Relationships between Types and Amounts of Chemical Dependency Treatment

And Drug Court Outcomes

NW HIDTA/DASA Drug Court Evaluation

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The nature of the relationship between treatment and outcome is of major interest in any intervention program. Drug courts are nearly unique in terms of the duration of the program, the intensity of the intervention, and the leverage on the participants to encourage their prolonged involvement. An important evaluation question is whether these relatively large amounts of treatment are associated with improved outcomes.

METHODS.

Subjects. Subjects are offenders referred to the drug courts in King, Pierce, Spokane, and Skagit counties, who had data as described below. (No subjects from Thurston or Kitsap counties had sufficient data to be included.)

Drug Court Outcome Subgroups. Within each court, subjects are grouped as follows:

- **Ineligibles** are persons who passed an initial legal screen and were referred to the court, but on closer examination were found to be ineligible on either legal or clinical grounds.

- **Opt Outs** are persons who met all criteria, and were offered entry to the court, but who personally declined to participate.

- **Did Not Finish (DNFs)** are individuals who entered a drug court program and either failed or dropped out prior to completion.

- **Graduates** are individuals who entered and graduated from a drug court.

- **Actives** are all remaining cases still in the drug court. They are not included in these analyses.

Data. Three types of data are involved, outcomes (arrests, convictions and income post drug court referral), predictors (amounts of individual, group and residential treatment after referral), and control variables (arrests and income before court referral).

Outcomes. The first *re-arrest* and first *re-conviction* (if any occurred) outcomes are for the post drug court referral period and are based on as many months as the individual subject had data (convictions are counted only for offenses that occurred after referral to the court). If a re-arrest and/or re-conviction occurred, the month of the event is recorded. *Income* is average quarterly income for the 13th through 24th months post court referral. At least one quarter of income data in this period is required for inclusion in the analyses.

Predictors are the number of units (sessions for outpatient, days for residential) of chemical dependency treatment per month in each of the first 12 months following referral in each of the following categories: individual, group, methadone maintenance (only in King County), and residential (combining intensive inpatient, long term care, extended care and recovery house).

Controls. The two control variables are the *annualized number of arrests* (excluding the arrest that led to the drug court referral) pre drug court referral beginning with January, 1993 (the total number of arrests in the pre referral period – less the incident arrest - divided by the number of years the data covered), and the pre referral annual income for the 12 months prior to referral.

Analyses. The outcome variables in these analyses are the risk of re-arrest, the risk of re-conviction, and the mean quarterly income for the second year following drug court referral. The "risks" of re-arrest and re-conviction are based on a survival analysis of the length of time to first arrest or conviction (if one occurred) or the end of data, and the analysis is performed using a special type of regression which allows the use of time varying predictors, such as amount of treatment per month, as well as more typical predictors, such as number of arrests or the amount of income previous to referral. This analysis examines the risk of (for example) re-arrest across the time being studied, and the extent to which the predictors increase or decrease the risk of the event occurring. There is no simple statement about how much risk there is (because risk is treated as a curve or graph across time), rather the focus is on how much change there is in risk due to the predictor variables.

Standard regression techniques are used for the analyses of the income data.

Because of the large numbers of subjects in many of the analyses, statistical significance can be achieved in spite of small or even very small effects.

Issues in the Analyses. There are three major issues to be decided in analyzing these data, first, the question of covariates that are known to predict outcomes, second the question of which grouping of subjects to use, and third, the best way to aggregate the treatment data.

First, we can be sure that arrests prior to referral to drug court will predict the likelihood of arrests after referral. We can also be sure that income before referral will predict income afterwards. Therefore the most appropriate analyses will include these variables as controls or covariates, to allow us to determine the degree to which treatment predicts outcomes after these known predictors have been taken into consideration. However, we will also analyze the outcomes without the control covariates, in order to get some idea of the overall relationship between treatment and outcomes. We will use the annualized number of arrests prior to drug court referral as a control variable for both re-arrest and re-conviction, and income in the year prior to referral as a control variable for income after referral. (In fact, both of these control variables were extremely strong predictors of their respective outcomes.)

