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A Preliminary Case Mix Model for Adult Protective Services Clients in Maine

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A PRELIMINARY CASE MIX MODEL
FOR ADULT PROTECTIVE SERVICES
CLIENTS IN MAINE



MUSKIE
SCHOOL

**A PRELIMINARY CASE MIX MODEL
FOR ADULT PROTECTIVE SERVICES
CLIENTS IN MAINE**

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EXECUTIVE SUMMARY

The purpose of this study was to develop a case mix classification system for Adult Protective Services (APS) cases in Maine to help establish more equitable distribution of case worker assignments. No model currently exists that classifies clients based on their characteristics and the time required of APS caseworkers. This preliminary case mix system was developed to weight individual APS clients (cases) based on their individual characteristics such as age and medication compliance.

The case mix model is based on a time study conducted on APS clients served during a two-week period in May and June of 1999. The Muskie School of Public Service collected data in cooperation with staff from the twelve APS offices throughout Maine. Client data were obtained from existing client records and time study questionnaires. The time study and client data provided information on the amount of time it took to assist clients with varying characteristics, which in turn was used to develop the case mix groups.

In examining the options for a case mix system for APS clients, a number of models were considered to determine which factors had the greatest influence on the amount of time staff spent serving clients. The case mix model using the variable *court time involvement* as its starting point was chosen because it explained the greatest amount of variation in the direct time caseworkers spent with or on behalf of their clients. Moreover, this factor made sense (had the greatest face validity) to APS professionals. Additional information on other models tested is included in Appendix A.

The selected case mix model explained almost 20% of the variation in the direct time caseworkers and aides spent serving clients. The model categorizes clients using court time involvement, compliance with medications, stability of living arrangement, age, a dementia diagnosis, hospitalization in the past 90 days, and whether or not the client required guardianship (GX70) or investigation services (AR11/AS11). Using these eight client-specific items, this case mix model results in 14 case mix groups.

Table 1 shows each of these 14 groups, the average amount of direct staff time expended to serve APS clients (*Mean Minutes*), and the *case mix weight* assigned to that group. The case mix weight is calculated for each group by dividing the average amount of direct time spent on group members by the average amount of time spent on the baseline group (the group against which all other groups were compared). The baseline group (highlighted in Table 1) includes clients who were the least resource intensive. The clients in this group were 65 years of age or older, lived in a stable living arrangement (primarily nursing homes and residential care), were always compliant with their medications, and required no court time. By comparing the first group shown in Table 1, (court time involvement and guardianship cases) with the baseline group, the case mix weight for the first group is set at 5.97. The first group required 488 minutes which is 5.97 times more than the direct time required by the baseline group (81.7 minutes). This number is referred to as the *case mix weight*. A case mix weight was calculated for each group in the model (see *Case Mix Weight* column on Table 1).

**Table 1:
APS Case Mix Model**

CASE MIX GROUPS	MEAN MINUTES	CASE MIX WEIGHT
1.) COURT TIME		
GX70 - Yes	488	5.97
GX70 - No	356.3	4.36
2.) NO COURT TIME		
Stable Living Arrangement		
• Compliant with medications – Never or almost never	310.9	3.81
• Compliant with medications - Somewhat, almost always, no medications		
GX70 case and hospitalized in last 90 days	276.7	3.39
GX70 case and no hospitalization in last 90 days	161.3	1.97
Not a GX70 case	121.1	1.48
• Compliant with medications - Always		
>= Age 65 and an AR11/AS11 case	141.3	1.73
>= Age 65 and not an AR11/AS11 case*	81.7	1.00
< Age 65 and hospitalized in last 90 days	264.3	3.24
< Age 65 and no hospitalization in last 90 days	151.8	1.86
Unstable Living Arrangement		
• GX70 and dementia diagnosis	239.3	2.93
• GX70 and no dementia diagnosis	386.7	4.73
• Not a GX70 case and dementia diagnosis	267.6	3.28
• Not a GX70 case and no dementia diagnosis	133.5	1.63

* Baseline group

Note: GX70 refers to public guardianship cases and AR11/AS11 refer to investigation cases.

Case mix groups and weights are needed to better understand the differences in resource use requirements across APS clients. Without it, caseload allocation is determined by the number of clients per caseworker, without regard for the specific characteristics of the clients or the time they require. Application of such a case mix classification system will allow APS management to allocate caseloads among caseworkers staff more equitably.

OVERVIEW

The purpose of this study was to develop a case mix classification system for Adult Protective Services (APS) cases in Maine. As no model currently exists that classifies clients based on varying conditions and characteristics, a preliminary case mix system was developed where individual APS clients (cases) are weighted based on characteristics such as age and medication compliance. Application of such a case mix classification system would allow APS management to better allocate equitable and manageable caseloads among caseworker staff.

The development of this preliminary model was based on a time study of APS clients during May and June 1999 conducted by the Muskie School of Public Service at the University of Southern Maine in cooperation with staff from the 12 APS offices throughout Maine. Time study data were collected by staff providing services to these clients and additional client data were obtained detailing client characteristics. The time study and client data provided information on the amount of time it took to care for people with different conditions and characteristics, which was then used to develop case mix groupings.

This paper is organized in two sections. Section I describes the caseworker time study and the recommended case mix groups. Section II provides practical information on the caseworker time study results such as the actual full time equivalent (FTE) work effort and time expended during the time study, projections of the required staffing to serve APS clients, and the application of the case mix algorithm to the APS clients served during the time study. These numbers are presented at the state and regional levels.

BACKGROUND

The Adult Protective Services program run by the Maine Bureau of Elder and Adult Services investigates allegations of abuse, neglect or exploitation of adults age 18 years and older. In addition, the APS program provides protective services, petitions Probate Court to become public guardian or conservator for incapacitated individuals who cannot direct their own affairs, and manages assets of public wards. The program serves approximately 3,600 people annually including 603 individuals in public guardianship.

