals within the full data set are too old to be eligible for childhood services (CPS, FC, OYA) within the time window (i.e., are 18 or older in the year 1998). In order to simultaneously evaluate all seven programs, we focused on individuals who were both young enough to be eligible for childhood-limited services (CPS, FC, OYA) and old enough to be eligible for DOC within the 14 years covered by the available records.

The final sample consisted of 189,400 individuals who accessed one or more DHS, OHA, or OYA programs, had valid gender and race/ethnicity information[1], and were between the ages of 8 and 12 years in 2000. This age range ensures that every individual had the opportunity for DHS, OHA, and OYA service records from at least age 12 forward (age 10 for CPS and FC), as well as at least 4 years of DOC eligibility (i.e., age 21 or older) by the end of 2013. Among individuals who entered DOC, we only included program contacts that occurred at least 3 months before DOC entry. Our measure of OYA contact thus excluded youth who were serving DOC sentences within OYA facilities (i.e., only pre-DOC contacts with OYA were included). Of the 189,400 individuals, 12,433 (6.6%) subsequently entered DOC.

It should be noted that because this sample has a maximum age of 25 years at the end of the observation window, DOC entry will be missed in individuals who entered DOC after age 25. This is an unavoidable limitation when examining the predictive value of the youth-limited services (CPS, FC, and OYA) within the time span of the available records. However, this limitation is mitigated by the fact that a large proportion of all first-time DOC entrants (nearly 40%) are age 25 or younger (see Racer, 2015).

[1] 19% of all age-eligible individuals were missing race/ethnicity information (2.7% of DOC entrants and 19.9% of those without DOC contact), and an additional 497 individuals (0.2%) were missing gender information. Including individuals with missing race/ethnicity or gender information did not affect the pattern of results (total N = 234,392).

Statistical Considerations

Demographic differences. The goal of this report was to identify the program contacts that were most predictive of future DOC entry. Thus, logistic regression was used to predict DOC entry (Yes or No) from program contact history (Yes/No for each program type) alone. We recognize that patterns of program contacts may vary by age, gender, and ethnicity, and these demographic factors may themselves affect the likelihood of future DOC entry (e.g., males are more likely than females to have OYA contact and are also more likely than females to enter DOC). Demographic characteristics will be examined in detail in future reports on individual-level predictors of DOC entry. To determine whether the results of the present analyses were meaningfully affected by age, gender, or ethnicity differences, we replicated the analyses after conducting a 1-to-1 matching of each future DOC entrant with a non-DOC entrant on the basis of age, gender, and ethnicity. The pattern of results with the matched sample was identical to that with the full sample, indicating that the present results are not driven by age, gender, or ethnicity. Only the results for the full sample are presented below.

Multicollinearity. Logistic regression can be unreliable if the predictor variables (in this case, program contacts) are highly correlated. As discussed in the first report, there is considerable overlap among services (i.e., many individuals access multiple programs), which might lead to high correlations among our program contact variables. The extent of program overlap for the present sample (overall and separated by future DOC status) is shown in Appendix A. Examination of the correlations among the predictor variables (see Appendix B) revealed that most correlations were modest ($r = .26$ and below), although there was a relatively high correlation between CPS and FC ($r = .47$). Multicollinearity diagnostics indicated that the interrelationships among the predictor variables were unlikely to impact the accuracy of the regression results (i.e., all Variance Inflation Factors < 1.4). Thus, no modifications were made to the original variables.

Results

Descriptive Characteristics

Of the 189,400 individuals who met the inclusion criteria, 6.6% (12,443) entered DOC (i.e., were convicted of a felony) by the end of the observation window. Table 2 shows the demographic characteristics of the sample, separated by DOC status (i.e., those who did versus did not enter DOC). DOC entrants had higher proportions of male, Hispanic, African American, and Native American individuals than non-entrants, and lower proportions of Caucasian, Asian, and Other ethnicities. DOC entrants had a higher proportion of program contacts before age 18 (80% of the DOC entrants had contact with one or more programs before 18, vs. 63% of the non-DOC population), and a younger average age at first contact (13.3 years for future DOC entrants vs. 14.9 years for non-entrants). The DOC entrants were also slightly older in 2000 (average age was 10.4 years for future DOC entrants vs. 10.1 years for non-entrants).