Second, there are at least three ways to group the subjects for the analyses: (1) all subjects together across all counties, (2) all subjects in each county grouped, and separate analyses done for each county, and (3) all subjects in each outcome subgroup (Graduates, DNFs, etc.) combined and the subgroups analyzed separately.

We will report all three types of groupings, but we feel the last, analyses by outcome subgroups, is the most appropriate and most important, because it controls to some extent for selection and other factors that might influence outcome and which are also confounded with drug court attendance.

Taking these two points together, the most appropriate analysis is of the outcome groups controlling for pre-referral levels of arrests or income.

Third, we will analyze individual, group, and residential treatment. Detox is too rare to be useful. However, while individual and group therapies are clearly different, it may also be that to some extent they are equivalent, in which case the best analyses would be to use the sum of the two as the predictor. We have performed the analyses both ways, with individual and group separately, and with them added together. In no case did we find that the sum produced a significant effect when the two components did not. Generally results from the sum were roughly the average of the two individual results.

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It is also the case that opiate substitution treatment was used in King County. We performed separate analyses on methadone maintenance in King, and within the Graduate and DNF groups in King, and we performed analyses using the sum of individual+group+methadone. Neither methadone nor the sum were predictors of outcomes.

Interpretation. Caution should be used in interpreting these results. This statistical procedure assumes that each additional treatment session has the same effect on outcomes, whether it's the second session or the 50th. This is certainly not true. Also, because the counties differ considerably in the average amount of treatment they provide, but the graduation rates are not as different, we know that there is not a straight line relationship between treatment and outcomes. Other factors influence the amount of treatment participants receive, for example, it is likely that participants who respond poorly to the program will receive more than the average amount of treatment, both because they progress more slowly through the phases, and because more treatment is likely to be a direct consequence of violations and marginal performance. Finally, because of radically different conditions in the counties, comparisons between counties are especially inappropriate.

RESULTS

Amount of Treatment Received

The amount of treatment received is important in considering the relationship between treatment and outcome. Tables 2a through 3c provide data on the percent of persons in each group who receive treatment, and the mean number of service units received for individual, group and residential treatment. Thurston and Kitsap counties are not included in these tables because they did not have subjects with one year of post referral data.

In a sense, these tables look at the "adequacy" of the amounts of treatment offered, where a judgement of adequacy is primarily based on the percent of persons in a group who receive a type of treatment, and of those who receive treatment, the number of units of service they receive.

- Graduate groups in the counties should have full participation in group therapy, and very high participation in individual therapy. Observed percentages for graduates range between 77% and 82% for individual, and 76% and 84% for group. *The lack of 100% participation in group or individual therapy for graduates suggests that the TARGET data base does not contain a complete record of treatment events,* which might compromise the following analyses.

- Table 2a breaks the subjects into the outcome subgroups within each county, and gives the percent receiving any treatment and the mean number of treatment sessions for each group, for individual therapy. Tables 2b and 2c do the same for group therapy and residential treatment.

  As expected, graduates have the highest percentages receiving service and the highest means, with did-not-finish (DNF) subjects second, but generally substantially lower, except in Skagit county, where the two groups are comparable. For *graduates*, the percent receiving **individual** therapy range between 77% and 82% (Table 2a), between 76% and 84% for **group** (Table 2b), and between 7% and 21% for **residential** (Table 2c). For *DNFs* the same figures are 46% - 63% for **individual** (81% in Skagit), 50% - 71% for **group** (88% in Skagit), and 14% - 25% for **residential**.

- Table 3a breaks the subjects into the outcome subgroups within each county, and gives the mean number of individual treatment sessions received for each group, for subjects who had at least one individual therapy service event. Tables 3b and 3c do the same for group therapy and residential treatment.

  For members of the subgroups who have actually received some service in the category being considered, for *graduates* in King, Pierce and Spokane counties, the mean

number of **individual** treatment sessions ranges between 9 to 14 (Skagit with 22) (Table 3a), of **group** sessions between 46 and 88 (Table 3b), and **residential** treatment between 26 and 78 (Table 3c). For *DNFs* the figures for **individual** are 6 - 9 (16 in Skagit), 22 - 50 for **group**, and 40 - 49 for **residential**.