APS cases have grown dramatically over the past decade while staffing and funding levels for such services have not grown at similar rates. While workload studies have been conducted by several states recommending optimal caseloads for APS caseworkers¹, they did not consider the amount of time required to manage each case based on its unique set of client circumstances. The development of an APS case mix classification system provides an estimate of appropriate caseloads based on the time required to serve each client and their individual situation.

¹ In a compilation report of these workload studies, the National Association of Adult Protective Services Administrators recommended that APS caseloads not exceed 25 cases (NAAPSA, 1997).

I. A Preliminary Model for an Adult Protective Services Case Mix System in Maine

The goal of this study was to propose a case mix classification system for application in caseload distribution. Similar to the Medicaid and Medicare nursing home case mix classification systems developed and implemented over the past decade, the APS model permits the identification of APS clients who are resource intensive. Unlike the Medicaid and Medicare case mix systems, this information will not be used for reimbursement purposes but is proposed for use to assure equitable caseload distribution among caseworkers.

This section describes the methodology for the development of the APS case mix model, the findings of the analysis from which the model was derived, and a detailed description of the model.

A. Methodology

The development of a classification system requires information and input from a number of sources. For this model the sources included: 1.) measurements of direct staff time spent with or on behalf of clients; 2.) a reliable assessment instrument that identifies the characteristics of APS clients; and 3.) input from staff who work with APS clients.

1. Measurements of Direct Staff Time Spent with or on Behalf of Clients

APS staff in 12 offices in Maine participated in a time study over a two-week period from May 26th through June 8th, 1999. This time frame captured periods when client direct time was likely to be greatest: a holiday (Memorial Day), the end of the month, and public benefit check arrival at the beginning of the month. During this period, 66 APS caseworkers, case managers, investigators, and managers recorded their client specific (direct time) and non-client specific time.

For purposes of developing the case mix model, *client specific time* was broken out by the following tasks: 1.) time spent with the client or on behalf of the client on the phone or in person, 2.) completing documentation, 3.) discussing a client with a supervisor, 4.) discussing a client with a case aide, and 5.) transit time. *Non-client specific time* was recorded as a total amount per day. Non-client specific time included staff meetings, training and other administrative tasks.

2. A Reliable Assessment Instrument that Identifies the Characteristics of APS Clients

APS staff provided *face sheets* for each client encountered during the time study. This existing form is completed by caseworkers for each new client and subsequently each time a change is made to the status of the case. Information from the face sheet used in the analysis included birth date, gender, region (location of residence), marital status, ethnicity, living arrangement, and program objective code describing the type of case (i.e. public guardianship, investigation, etc.).

Additionally, caseworkers completed a data sheet on each client encountered during the time study. Caseworkers were asked to complete a checklist of medical diagnoses and to write in other diagnoses not included on the checklist. Other items on the data sheet completed for this study included whether the client takes prescription drugs; a rating of the client's compliance with his/her medications program on a scale of 1 (never) to 5 (always); whether the client's living arrangement had been stable over the past 30 days; and whether the client had been hospitalized in the past 90 days.

Finally, the date the client was first served by Adult Protective Services was obtained to calculate the amount of time the client had been in the APS system and the number of times an APS case had been opened and closed for each client.

3. Input from Staff Who Work with APS Clients

Prior to the time study, Muskie School researchers met with APS supervisors and caseworkers to discuss the planning of the study and important client characteristics to capture including clinical and demographic information. In April, caseworkers in the Portland office participated in a two-day pilot time study to evaluate the process and the data collection instruments and to recommend improvements. Changes were made to the process and instruments in preparation for statewide training and implementation. In May, Muskie researchers traveled across the state to APS office locations to train APS staff on the time study and data collection process. The collection of data was monitored by reviewing frequent submissions of data throughout the time study and assistance was available by phone for questions.

Following analysis of the time study data, Muskie staff met with APS management to present preliminary findings and discuss the face validity and applicability of the recommended case mix model.

B. Analytic Approach

Time study data and client information were combined into a single analytic file at the client level. In this way, the analysis focused on the amount of time spent on behalf of clients with certain characteristics and it was possible to match client characteristics with client-specific staff time. For purposes of this analysis, a number of analytic approaches were used. The principal technique used was the Automatic Interactions Detection (AID) in an interactive application called PC-Group which was used in the development of the nursing home case mix groups. Bivariate analyses were also used to define the study population and multiple regression techniques were used to test alternative models for a classification system.

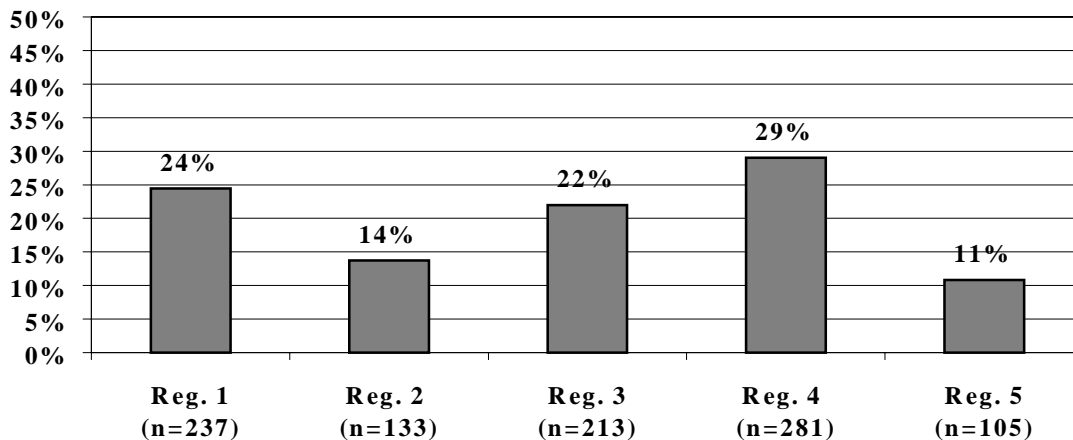
The dependent variable used for this analysis was client-specific time referred to throughout this report as *direct time*. Direct time is time spent either directly with a client or directly on behalf of a client by APS staff. The variables used to explain variation in direct time were the client demographic, clinical, and historical information collected from the data sources mentioned above (also see list of variables in Table 4). Global diagnoses variables were created by collapsing several diagnoses into one group. They included *mental illness*, *severe mental illness*, *other mental illness*, and *chronic physical illness*. The *mental illness* item included anxiety