Table 2. Demographic characteristics of the study sample, separated into those who did and did not enter DOC by the end of 2013.

Demographic Characteristics by DOC Status Sample = Individuals Ages 8-12 in 2000 (21-25 in 2013) Total N = 189,400 (12,443 DOC Entrants)					
		Entered DOC (N=12,443)		No DOC Contact (N=176,957)	
		N	Percent	N	Percent
Sex[1]	Female	2,835	22.8%	90,443	51.1%
	Male	9,608	77.2%	86,514	48.9%
Race/Ethnicity[2]	Caucasian	9,224	74.1%	137,124	77.5%
	Hispanic	1,826	14.7%	19,759	11.2%
	African American	803	6.5%	7,775	4.4%
	Native American	399	3.2%	4,933	2.8%
	Asian	110	0.9%	4,999	2.8%
	Other	81	0.7%	2,367	1.3%
Age at First DHS, OHA, or OYA Contact	6-9	2,071	16.6%	27,812	15.7%
	10-13	5,501	44.2%	55,830	31.6%
	14-17	2,469	19.8%	29,487	16.7%
	18-21	2,073	16.7%	43,031	24.3%
	22-25	329	2.6%	20,797	11.8%
	Average[3]	13.3 years		14.9 years	
Age in 2000	8	1,459	11.7%	33,068	18.7%
	9	2,095	16.8%	34,306	19.4%
	10	2,617	21.0%	36,077	20.4%
	11	2,980	23.9%	35,468	20.0%
	12	3,292	26.5%	38,038	21.5%
	Average[3]	10.4 years		10.1 years	

[1]Percentages of males and females were significantly different across DOC and non-DOC groups (Pearson Chi-Square = 3732.07, $p < .001$).

[2]Percentages of each race/ethnicity were significantly different across DOC and non-DOC groups (all Pearson Chi-Squares > 7.46, $ps < .01$).

[3]Average ages were significantly different between DOC and non-DOC groups ($ts > .23$, $ps < .001$).

Table 3 shows the number of individuals within the sample who accessed each program, and the percentage of those individuals who subsequently entered DOC. The percentages entering DOC were generally similar to those in the initial report (Racer, 2015), although they tend to be a bit lower given that the present report only tracked DOC entry up to ages 21-25 years.

Table 3. Programs accessed and rates of DOC entry for the study sample (individuals ages 8-12 in 2000).

Total Number Accessing Each Program Type and Percentage and Number who Subsequently Entered DOC Sample = Individuals Ages 8-12 in 2000 (21-25 in 2013) Total N = 189,400 (12,443 DOC Entrants)			
Program	Total Number Who Accessed Program	Percentage Entering DOC by the end of 2013	Number Entering DOC by the end of 2013
SS	162,058	6.7%	10,924
DMAP	125,030	7.6%	9,448
MH	44,888	11.4%	5,130
AD	30,184	17.5%	5,286
CPS	18,110	10.4%	1,879
FC	8.055	15.6%	1,254
OYA[2]	3,110	44.2%	1,374

[2] Note that the OYA sample excluded youth serving DOC sentences within OYA facilities (i.e., only pre-DOC contacts with OYA were included).

Table 4 shows the percentage of future DOC entrants and non-entrants who accessed each program type. SS and DMAP were the most frequently accessed programs for all individuals. Contacts with each program type were more common among future DOC entrants than non-entrants (all Pearson Chi-squares > 53.5, all ps < .001). The largest rate differences were for OYA (11 times more common among future DOC entrants), Alcohol and Drug Treatment Services (4.3 times more common among future DOC entrants), and Foster Care Services (2.6 times more common among future DOC entrants). This is broadly consistent with the "density" of future DOC entrants within each service as reported in the first report (i.e., the highest densities of future DOC entrants were within OYA, AD, and FC (see Racer (2015), Figure 7). Note that the percentages shown in Table 4 do not account for overlap among services, and do not necessarily correspond to the services that are most predictive of future DOC entry.

Table 4. Prevalence of contact with each program type for those who did and did not enter DOC by the end of 2013.