Summary. These results are summarized in Table 1. It seems almost certain that service data are underreported for the graduates, and presumably proportionately for the DNFs and possibly the other groups as well, so the percentages receiving service for both groups are likely too low. Further, for subjects for whom data are reported, at least some graduates have fewer sessions than seems possible, e.g., at least one graduate with services has only one unit of group therapy. Even given this problem with the data, *the mean numbers of services delivered for group and individual therapy seem adequate to expect a therapeutic effect, but this is true for the DNF subjects as well as the graduates*.

Table 1

Percent of Each Outcome Subgroup Receiving Treatment
And Mean Number of Units of Treatment

		Graduates	Did Not Finish
Individual Therapy	Percent of group receiving treatment	77 - 82	46 -63 (81)
	Mean units of service for those receiving some service	9 - 14 (22)	6 - 9 (16)
Group Therapy	Percent of group receiving treatment	76 - 84	50 - 71 (88)
	Mean units of service for those receiving some service	46 - 88	22 - 50
Residential Treatment	Percent of group receiving treatment	7 - 21	14 - 25
	Mean units of service for those receiving some service	26 - 78	40 - 49

Statistical Results.

Arrests.

Looking at simple analyses by type of treatment, with no statistical controls:

- For all subjects combined, increasing Group treatment is associated with reduced risk of re-arrest. Neither individual nor residential treatments are associated with improvement.

- By counties, in King and Pierce counties, none of the types of therapies is associated with changes in risk of re-arrest. In Spokane, both Individual and Group are associated with reduced risk of re-arrest, but residential is not.

- By outcome subgroups, among graduates only group treatment is associated with reduced risk of rearrest. For DNFs, increased amounts of both individual and, to a lesser degree, group are associated with *increased* risk of rearrest. There are no significant relationships between amounts of treatment and re-arrest for either Opt Outs or Ineligibles.

- The sum of individual and group treatment was tested, generally with results similar to the better of the component therapies.

- Methadone maintenance treatment is offered in King county. A separate analysis there showed no overall treatment effect, nor any effect for any of the within county outcome groups.

Looking at the same analyses, but controlling for the annualized number of arrests before drug court referral:

- In all analyses, arrests before drug court is a very strong predictor of increased risk for re-arrest.

- For all subjects combined, only group treatment shows a significant relationship with reduced risk of re-arrest.

- By counties, in King no treatment type shows a significant relationships between amount of therapy and re-arrest. Both Pierce and Spokane show a borderline significant relationship between amount of group treatment and reduced risk of rearrest, and Spokane shows a borderline effect for individual treatment as well.

- By outcome groups (in our judgement the most important analyses), graduates show a significant relationship between amount of group treatment and reduced risk of re-arrest. DNFs show a significant relationship between amount of both individual and group treatment and *increased* risk of re-arrest. Neither opt outs nor ineligibles show any relationships between treatment and re-arrest.

- The sum of individual and group treatment have roughly the pattern and magnitude of results as for group therapy.

- Methadone maintenance treatment is offered in King county. A separate analysis there showed no overall treatment effect, nor any effect for any of the outcome groups there.

Summary. There is not strong relationship between amount of treatment and reduced risk of rearrest. Among graduates, there is support for an association between larger amounts of group treatment received and reduced risk, but the relationship is generally either not present in other groups or is of only borderline significance. Only in Spokane County are larger amounts of treatment associated with reduced risk, and then only when pre court arrest levels are not controlled. Residential treatment is consistently not related to rearrest. In King County, methadone maintenance is not related to rearrest. In the DNFs, higher levels of both individual and group treatment is associated with *increased* risk of re-arrest. There are no relationships among opt-outs or ineligibles.

Convictions

Looking at simple analyses by treatment types (individual, group and residential), with no statistical controls:

- For all subjects combined, there are highly significant relationships between each of individual, group and residential treatment and reduced risk of new convictions.

- By counties, all three counties show high levels of significance between both individual and group therapy and reduced risk, and in Pierce County, residential is significant as well.

- By outcome subgroups, Graduates show significant relationships between individual and group treatment and reduced risk of conviction, but residential shows no effect. There are no significant relationships in any of the other groups.

- In King County, Methadone Maintenance is not associated with changes in risk of re-conviction.