disorder, bipolar disorder, severe depression, schizophrenia, schizoaffective disorder, personality disorder, post traumatic stress disorder, and other psychoses. *Severe mental illness* included bipolar disorder, schizophrenia, schizoaffective disorder, and other psychoses. *Other mental illness* included schizoaffective disorder, personality disorder, post traumatic stress disorder, and other psychoses. *Chronic physical illness* included Chronic Obstructive Pulmonary Disease (COPD), emphysema, Parkinson's disease, diabetes, coronary artery disease, congestive heart failure, arterisclerotic heart disease, cardiovascular disease, and other heart problems.

C. Study Population

APS staff interacted with or on behalf of 1,129 clients during the time study period. Due to data analysis constraints, only clients for whom all data were available were included in our study. For example, some clients had missing values on one or more of the items used to explain direct time such as compliance with medications or stable living arrangement, and had to be excluded from the analysis. In total, 160 clients or 15% of the APS clients were excluded yielding a study population of 969 clients. The client distribution across the five APS regions is shown in Figure 1. The majority of APS clients were served in Region 1 (Portland, Biddeford), Region 3 (Augusta, Rockland) and Region 4 (Bangor, Ellsworth, Machias, Calais). Region 2 serves Lewiston and Region 5 serves Houlton, Caribou, and Ft. Kent.

**Figure 1:
Distribution of APS Clients Served
During Time Study Period**



D. Findings

1. APS Client Characteristics

The average age of the APS study population was 68 years, ranging from 18 to 103 years. Approximately one-third of the study population or 344 clients were younger than 65 year of age and slightly more than two-thirds or 625 clients were age 65 or older. Both age groups were similar in their living arrangement with approximately one-fifth of each age group living alone (Table 2).

Greater than 90 percent of both age groups were taking prescription drugs but their compliance varied between groups with the older population 14.3% more likely to *always* take their medications. The older population was less likely to have experienced an unstable living arrangement in the past 30 days, to have been hospitalized in the past 90 days, or to have APS staff spend time in court with them or on their behalf.

Clients in the older group were 10.5 percent more likely be assigned as *at risk* of danger and APS staff were in the process of determining if incapacitation, dependency, and/or danger existed to a degree requiring protective services (an AR11 or AS11 case). Clients in the younger group were 10.7 percent more likely to have the State of Maine acting as public guardian or conservator for the client (a GX70 case).

Table 2
Characteristics of APS Time Study Clients (n=969)

Characteristics	Under Age 65 (n=344)	Age 65 and Older (n=625)
Lives alone	20.3%	19.2%
Client takes prescription drugs	93.6%	91.8%
Compliance with medications		
Always*	47.2%	61.5%
Sometimes/almost always	52.5%	37.6%
Never	0.3%	0.9%
Stable living arrangement (last 30 days)*	79.9%	84.6%
Hospitalized (last 90 days)*	30.8%	23.5%
Court time involved*	3.2%	1.6%
New Client (< 12 months)*	21.8%	31.7%
Incapacitated adults – complete study and make report (AN11/AC11)	7.0%	5.8%
Adults at risk – investigate (AR11/AS11)*	14.8%	25.3%
Public guardianship (GX70)*	65.4%	54.7%

*T-Test p<.01

Table 3 shows the medical diagnoses and conditions of the APS clients by age (divided into two groups of those under the age of 65 and those age 65 and older). Diagnoses occurring in less than 3 percent of the population were excluded as were individual mental illness diagnoses.

Table 3
Diagnoses and Medical Conditions of APS Clients by Age (n=969)

Diagnosis	% Clients under age 65 (n=344)	Diagnosis	% Clients age 65 and older (n=625)
Mental illness diagnosis*	78.5%	Dementia diagnosis*	62.7%
Diabetes*	14.5%	Mental illness diagnosis*	41.6%
Dementia diagnosis*	14.2%	Congestive heart failure*	20.3%
TBI head injury	12.8%	Diabetes*	19.4%
Emphysema or COPD diagnosis*	12.8%	Emphysema or COPD diagnosis*	18.6%
Substance Abuse*	9.3%	CVA/Stroke*	6.1%
Mental retardation	5.5%	Other Heart Problems	5.1%
CVA/Stroke*	4.9%	Thyroid Disorder*	4.6%
Seizure Disorder	4.4%	Parkinson's disease	4.2%
Congestive heart failure*	3.5%	Substance Abuse*	4.0%
Thyroid disorder*	3.2%	Arteriosclerotic heart disease	3.0%

* Diagnoses common to both age groups

As Table 3 shows, the most common diagnosis for APS clients under age 65 was mental illness with 78.5 percent of the population or 270 clients reported as having this condition. Other diagnoses occurred in less than 15 percent of the population, with diabetes (14.5%), dementia (14.2%), traumatic brain injury (12.8%), and emphysema or COPD (12.8%) reported as the most commonly occurring diseases.

The most common diagnosis for clients age 65 and older was dementia, with 62.7 percent or 392 clients reported as having this condition. Other common diagnoses included mental illness (41.6%), congestive heart failure (20.3%), diabetes (19.4%), and emphysema or COPD (18.6%). Other diagnoses occurred in less than 7 percent of the population.