Prevalence of Program Access by DOC Status Sample = Individuals Ages 8-12 in 2000 (21-25 in 2013) Total N = 189,400 (12,443 DOC Entrants)		
Program	Among those who entered DOC (N=12,443)	Among those who did not enter DOC (N=176,957)
SS	87.8%	85.4%
DMAP	75.9%	65.3%
MH	41.2%	22.5%
AD	42.5%	14.1%
CPS	15.1%	9.2%
FC	10.1%	3.8%
OYA	11.0%	1.0%

Predicting DOC Entry from Program Contacts

To determine which program contacts were most predictive of future DOC entry, we conducted a backward stepwise logistic regression in which we predicted DOC entry (Yes/No) from the seven dichotomous variables (Yes/No) indicating each individual's history of involvement with Self-Sufficiency, Medical Assistance, Mental Health Treatment Services, Alcohol and Drug Treatment Services, Child Protective Services, Foster Care, and the Oregon Youth Authority. For individuals who entered DOC, services accessed less than 90 days before DOC were excluded (i.e., coded as "No").

Primary Model. Results of the logistic regression are presented in Table 5. As a group, the variables in the final model were able to accurately predict DOC entry about 70% of the time (Area Under the Curve (AUC) statistic of 0.70). With the exception of CPS, all program contacts were significant and positive predictors of future DOC entry (i.e., DOC entry was more likely if a program contact occurred), as indicated by p-values less than .05 and by Odds Ratios greater than 1.0. The strongest predictors (i.e., the predictors with the highest Odds Ratios) were OYA and Alcohol and Drug Treatment Services. The Odds Ratios indicate that, controlling for the influence of all other programs, the likelihood of future DOC entry was more than 4 times greater among individuals who accessed OYA, and nearly 4 times greater among individuals who accessed Alcohol and Drug Treatment Services.

Table 5. Results of the logistic regression predicting DOC entry (Yes/No) from program contacts. Shading indicates program contacts that more than doubled the risk of future DOC entry (Odds Ratios > 2.0).

N=189,400 (12,443 entered DOC) AUC=.701 Nagelkerke R-Square = .12 Cox & Snell R-Square = .04	Odds Ratio	p-value	β	S.E.	Wald	df
OYA	4.30	.000	1.46	.04	1231.33	1
Alcohol and Drug Services	3.81	.000	1.34	.02	4054.11	1
Mental Health Services	1.49	.000	.40	.02	321.28	1
Foster Care Services	1.43	.000	.36	.04	94.75	1
Medical Assistance	1.39	.000	.33	.02	189.25	1
Self-Sufficiency	1.36	.000	.31	.03	106.17	1
Child Protective Services	Excluded (not a substantial predictor of DOC)[3]					
Constant	.025	.000	-3.71	.03	14467.06	1

Program Access Before or After Age 18. Four of the seven programs (SS, DMAP, AD, and MH) can be accessed either before or after age 18. The predictive importance of first contacts that occur before age 18 may be different than first contacts that occur after 18. For example, risk for DOC entry might be higher among individuals who received SS in childhood compared to those who accessed SS for the first time as an adult. The primary analysis did not distinguish between juvenile and adult contacts (i.e., any contact within the observation window was coded as "yes"). We therefore conducted a second analysis in which SS, DMAP, AD, and MH contacts were subdivided according to whether the individual's

[3] Recall that CPS and FC were moderately correlated (r = .47). To ensure that the correlation with FC was not obscuring the effects of CPS, we conducted an additional logistic regression in which FC was not included as a predictor. Although statistically significant, CPS was the weakest predictor within this model (odds ratio 1.18). When CPS is the *only predictor* included in the model, it is statistically significant with an odds ratio of 1.75. For comparison, the odds ratios of the other predictors when entered alone (i.e., as the *only predictor* of DOC entry) are: 12.53 (OYA), 4.51 (AD), 2.80 (FC), 2.42 (MH), 1.23 (SS), and 1.68 (DMAP).

first contact with the program occurred before age 18 ("Juvenile") or after age 18 ("Adult"). These categories are mutually exclusive – each individual can have either a juvenile or adult contact with a program, but not both (i.e., only the first contact is coded).

The results of this second logistic regression are presented in Table 6. The overall pattern of results was very similar to the primary analysis, although juvenile Alcohol and Drug Services was a slightly stronger predictor of DOC involvement than OYA Services. This second analysis also revealed that the risk of future DOC involvement was reduced slightly for individuals who were 18 or older at the time of their first contact with DMAP.