Looking at the same analyses, but controlling for the annualized number of arrests before drug court referral:

- In every analysis, number of arrests before referral to drug court is very strongly linked to increased risks of re-conviction. The remaining analyses here control for this effect.

- For all subjects combined, individual, group and residential therapies all show significant reductions in the risk of re-conviction.

- By counties, both individual and group treatment produce significant reductions in risk of conviction in all three counties. In Pierce County, residential treatment is also significantly associated with reduced risk.

- By outcome subgroups (in our judgement the most important analyses), for Graduates both individual and group therapy are associated with reduced risk of new convictions, but residential is not. No therapy is significant for any of the other groups.

- Summing individual and group gives results similar to those for the individual therapies.

- In King County, Methadone Maintenance is not associated with changes in risk of re-conviction.

Summary. Both group and individual therapy show significant and substantial patterns of reduced risk of new convictions following referral to drug court. This pattern is present for all subjects combined, for each county, and for the Graduate participants, but not for the DNFs. Residential treatment is associated with reduced risk only for all subjects combined and in Pierce County.

Earned Income.

Looking at simple analyses by treatment types (individual, group and residential), with no statistical controls:

- For all subjects combined, both group and individual treatment are strongly related to increased income post referral. Residential treatment is not related to income.

- In all three counties, group therapy is related to increased income. In Pierce and Spokane counties, individual therapy is also significantly related to income, but not in King. Residential treatment is not associated with changes in income.

- Among outcome subgroups, the only significant relationship is that for Graduates days of residential treatment are associated with *reduced* income, conceivably at least partly due to the loss of income that could be related to time in institutions.

Looking at the same analyses, with amount of income in the year before drug court referral as a covariate:

- Income in the year before drug court referral is an extremely strong predictor of income in the year post referral, in all analyses.

- For all subjects combined, both group and individual treatment are strongly related to increased income post referral. Residential treatment is not related to income.

- In all three counties, group therapy is related to increased income. In King and Pierce counties, individual therapy is also significantly related to income, but this relationship is only borderline significant in Spokane.

- Among outcome subgroups (in our judgement the most important analyses), the only significant relationship is between residential treatment days and an increased level of income for Ineligible offenders.

Summary. Whether or not the analyses control for pre-referral income, when outcome subgroups are combined, either across or within counties, increased group therapy is associated with increased income. Generally increased individual therapy is also associated with increased income. This finding is mitigated by the fact that *no* significant relationships are found between treatment and income among the outcome subgroups, which implies that for Graduates and DNFs the amount of treatment received is not a major factor in determining post referral income. It may also suggest that factors related to income before drug court referral figure in selection into drug court.

CONCLUSIONS.

- The service data included in TARGET appear to be incomplete

- Overall, based on the available data, the amount of group and individual treatment being received by drug court participants appears to be adequate.

- There is only very weak evidence for a relationship between higher amounts of group and individual treatment being related to lower risk of re-arrest. This finding does apply to Graduates, but for DNFs the effect is reversed: more therapy is associated with *higher* risk for re-arrest.

- Support for a relationship between higher amounts of group and individual therapy being related to lower risk of re-conviction is stronger. This pattern is found in Graduate but not DNF groups.

- When outcome subgroups are combined, there is a relationship between higher amounts of both group and individual treatment being associated with higher post-referral income. This is not true within subgroups of Graduates or DNFs.

- Residential treatment has no systematic relationships with these outcome variables.

These results suggest a complex relationship between treatment and outcomes. There is some relationship between treatment and re-arrests for Graduates (although it is significant and reversed for DNFs). For re-convictions only Graduates show effects, and for income neither Graduates nor DNFs show significance. Generally when all subjects are combined, there are significant relationships between group and (less strongly) individual treatment and outcomes, but when outcome subgroups are combined within counties, the results are less robust. Usually the effect sizes are modest.

It is easy to find an explanation for the negative direction of results for the DNFs on arrests: troubled participants are given more attention. It may be that the general lack of clear and strong relationships between amount of treatment and outcomes for Graduates is because, in general, they are all getting "enough" treatment, so the outcomes result from the effects of other factors. From a programmatic viewpoint, however, these results suggest that current average levels of treatment are adequate for most participants, and that in general more treatment would not improve outcomes, and less might very well be equally adequate. Higher levels may be indicated for some participants, but this will not assure successful retention or outcomes. Amount of treatment is not a major determinant of outcomes for this data set.