2. Client Direct Time

The average amount of direct time spent on each client during the time study (n=969) was 153.5 minutes or 15.35 minutes per client per day over the 10-day period. Direct time varied significantly across clients ranging from 1 minute to 1,277 minutes or 21.28 hours over the study period.

3. Analysis of Variance

An analysis of variance test was conducted for all clients in the time study using client direct time. Each of the client characteristics and conditions listed in Table 4 was analyzed to determine whether or not they could explain differences or *variance* in direct time across clients.

The analysis software (PC Group) provided the amount of variance explained (*Percent* column) and a recommended number of groups the full set of clients should be broken out into (*No. of Groups* column).

For example, when the variable *age 65 and older* was analyzed, it explained 2 percent of the variation in direct time. For individuals 64 years old and younger, the average amount of direct time was 188.6 minutes compared to the average time for clients 65 years and older which was 134.1 minutes. As a result, on average, a client who is younger than 65 years of age requires more direct time than a client who is age 65 or older, and that age accounts for 2 percent of the variation in direct time among all clients.

Table 4
Variance Explanation for Key Variables

Variance Explained	Percent	No. of Groups	Variance Explained	Percent	No. of Groups
Age**	2.3	2.0	TBI head injury	N/R*	
Age 65 and older**	2.0	2.0	Congestive heart failure	N/R*	
Medications?	N/R*		COPD	N/R*	
Compliant with medications	3.1	3.0	Emphysema	N/R*	
Stable living arrangement in last 90 days	2.7	2.0	Diabetes	N/R*	
Hospitalized last 90 days	3.0	2.0	End-stage renal failure	N/R*	
Lives alone	N/R*		Coronary Artery Disease	N/R*	
Court time involved	4.6	2.0	Arteriosclerotic heart disease	N/R*	
Time in APS system (months)	N/R*		Other Heart Problems	N/R*	
New Client (< 12 months)	N/R*		CVA/Stroke	N/R*	
Number of open and closed cases	N/R*		Parkinson's disease	N/R*	
Region of residence	N/R*		Mental retardation	N/R*	
Incapacitated adults – remove from danger (AI24/AD24)	N/R*		Substance Abuse	N/R*	
Incapacitated adults – complete study (AN11/AC11)	N/R*		Cancer	N/R*	
Adults at risk – investigate (AR11/AS11)	N/R*		Seizure Disorder	N/R*	
Public guardianship (GX70)	N/R*		Thyroid Disorder	N/R*	
Anxiety disorder	N/R*		Hip Fractures	N/R*	
Bipolar affective	N/R*		Other Fractures	N/R*	
Severe depression	N/R*		Chronic Physical Illness diagnoses	N/R*	
Schizophrenia	N/R*		Diagnoses Count	N/R*	
Post traumatic stress disorder	N/R*		Emphysema or COPD diagnosis	N/R*	
Schizoaffective Disorder	N/R*		Mental Illness diagnosis	N/R*	
Personality Disorder	N/R*		Other Mental illness diagnosis	1.2	2.0
Other Psychoses	N/R*		Severe Mental illness diagnosis	N/R*	
Dementia diagnosis	N/R*				

*N/R indicates that the analysis software (PC Group) did not recommend grouping for these variables due to an explained variance of less than 1%.

** The first age variable (age) is continuous and PC Group recommended two groupings: 18-63 years and 64 to 103 years. The second age variable (age 65 and older) is dichotomous with two groupings: 18-64 years and 65 to 103 years. For ease of reporting, the second age variable, age 65 and older, was selected for use in our analysis.

The variables that explained the most variation in direct time were age, compliance with medications, stable living arrangement, hospitalization, court time, and diagnoses included in the “other mental illness” item (schizoaffective disorder, personality disorder, post traumatic stress disorder, and other psychoses). Individual diagnoses explained less than 1% of direct time, as did lived alone, region of residence, how long the client was in the APS system, and type of case (i.e. guardianship, investigation, competency, etc.).

4. Preliminary APS Case Mix Model

In examining the options for a case mix system for APS clients, a number of models were considered. To begin, clients were classified according to the following groupings: *age 65 and older*; *compliance with medications*; *hospitalized in the past 90 days*; and *court time involvement*. The grouping or model using *compliance with medications* did not explain as much variation in direct time as the other three and was excluded from further consideration.