Table 6. Results of the logistic regression predicting DOC entry (Yes/No) after subdividing SS, DMAP, AD, and MH contacts by age of first contact (before 18 or after 18). Shading indicates program contacts that more than doubled the risk of future DOC entry (Odds Ratios > 2.0).

N=189,400 (12,443 entered DOC) AUC=.71 Nagelkerke R-Square = .12 Cox & Snell R-Square = .05	Odds Ratio	Sig.	β	S.E.	Wald	df
Juvenile Alcohol and Drug Services	4.26	.000	1.45	.03	3118.50	1
OYA	3.93	.000	1.37	.04	1034.78	1
Adult Alcohol and Drug Services	3.22	.000	1.17	.03	1714.15	1
Juvenile Self-Sufficiency	1.44	.000	.37	.03	116.90	1
Juvenile Mental Health Services	1.44	.000	.36	.03	210.38	1
Juvenile Medical Assistance	1.36	.000	.31	.03	103.91	1
Adult Mental Health Services	1.35	.000	.30	.04	58.07	1
Foster Care Services	1.32	.000	.28	.04	54.84	1
Adult Self-Sufficiency	1.22	.000	.20	.03	34.6	1
Adult Medical Assistance	.91	.019	-.09	.04	5.46	1
Child Protective Services	Excluded (not a substantial predictor of DOC)					
Constant	.027	.000	-3.62	.032	13061.08	1

Type of DOC Commitment. Of the 12,443 individuals who entered DOC, 88.8% (11,059) entered on a Probation commitment and 9.6% (1,196) entered on an Incarceration commitment. We conducted an additional pair of regression analyses to examine whether the pattern of results differed by type of DOC commitment (Probation or Incarceration). The results of these regression models are shown in Table 7 (Probation only) and Table 8 (Incarceration only). The results should be interpreted cautiously given the small number of Incarceration entrants (only 0.6% of the total sample of 189,400). AD and OYA emerged as the two strongest predictors in both models, but AD was a slightly stronger predictor than OYA in the Probation model, while OYA was a much stronger predictor than AD in the Incarceration model. In addition, SS was a predictor of Probation but not Incarceration. Prior contacts with Mental Health, Medical Assistance, and Foster Care were modest predictors of both Probation and Incarceration.

Table 7. Results of the Logistic Regression Predicting DOC Entry on a **Probation** commitment (Yes/No) from Program Contacts. Shading indicates program contacts that more than doubled the risk of future DOC entry (Odds Ratios > 2.0).

Probation ONLY **N=188,204 (11,059 entered DOC)** AUC=.690 Nagelkerke R-Square = .10 Cox & Snell R-Square = .04	Odds Ratio	p-value	β	S.E.	Wald	df
OYA	3.33	.000	1.20	.05	718.65	1
Alcohol and Drug Services	3.95	.000	1.37	.022	3909.89	1
Self-Sufficiency	1.41	.000	.34	.03	114.05	1
Mental Health Services	1.49	.000	.40	.02	290.10	1
Medical Assistance	1.37	.000	.32	.03	159.74	1
Foster Care Services	1.40	.000	.33	.04	74.53	1
	Excluded (not a substantial predictor of DOC)					
Child Protective Services	Excluded (not a substantial predictor of DOC)					
Constant	.02	.000	-3.84	.03	13893.48	1

Table 8. Results of the Logistic Regression Predicting DOC Entry on an **Incarceration** commitment (Yes/No) from Program Contacts. Shading indicates program contacts that more than doubled the risk of future DOC entry (Odds Ratios > 2.0).