Table 2a
Percent Receiving Individual Therapy and Mean and Median Numbers of Sessions
By Counties and Offender Groups
For All Offenders with One Year of Post Referral Treatment Data

County	Offender Subgroups	Number of Cases	% Cases With any Treatment	Mean Number of Units of Treatment	Standard Deviation	Median	Minimum	Maximum
King	Graduate	290	79.3%	10.8	11.7	7	0	79
	DNF	705	63.1%	5.4	8.3	2	0	55
	Opt Out	1827	11.1%	0.6	3.4	0	0	67
	Ineligible	286	12.9%	0.6	2.6	0	0	23
Pierce	Graduate	259	77.2%	6.8	5.8	7	0	41
	DNF	377	46.2%	2.5	4.2	0	0	25
	Opt Out	386	11.4%	0.5	2.4	0	0	36
	Ineligible	772	8%	0.5	2.4	0	0	36
Spokane	Graduate	73	82.2%	7.5	5.4	7	0	26
	DNF	98	59.2%	3.4	4.4	2	0	19
	Opt Out	317	6.6%	0.3	1.9	0	0	25
	Ineligible	1056	4.9%	0.2	1.3	0	0	19
Skagit	Graduate	21	81%	18	11.1	20.0	0	33
	DNF	16	81.3%	12.8	10.4	10.5	0	40
	Opt Out	1	0%	0	.	0.0	0	0
Total		6643	24.3%	2	5.5	0.0	0	79

Table 2b
Percent Receiving Group Therapy and Mean and Median Numbers of Sessions
By Counties and Offender Groups
For All Offenders with One Year of Post Referral Treatment Data

County	Offender Subgroups	Number of Cases	% Cases With any Treatment	Mean Number of Units of Treatment	Standard Deviation	Median	Minimum	Maximum
King	Graduate	290	82.1%	37.4	29.8	38	0	130
	DNF	705	70.9%	15.8	21.5	6	0	114
	Opt Out	1827	16.3%	1.4	6.9	0	0	185
	Ineligible	286	17.5%	2.1	10.3	0	0	121
Pierce	Graduate	259	76.4%	39.3	28.9	52	0	119
	DNF	377	49.9%	15.1	22.7	0	0	124
	Opt Out	386	17.1%	2.2	6.7	0	0	48
	Ineligible	772	9.2%	1.5	6.2	0	0	54
Spokane	Graduate	73	83.6%	73.3	39.8	89	0	128
	DNF	98	62.2%	31.1	34.7	17	0	119
	Opt Out	317	7.9%	1.1	5.9	0	0	79
	Ineligible	1056	4.2%	0.6	4.1	0	0	62
Skagit	Graduate	21	81.0%	57.1	35.0	60	0	113
	DNF	16	87.5%	35.9	22.4	37	0	78
	Opt Out	1	0.0%	0.0	.	0	0	0
Total		6643	27.5%	8.2	20.0	0	0	185

Table 2c
Percent Receiving Residential Treatment and Mean and Median Numbers of Treatment Days
By Counties and Offender Groups
For All Offenders with One Year of Post Referral Treatment Data

County	Offender Subgroups	Number of Cases	% Cases With any Treatment	Mean Number of Units of Treatment	Standard Deviation	Median	Minimum	Maximum
King	Graduate	290	17.6%	13.7	38.7	0	0	186
	DNF	705	13.8%	6.7	23.2	0	0	218
	Opt Out	1827	3.2%	1.9	13.0	0	0	228
	Ineligible	286	3.8%	1.6	10.0	0	0	89
Pierce	Graduate	259	21.2%	13.0	34.4	0	0	210
	DNF	377	24.7%	11.3	27.6	0	0	230
	Opt Out	386	8.8%	4.2	18.2	0	0	174
	Ineligible	772	7.0%	3.7	17.7	0	0	211
Spokane	Graduate	73	6.8%	1.8	8.3	0	0	59
	DNF	98	17.3%	6.9	19.2	0	0	121
	Opt Out	317	3.8%	1.6	9.8	0	0	94
	Ineligible	1056	5.7%	2.4	13.2	0	0	177
Total		6643	8.2%	4.3	19.2	0	0	230