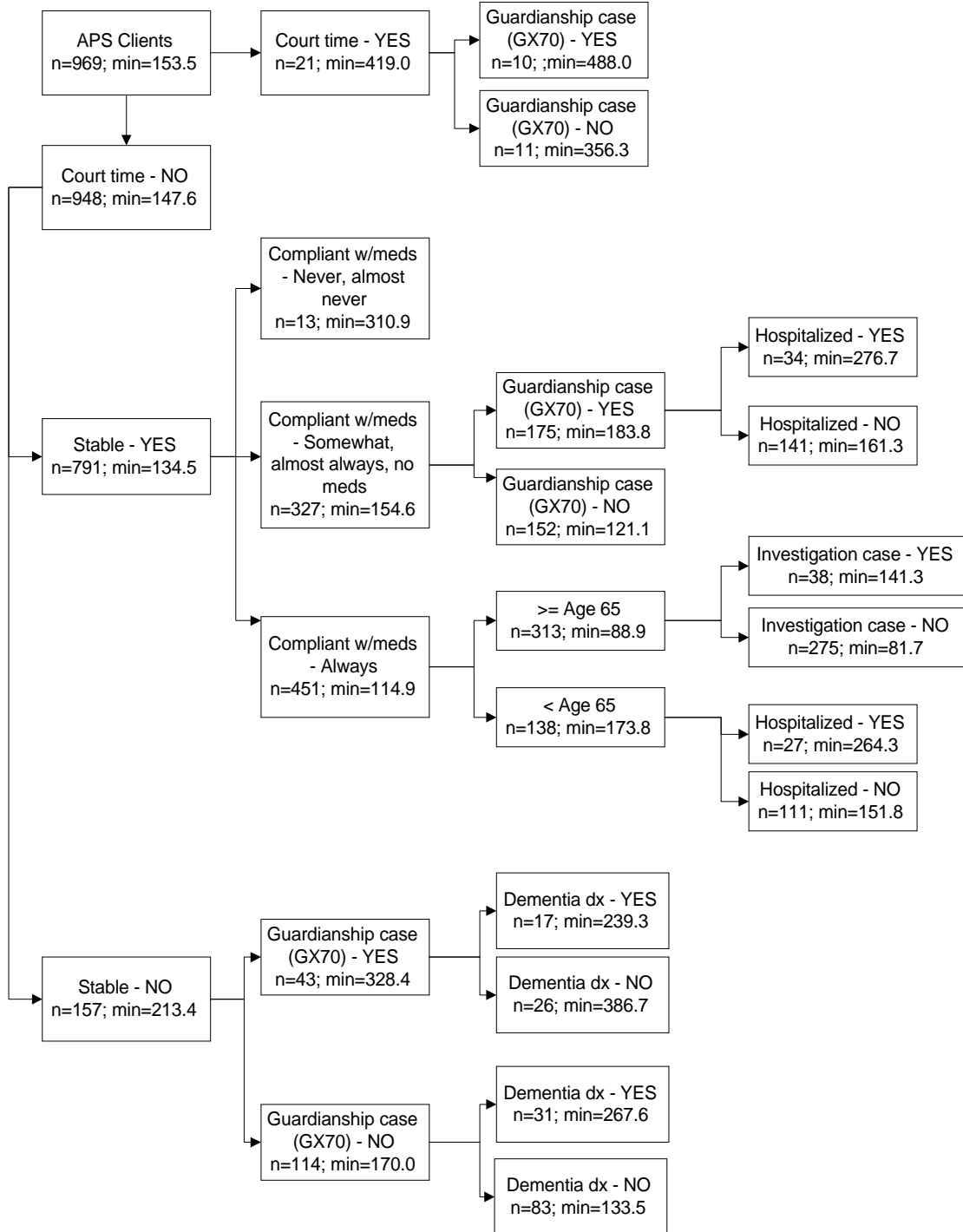
The remaining three models were presented to a group of APS supervisors. The case mix model using the variable *court time involvement* as its starting point was recommended because it explained the greatest variance in direct time. Moreover, this factor had the greatest face validity to APS professionals. For additional information on the other two models, refer to Appendix A.

In the recommended case mix model (refer to Figure 2 on the following page), almost 20% (19.31%) of the variation in the direct time caseworkers and aides spent serving clients was explained by classifying clients into groups using *court time involvement*, *compliance with medications*, *stability of living arrangement*, *age*, *a dementia diagnosis* (e.g., schizoaffective, personality disorder, post traumatic stress disorder, and other psychoses), *hospitalization in the past 90 days*, and *whether or not the case was a guardianship case (GX70) or investigation case (AR11/AS11)*.

Whether or not the caseworker spent time in court with the client or on behalf of the client accounted for the largest variation in direct time among clients (4.6%). On average, clients who had court time (n=21) required 419 minutes of direct time compared to 147.6 minutes of direct time required by clients who were not involved with the courts (n=948). As a result, court time was the starting point for developing the case mix model.

The analysis proceeded by again considering how each of the characteristics and conditions shown in Table 4 might explain variation in direct time among the clients *within each of these subgroups* (court time=yes and court time=no). For clients with court time, the item that explained the greatest variation in direct time was the assignment of their case as “GX70” meaning public guardianship or public conservatorship. Clients with court time who were public guardianship cases required 488 minutes of direct time compared to 356.3 minutes required by clients with court time who were not public guardianship cases. Each of these new subgroups were analyzed and no further explanations of significant variance could be made, that is, no further subgroups were recommended. These two end groups are referred to as *end nodes* and their relevance will become apparent as further explanation of the model is made.

Model 1
Explanation of Variance for APS Client Direct Time
Variance Reduction 19.31%



For clients with no court time (n=948), whether or not they lived in a stable arrangement over the past 30 days was selected as the most desired explanatory variable. As expected, the 157 clients with an unstable living arrangement required a significantly greater amount of direct time (213.4 minutes) compared to the 791 clients who lived in a stable arrangement (134.5 minutes). For clients with a stable living arrangement, compliance with medications was selected as the next set of groupings. Three groups were recommended: 1) never or almost never compliant; 2) somewhat or always compliant or no medications taken, and; 3) always compliant. Clients who were never or almost never compliant with their medications (n=13) were the most resource intensive group requiring nearly twice as much direct time as the other two groups. No further breakdown of this group was recommended, and it is categorized as an *end node*.

Clients with no court time living in a stable arrangement who were somewhat or almost always compliant with their medications or who took no medications (n=327) were further classified by whether or not they were a guardianship case (GX70). Clients who were not classified as a guardianship case required less direct time than those who were guardianship cases and no further groupings were recommended (*end node*). Guardianship (GX70) cases were further classified by whether the client had been hospitalized in the past 90 days and no further groups were recommended (*end nodes*).

Clients with no court time living in a stable arrangement who were always compliant with their medications (n=451) were classified by age (65 years and older vs. under 65 years). Older clients were further classified by whether or not they were an investigation case (AR11/AS11). Younger clients were further classified by whether they had been hospitalized in the past 90 days.

Clients with no court time who lived in an unstable living arrangement were classified by whether their case was a guardianship case (GX70) and whether they had a diagnosis of dementia.