Incarceration ONLY **N=178,341 (1,196 entered DOC)** AUC=.728 Nagelkerke R-Square = .13 Cox & Snell R-Square = .01	Odds Ratio	p-value	β	S.E.	Wald	df
OYA	13.70	.000	2.62	.09	907.26	1
Alcohol and Drug Services	2.41	.000	.88	.07	163.87	1
Self-Sufficiency	Excluded (not a substantial predictor of DOC)					
Mental Health Services	1.47	.000	.38	.07	28.77	1
Medical Assistance	1.54	.000	.43	.08	29.58	1
Foster Care Services	1.78	.000	.58	.09	38.01	1
Child Protective Services	Excluded (not a substantial predictor of DOC)					
Constant	.002	.000	-6.20	.093	4410.79	1

Discussion

The purpose of the present report was to identify which program contacts are most predictive of future DOC entry (i.e., felony convictions after age 18). Using logistic regression to control for the influence of every other program type, we found that contacts with the Oregon Youth Authority and Alcohol and Drug Treatment Services were the strongest predictors of future DOC involvement.

The current results expand upon the earlier descriptive analyses (Racer, 2015) by isolating the unique effects of contact with each type of program for predicting future DOC entry. The importance of OYA and AD contacts was consistent with the high densities of future DOC entrants among individuals accessing these programs and underscores the significance of substance abuse and serious juvenile delinquency as risk factors for future DOC involvement.

The lack of contribution from substantiated child welfare referrals (CPS) may seem surprising, but was also observed in the parallel report for the OYA feeder system (Braun, 2015). That is, substantiated CPS referrals were not a significant predictor of either OYA or DOC entry, after accounting for the effects of other programs. Although previous studies have established a link between CPS involvement and juvenile delinquency (e.g., Ryan & Testa, 2005), these studies typically include low-level juvenile offenses (e.g., any juvenile referrals or petitions). In contrast, OYA commitments and DOC entry represent a relatively high threshold of severe and/or persistent antisocial behavior. Furthermore, most previous work has not controlled for the effects of contacts with other social service programs (e.g., Self-Sufficiency, Mental Health Treatment).

More surprising was the relatively weak contribution of Foster Care. The first report (Racer, 2015) demonstrated that 21% of individuals accessing FC in a given year entered DOC within the next 13 years. This rate was second only to OYA (57%), with AD having the third highest rate (16%). Furthermore, FC was a substantial predictor of OYA entry (Braun, 2015), and previous studies have demonstrated links between foster care and adult criminality (e.g., Barth et al., 2010). One possible explanation for the limited predictive utility of FC is that many of the FC youth who enter DOC may also have contact with OYA – thus, including OYA contact in the same model could overshadow the contribution of FC contact. However, only 8% of youth who accessed FC also accessed OYA (26% among those who later entered DOC; see Appendix A), and we obtained essentially the same results after removing OYA from the model (see Appendix C). Further analysis of individual characteristics and patterns of service utilization (e.g., age at first service, duration of services, other programs accessed) is needed to better clarify the contributions of FC.

The modest contributions of SS, DMAP and MH (odds ratios of approximately 1.4) were generally consistent with the descriptive findings from the first report. Interestingly, parallel analyses in which DHS and OHA program contacts were used to predict OYA entry (Braun, 2015) found that SS contact had a modest protective effect, reducing the risk of OYA entry by about 30%. On the other hand, at least one previous study has shown higher than expected rates of felony charges among individuals with a history of household income assistance as a child/adolescent (Barth, Duncan, Hederowicz, & Kum, 2010). Further analysis of individual characteristics and patterns of service utilization (e.g., age at first service, duration of services, other programs accessed) is needed to better clarify the varying effects of SS involvement. With regard to DMAP, we are not aware of any published research examining links between medical assistance and future criminality; additional study will be needed to clarify this relationship. The Mental Health results are broadly consistent with previous studies showing higher rates of psychological disorders among men who engaged in serious antisocial behavior (Moffitt, Caspi, Harrington, & Milne, 2002), and higher than expected rates of both felony and misdemeanor offenses among individuals with severe and persistent mental illness who accessed public mental health services (Fisher et al., 2011). However, neither of these studies controlled for the influence of other factors.

Limitations. Given the limited time frame of the available data (i.e., 1998-2013), only the youngest DOC entrants (i.e., up to age 25) had eligibility for both youth-limited services (CPS, FC, OYA) and DOC within the time span of the observation window. It is expected that a number of individuals in our sample will enter DOC for the first time after age 25; these DOC contacts are missed in the current analyses. However, prior Feeder System work has shown that nearly 40% of first-time DOC entrants are age 25 or younger (Racer, 2015).