Table 3a
Mean and Median Units of Individual Therapy
By Counties and Offender Groups
For Offenders with One Year of Post Referral Treatment Data Who Received Individual Therapy

County	Offender Subgroups	Number of Cases	Mean Number of Units of Treatment	Standard Deviation	Median	Minimum	Maximum
King	All	915	9.0	10.1	5	1	79
	Graduate	230	13.7	11.5	10	1	79
	DNF	445	8.5	9.1	5	1	55
	Opt Out	203	5.5	8.9	2	1	67
	Ineligible	37	4.7	5.7	3	1	23
Pierce	All	480	6.9	5.4	6	1	41
	Graduate	200	8.8	5.0	9	1	41
	DNF	174	5.5	4.7	4	1	25
	Opt Out	44	4.5	5.8	3	1	36
	Ineligible	62	6.2	6.2	5	1	36
Spokane	All	191	6.3	4.9	5	1	26
	Graduate	60	9.2	4.5	8.5	1	26
	DNF	58	5.8	4.4	4	1	19
	Opt Out	21	4.7	5.9	3	1	25
	Ineligible	52	4.3	3.9	3	1	19
Skagit	All	30	19.4	8.7	19	8	40
	Graduate	17	22.2	7.3	21	9	33
	DNF	13	15.8	9.2	13	8	40
Total		1616	8.3	8.6	5	1	79

Table 3b
Mean and Median Units of Group Therapy
By Counties and Offender Groups
For Offenders with One Year of Post Referral Treatment Data Who Received Group Therapy

County	Offender Subgroups	Number of Cases	Mean Number of Units of Treatment	Standard Deviation	Median	Minimum	Maximum
King	All	1085	23.2	25.5	12	1	185
	Graduate	238	45.6	26.6	47.5	1	130
	DNF	500	22.3	22.6	14	1	114
	Opt Out	297	8.6	15.1	4	1	185
	Ineligible	50	12.1	22.1	3	1	121
Pierce	All	523	34.1	25.5	33	1	124
	Graduate	198	51.5	21.6	54	1	119
	DNF	188	30.2	24.1	24	1	124
	Opt Out	66	12.8	11.2	9	1	48
	Ineligible	71	15.9	13.8	14	1	54
Spokane	All	191	49.2	38.8	43	1	128
	Graduate	61	87.7	24.9	92	5	128
	DNF	61	50.0	31.5	53	1	119
	Opt Out	25	14.3	16.2	10	1	79
	Ineligible	44	14.4	14.2	10	1	62
Skagit	All	31	57.3	25.6	54	5	113
	Graduate	17	70.6	22.9	65	26	113
	DNF	14	41.1	18.8	43.5	5	78
Total		1830	29.6	28.6	20	1	185

Table 3c
Mean and Median Units of Residential Treatment
By Counties and Offender Groups
For Offenders with One Year of Post Referral Treatment Data Who Received Residential Treatment

County	Offender Subgroups	Number of Cases	Mean Number of Units of Treatment	Standard Deviation	Median	Minimum	Maximum
King	All	218	57.6	48.8	46	1	228
	Graduate	51	77.8	59.8	63	1	186
	DNF	97	48.8	43.3	37	1	218
	Opt Out	59	57.4	45.3	59	1	228
	Ineligible	11	42.6	30.5	33	4	89
Pierce	All	236	51.4	43.5	30.5	1	230
	Graduate	55	61.0	51.5	42	8	210
	DNF	93	46.0	38.7	28	3	230
	Opt Out	34	47.5	41.8	24.5	3	174
	Ineligible	54	53.4	43.0	53.5	1	211
Spokane	All	94	40.7	34.5	28	1	177
	Graduate	5	26.2	20.7	21	2	59
	DNF	17	39.9	29.0	29	10	121
	Opt Out	12	41.9	30.6	27.5	8	94
	Ineligible	60	41.9	37.7	27.5	1	177
	Total	548	52.0	44.7	33	1	230