Table 5 shows each of the fourteen *end node* groups, the number of clients in each group, the average direct time for the group (*Mean Minutes*), and a *Case Mix Weight*. As mentioned earlier, each end node is a group for which PC Group recommended no further break down. No additional characteristics or conditions could explain significantly more variation in client direct time. Looking down the *Mean Minutes* column, note the group that has been highlighted. This group of clients required the least amount of direct time on average (81.7 minutes). These clients had no court time, lived in a stable living arrangement, were always compliant with their medications, 65 years of age or older, and were not classified as an investigation case (AR11/AS11). To compare one group against another, this group was used as the *baseline group* in the analysis.

The baseline group was compared to the first group shown in Table 5: *clients with court time who were classified as a guardianship case*. This group required 488 minutes of direct time during the time study. If 488 minutes is divided by the direct time of the baseline group (81.7 minutes), we find that this group required 5.97 times as much direct time as the baseline group. This number is referred to as the *case mix weight*. A case mix weight was calculated for each

group in the model (see *Case Mix Weight* column). Groups in the model are referred to as *case mix groups*.

Table 5
Preliminary APS Case Mix Model
Variance Reduction 19.31%

CASE MIX GROUPS	MEAN MINUTES	CASE MIX WEIGHT
1.) COURT TIME		
GX70 - Yes	488	5.97
GX70 - No	356.3	4.36
2.) NO COURT TIME		
Stable Living Arrangement		
• Compliant with medications – Never or almost never	310.9	3.81
• Compliant with medications - Somewhat, almost always, no medications		
GX70 case and hospitalized in last 90 days	276.7	3.39
GX70 case and no hospitalization in last 90 days	161.3	1.97
Not a GX70 case	121.1	1.48
• Compliant with medications - Always		
>= Age 65 and an AR11/AS11 case	141.3	1.73
>= Age 65 and not an AR11/AS11 case*	81.7	1.00
< Age 65 and hospitalized in last 90 days	264.3	3.24
< Age 65 and no hospitalization in last 90 days	151.8	1.86
Unstable Living Arrangement		
• GX70 and dementia diagnosis	239.3	2.93
• GX70 and no dementia diagnosis	386.7	4.73
• Not a GX70 case and dementia diagnosis	267.6	3.28
• Not a GX70 case and no dementia diagnosis	133.5	1.63

* Baseline group

5. Characteristics of the Case Mix Groups

The average age, living arrangement, and the most frequent medical diagnoses and conditions for each of the fourteen case mix groups were analyzed to better understand the clients categorized in these groups (Tables 6.1 - 6.14). Within each group, the living arrangement and medical diagnoses/conditions are presented in ascending order of frequency. Only the most common diagnoses (10% or more) are included in the tables.

Tables 6.1 – 6.14
The Fourteen Groupings of the APS Case Mix Model

Table 6.1: Court time: Guardianship Case (GX70) (n=10)

Case Mix Weight	5.97
Age (average)	61.7
Living Arrangement:	
Nursing home	50.0%
Hospital/Other medical facility	20.0%
Lives alone	10.0%
Resident/group home	10.0%
Institution	10.0%
Medical Diagnoses/Conditions:	
Mental Illness diagnosis	70.0%
Dementia diagnosis	50.0%
Diabetes	30.0%
Mental retardation	10.0%
Cancer	10.0%
Thyroid Disorder	10.0%

Table 6.4: No court time: Stable, never or almost never compliant w/meds(n=13)

Case Mix Weight	3.81
Age (average)	66.46
Living Arrangement:	
Lives alone	30.8%
Lives with family or non-relative	23.1%
Adult boarding home	15.4%
Hospital/Other medical facility	15.4%
Resident/group home	7.7%
Nursing home	7.7%
Medical Diagnoses/Conditions:	
Mental Illness diagnosis	76.9%
Dementia diagnosis	53.8%
Diabetes	23.1%
Substance Abuse	15.4%

Table 6.2: No court time: Unstable, GX70 case, no dementia dx (n=26)

Case Mix Weight	4.73
Age (average)	44.42
Living Arrangement:	
Lives alone	23.1%
Resident/group home	15.4%
Nursing home	15.4%
Lives with family or non-relative	11.5%
Institution	11.5%
Adult boarding home	7.7%
Hospital/Other medical facility	7.7%
Other living arrangement	7.7%
Medical Diagnoses/Conditions:	
Mental Illness diagnosis	88.5%
Diabetes	30.8%
TBI head injury	23.1%
Emphysema or COPD diagnosis	19.2%

Table 6.5: No court time: Stable, somewhat, almost always compliant or no meds, GX70, hospitalized (n=34)

Case Mix Weight	3.39
Age (average)	57.56
Living Arrangement:	
Adult boarding home	23.5%
Nursing home	23.5%
Lives alone	17.6%
Resident/group home	17.6%
Institution	8.8%
Hospital/Other medical facility	5.9%
Lives with family or non-relative	2.9%
Medical Diagnoses/Conditions:	
Mental Illness diagnosis	73.5%
Dementia diagnosis	38.2%
Emphysema or COPD diagnosis	32.4%
Congestive heart failure	17.6%

Table 6.3: Court time: Not a Guardianship case (n=11)

Case Mix Weight	4.36
Age (average)	58.55
Living Arrangement:	
Lives with family or non-relative	36.4%
Lives alone	18.2%
Hospital/Other medical facility	18.2%
Resident/group home	9.1%
Nursing home	9.1%
Institution	9.1%
Medical diagnoses/conditions*	
Dementia diagnosis	54.5%
Mental Illness diagnosis	36.4%
Emphysema or COPD diagnosis	27.3%
TBI head injury	18.2%
Cancer	18.2%

Table 6.6: No court time: Unstable, not a GX70 case, dementia dx(n=31)