Another time-frame limitation is that, in order to ensure an adequate period of eligibility for DOC by the end of 2013, the present sample had a minimum age of 6 at the beginning of the observation window for CPS and FC (the year 1998), and a minimum age of 8 for all other programs (the year 2000). Thus, if an individual had contact with a program in early childhood, and did not have subsequent contacts within the time frame of the observation window, their history of contact will be missed. Given that nearly half of the initial CPS and FC contacts in the source data occurred before age 6 (48.3% of CPS contacts and 48.8% of FC contacts), the present sample is almost certainly missing CPS and FC histories among some individuals (i.e., those whose CPS or FC contacts occurred only in early childhood).

It should also be noted that only the presence or absence of program contact was used to predict DOC entry; the pattern of results might be different if contact details (e.g., number of contacts, duration of services, timing of contacts) were included. In addition, OYA contact could be argued to both increase risk (e.g., as an indicator of antisocial behavior) and decrease risk (e.g., by limiting opportunity for crime via placement in youth correctional facilities and/or intensive supervision). To the extent that OYA contact reduces opportunity for crime, the importance of OYA may actually be underestimated.

Conclusions and Future Directions. The current study examined the probability of DOC entry among individuals who accessed one or more of the following state-funded programs: Self-Sufficiency (SS), Medical Assistance (DMAP), Mental Health Services (MH), Alcohol and Drug Treatment Services (AD), Child Protective Services (CPS), Foster Care (FC), and the Oregon Youth Authority (OYA). The purpose of this report was to compare these program contacts side-by-side to identify the best predictors of future DOC entry. In this respect, it is clear that OYA and AD had the strongest effects. Nevertheless, it should be emphasized that all program contacts, with the exception of CPS, made significant contributions to the prediction of DOC entry. Furthermore, every program was significantly associated with future DOC entry when examined individually (i.e., without controlling for the effects of the other programs). Thus, there is potential within every program to identify individuals at high risk for future DOC involvement and to reduce future DOC commitments through targeted prevention and intervention services.

Future work will look within each program type to identify individual characteristics (e.g., gender, race/ethnicity, age at first service) and patterns of service utilization (e.g., length of service access, types of services received, number of programs accessed) that best predict risk for future DOC entry. The ultimate goal is to develop methods for identifying the highest-risk individuals as they enter each type of program. These methods can and should be applied to every program, but the present analyses demonstrated that contacts with OYA and AD have the most power to predict future DOC entry. Thus, our initial efforts will focus upon the populations accessing these three programs.

Appendix

Appendix A: Rates of program overlap (i.e., percentage of individuals who contacted a given pair of services, even if the contacts occurred at different times). Rates are shown for the full sample and after separating by future DOC status.

Table A.1. Program overlap within the full sample (N=189,400): Among those who accessed a given program, what percentage also accessed the other program types? Areas of greater than 50% overlap are highlighted in yellow.

	Percentage of those who accessed:						
Who also had contact with:	SS	DMAP	MH	AD	CPS	FC	OYA
	N=162,058	N=125,030	N=44,888	N=30,184	N=18,110	N=8,055	N=3,110
SS	--	88.4%	84.4%	72.2%	87.9%	90.7%	90.0%
DMAP	68.2%	--	82.3%	58.6%	86.2%	96.4%	97.7%
MH	23.4%	29.5%	--	35.2%	51.7%	77.2%	84.0%
AD	13.4%	14.2%	23.7%	--	20.0%	28.2%	71.9%
CPS	9.8%	12.5%	20.9%	12.0%	--	75.5%	24.6%
FC	4.5%	6.2%	13.9%	7.5%	33.6%	--	21.0%
OYA	1.7%	2.4%	5.8%	7.4%	4.2%	8.1%	--

Table A.2. Program overlap among those who did not enter DOC by the end of 2013 (N=176,957). Areas of greater than 50% overlap are highlighted in yellow.