Case Mix Weight	3.28
Age (average)	77.26
Living Arrangement:	
Lives alone	29.0%
Lives with family or non-relative	29.0%
Nursing home	16.1%
Adult boarding home	9.7%
Hospital/Other medical facility	9.7%
Institution	6.5%
Medical Diagnoses/Conditions:	
Dementia diagnosis	100.0%
Mental Illness diagnosis	29.0%
Diabetes	25.8%
Congestive heart failure	25.8%

Tables 6.1 – 6.14
The Fourteen Groupings of the APS Case Mix Model

Table 6.7: No court time: Stable, always compliant w/meds, under age 65, hospitalized (n=27)

Case Mix Weight	3.24
Age (average)	46.52
Living Arrangement:	
Institution	22.2%
Lives with family or non-relative	18.5%
Adult boarding home	14.8%
Nursing home	14.8%
Lives alone	11.1%
Resident/group home	11.1%
Hospital/Other medical facility	7.4%
Medical Diagnoses/Conditions:	
Mental Illness diagnosis	
Dementia diagnosis	18.5%
TBI head injury	14.8%
Diabetes	14.8%
CVA/Stroke	14.8%
Emphysema or COPD diagnosis	11.1%

Table 6.9: No court time: Stable, always compliant w/meds, under age 65, not hospitalized (n=111)

Case Mix Weight	1.86
Age (average)	47.88
Living Arrangement:	
Resident/group home	29.7%
Adult boarding home	24.3%
Nursing home	15.3%
Lives alone	14.4%
Lives with family or non-relative	7.2%
Institution	4.5%
Hospital/Other medical facility	3.6%
Other living arrangement	0.9%
Medical Diagnoses/Conditions:	
Mental Illness diagnosis	81.1%
Dementia diagnosis	16.2%
TBI head injury	12.6%
Diabetes	10.8%

Table 6.8: No court time: Unstable, GX70 case, dementia dx(n=17)

Case Mix Weight	2.93
Age (average)	77.47
Living Arrangement:	
Hospital/Other medical facility	52.9%
Resident/group home	29.4%
Lives with family or non-relative	11.8%
Adult boarding home	5.9%
Lives alone	
Medical Diagnoses/Conditions:	
Dementia diagnosis	100.0%
Mental Illness diagnosis	52.9%
Emphysema or COPD diagnosis	41.2%
Diabetes	29.4%
CVA/Stroke	17.6%
Congestive heart failure	11.8%
Other Heart Problems	11.8%
Other Fractures	11.8%

Table 6.10: No court time: Stable, always compliant w/meds, age65+, AR11/AS11 case (n=38)

Case Mix Weight	1.73
Age (average)	79.82
Living Arrangement:	
Lives with family or non-relative	34.2%
Nursing home	31.6%
Lives alone	18.4%
Adult boarding home	7.9%
Hospital/Other medical facility	5.3%
Resident/group home	2.6%
Medical Diagnoses/Conditions:	
Dementia diagnosis	31.6%
Mental Illness diagnosis	21.1%
CVA/Stroke	18.4%
Congestive heart failure	15.8%
Emphysema or COPD diagnosis	10.5%
Diabetes	10.5%

Tables 6.1 – 6.14
The Fourteen Groupings of the APS Case Mix Model

Table 6.11: No court time: Stable, somewhat, almost always compliant or no meds, GX70 case, not hospitalized (n=141)

Case Mix Weight	1.98
Age (average)	64.15
Living Arrangement:	
Nursing home	29.8%
Adult boarding home	28.4%
Resident/group home	17.0%
Lives alone	14.9%
Lives with family or non-relative	3.5%
Institution	3.5%
Hospital/Other medical facility	1.4%
Other living arrangement	1.4%
Medical Diagnoses/Conditions:	
Mental Illness diagnosis	71.6%
Dementia diagnosis	42.6%
Emphysema or COPD diagnosis	15.6%
Diabetes	12.1%
Congestive heart failure	10.6%

Table 6.13: No court time: Unstable, not a GX70 case, no dementia dx (n=83)

Case Mix Weight	1.63
Age (average)	62.27
Living Arrangement:	
Lives with family or non-relative	45.8%
Lives alone	26.5%
Nursing home	8.4%
Institution	8.4%
Hospital/Other medical facility	7.2%
Adult boarding home	1.2%
Resident/group home	1.2%
Other living arrangement	1.2%
Medical Diagnoses/Conditions:	
Mental Illness diagnosis	56.6%
Diabetes	22.9%
Congestive heart failure	22.9%
Emphysema or COPD diagnosis	16.9%
Other Heart Problems	12.0%

Table 6.12: No court time: Stable, somewhat, almost always compliant or no meds, not a GX70 case (n=152)

Case Mix Weight	1.48
Age (average)	70.99
Living Arrangement:	
Lives alone	51.3%
Lives with family or non-relative	28.9%
Nursing home	7.2%
Hospital/Other medical facility	4.6%
Institution	3.9%
Adult boarding home	3.3%
Other living arrangement	0.7%
Medical Diagnoses:	
Dementia diagnosis	39.5%
Mental Illness diagnosis	36.8%
Diabetes	19.7%
Congestive heart failure	15.1%
Emphysema or COPD diagnosis	12.5%

Table 6.14: No court time: Stable, always compliant w/meds, age65+, not an AR11/AS11 case (n=275)

Case Mix Weight	1.00
Age (average)	80.83
Living Arrangement:	
Nursing home	56.0%
Adult boarding home	25.1%
Lives with family or non-relative	5.8%
Lives alone	4.7%
Resident/group home	2.9%
Hospital/Other medical facility	2.5%
Medical Diagnoses/Conditions:	
Dementia diagnosis	75.3%
Mental Illness diagnosis	45.1%
Emphysema or COPD diagnosis	21.1%
Diabetes	20.0%
Congestive heart failure	19.6%

The clients who required the greatest amount of time (488 minutes) had court time and were classified as a public guardianship case (Table 6.1). They were younger on average than the baseline group (age=61.7) with 50 percent living in a nursing home and 20 percent living in a hospital or other medical facility. The most common diagnoses were mental illness (70%), dementia (50%), and diabetes (30%). This group required 5.97 times more direct time than the baseline group.