	Percentage of non-DOC entrants (N=176,957) who accessed:						
N=176,957 Who also had contact with:	SS	DMAP	MH	AD	CPS	FC	OYA
	N=151,134	N=115,582	N=39,758	N=24,898	N=16,231	N=6,801	N=1,736
SS	--	88.1%	83.6%	69.7%	87.1%	90.0%	91.2%
DMAP	67.4%	--	81.3%	54.8%	85.3%	95.8%	97.5%
MH	22.0%	28.0%	--	31.5%	49.7%	75.4%	84.4%
AD	11.5%	11.8%	19.7%	--	16.5%	23.2%	66.4%
CPS	9.4%	12.0%	20.3%	10.8%	--	77.1%	25.3%
FC	4.1%	5.6%	12.9%	6.3%	32.3%	--	18.8%
OYA	1.0%	1.5%	3.7%	4.6%	2.5%	4.3%	--

Table A.3. Program overlap among those who entered DOC by the end of 2013 (N=12,443). Areas of greater than 50% overlap are highlighted in yellow.

	Percentage of DOC entrants (N=12,443) who accessed:						
Who also had contact with:	SS	DMAP	MH	AD	CPS	FC	OYA
	N=10,924	N=9,448	N=5,130	N=5,286	N=1,879	N=1,254	N=1,374
SS	--	91.9%	90.1%	83.8%	94.8%	94.3%	88.4%
DMAP	79.5%	--	90.4%	76.8%	94.3%	99.4%	97.9%

MH	42.3%	49.1%	--	52.8%	69.7%	87.4%	83.5%
AD	40.6%	43.0%	54.4%	--	49.7%	55.5%	78.8%
CPS	16.3%	18.7%	25.5%	17.7%	--	66.8%	23.8%
FC	10.8%	13.2%	21.4%	13.2%	44.6%	--	23.7%
OYA	11.1%	14.2%	22.4%	20.5%	17.4%	26.0%	--

Appendix B: Correlations between program contact indicators (Yes=1/No=0 for each program). Rates are shown for the full sample and after separating by future DOC status.

Table B.1. Correlations between Program Contact Indicators (Yes/No), Full Sample.

N=189,400	SS	DMAP	MH	AD	CPS	FC
SS	1.0					
DMAP	.11	1.0				
MH	-.02	.19	1.0			
AD	-.17	-.07	.12	1.0		
CPS	.02	.14	.21	.04	1.0	
FC	.03	.14	.27	.07	.47	1.0
OYA	.02	.09	.18	.20	.07	.11

*all correlations are statistically significant (ps < .001)

Table B.2. Correlations between Program Contact Indicators (Yes/No), non-DOC Entrants

N=176,957	SS	DMAP	MH	AD	CPS	FC
SS	1.0					
DMAP	.11	1.0				
MH	-.03	.18	1.0			
AD	-.18	-.09	.09	1.0		
CPS	.02	.13	.21	.02	1.0	
FC	.03	.13	.25	.05	.47	1.0
OYA	.02	.07	.15	.15	.06	.08

*all correlations are statistically significant (ps < .001)

Table B.3. Correlations between Program Contact Indicators (Yes/No), DOC Entrants

N=12,443	SS	DMAP	MH	AD	CPS	FC
SS	1.0					
DMAP	.22	1.0				
MH	.06	.28	1.0			
AD	-.10	.02	.20	1.0		
CPS	.09	.18	.24	.06	1.0	
FC	.07	.18	.31	.09	.48	1.0
OYA	.01	.18	.30	.26	.09	.16

*all correlations are statistically significant (ps < .001) with the exception of SS-OYA (p = .50) and AD and DMAP (p=.04)

Appendix C: Model without OYA

OYA was excluded to determine whether it was suppressing the effects of FC. Excluding OYA did not increase the relative importance of FC for predicting future DOC entry. Shading indicates program contacts that more than doubled the risk of future DOC entry (Odds Ratios > 2.0).

Excluding OYA from Model **N=189,400 (12,443 entered DOC)** AUC=.695 Nagelkerke R-Square = .10 Cox & Snell R-Square = .04	Odds Ratio	p-value	β	S.E.	Wald	df
Alcohol and Drug Services	4.38	.000	1.48	.02	5358.43	1
Self-Sufficiency	1.39	.000	.33	.03	120.10	1
Mental Health Services	1.69	.000	.53	.02	596.53	1
Medical Assistance	1.48	.000	.39	.02	271.58	1
Foster Care Services	1.49	.000	.40	.04	123.03	1
Child Protective Services	Excluded (not a substantial predictor of DOC)					
Constant	.02	.000	-3.79	.03	15433.84	1

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