The group with the next highest amount of direct time (386.7 minutes) required no court time, lived in unstable living arrangements, were public guardianship cases, and had no diagnosis of dementia (n=26) (Table 6.2). This was the youngest group, with an average age of 44.4 years. The most common living arrangement was living alone (23.1%) and the vast majority of these clients (88.5%) had a diagnosed mental illness. Other less frequently occurring diagnoses for this group included diabetes (30.8%), traumatic brain injury (23.1%), and emphysema or COPD (19.2%). The major differences between this group and the baseline group were the living arrangement (unstable and living alone), age, and mental illness, and traumatic brain injury. They consumed 4.73 times as much direct time as the baseline group.

The clients who required the least amount of direct time (81.7 minutes), the baseline group, was largest and oldest, (n=275) with an average age of 80.8 years (Table 6.14). More than 75 percent of this group lived in a nursing home (56%) or a residential care facility (25.1%). The most common diagnoses were dementia (75.3%), mental illness (45.1%), emphysema or COPD (21.1%), diabetes (20%), and congestive heart failure (19.6%).

Numerous comparisons can be made across case mix groups. The characteristics presented in Tables 6.1 through 6.14 should assist in explaining the differences in direct time and the case mix weights.

II. Practical Application of APS Time Study Data and Case Mix Algorithm

This section provides information on the caseworker time study findings including the actual full time equivalent (FTE) work effort and direct time² expended during the time study, projections on the required FTE staffing to serve APS clients, and the application of the case mix algorithm to the entire APS population served during the time study (n=1, 129). These numbers are presented at the state level and by APS region.

APS offices are divided into 5 regions across the state (Table 7). These regions are referred to throughout this section.

Table 7
APS Regional Offices

REGION	CITY/TOWN
Region 1	Portland, Biddeford
Region 2	Lewiston
Region 3	Augusta, Rockland
Region 4	Bangor, Ellsworth, Machias, Calais
Region 5	Houlton, Caribou, Ft. Kent

A. Summary Statistics

The number of full time equivalent (FTE)³ staff who worked during the study period was calculated based on the amount of both client-specific time (direct time) and non-client specific time reported during the time study. Regional and statewide totals are presented in Table 8.

Statewide, approximately 57 FTE staff participated in the time study (including approximately 9 FTE management staff, 4 case aide (CA) FTE staff, and 44 caseworker (CW) FTE staff. A total of 1,129 clients were served and 177,909 minutes of direct time were expended.

Table 8
Work Effort During APS Time Study (in minutes)

Region	Total FTEs	Mgmt FTEs	CA* FTEs	CW** FTEs	CW/CA FTEs	# Clients	Client/ Staff Ratio	Direct Time (Min)
1	14.14	1.57	1.41	11.16	12.66	267	21.09	43,571
2	6.69	1.01	0.87	4.82	5.70	155	27.20	20,856
3	14.65	2.61	0.58	11.46	12.25	267	21.79	43,639
4	16.39	2.86	1.24	12.29	13.84	316	22.84	53,292
5	5.23	0.97	0.00	4.26	4.33	124	28.61	16,551
Statewide	57.10	9.01	4.10	43.99	48.79	1129	23.14	177,909

*CA = case aide

**CW = caseworker

² **PLEASE NOTE:** Calculation of level of work effort includes reportable time working with or on behalf of clients on the phone, completing documentation, supervision, case aide consultation, and in person. It does not include general transit time.

³ One full time equivalent (FTE) staff works 40 hours per week.

The client/staff ratio or average caseload during the time study was 23.14 clients per caseworker. This ratio was calculated using only the direct time expended by caseworker and case aide FTE staff, and management. Regions 2 and 5 had the highest caseload ratio during the time study. However, the caseload numbers were compared across regions without taking into consideration the differences in time required (case mix weight) by each client.

APS staff reported their direct time by task including phone, documentation, supervision, case aide consultation, in person, and transit time. Table 9 shows the amount of total direct time in minutes per client and total time spent on each task per client, regionally and statewide. On average, APS staff spent the most time on documentation relating to their clients, in person with their client or someone on behalf of their client, and in transit. Please note transit time reported below is not “reportable” and therefore is excluded from the calculation of Total time for purposes of describing level of work effort.

Table 9
Average Time By Task Per Client
(in minutes)

Region	Total Time	Phone	Documentation	Supervision	Ca Consult	In Person	Transit
1	134.3	19.96	62.83	2.25	1.87	47.39	28.88
2	106.26	19.87	43.30	3.19	3.01	36.89	28.30
3	134.37	30.43	62.80	2.54	0.27	38.33	29.07
4	137.06	30.51	47.92	5.39	1.03	52.21	31.59
5	101.45	22.03	30.39	2.58	0.03	46.42	32.02
Statewide	127.63	25.61	52.40	3.36	1.21	45.05	29.95

Of particular interest to APS management was the amount of *direct time* expended as a percentage of total work time. The percent of direct time captured in our cross-sectional study is not representative of direct time over a one-year period. A one year window is more likely to capture vacation hours, sick time, classes, new hire orientation, other non-client specific task, etc. Actual direct time may also differ from what was reported during the time study since a concentrated effort was made to serve clients during this time period, and other non-client specific tasks may have been set aside.

Table 10 shows the total amount of direct time reported by APS staff. The percentage of direct time was calculated based on the total time reported which included direct time and non-client specific time. Looking at the state level, 62% of staff time was spent directly with or on behalf of clients (*Actual % Direct Time* column). Each FTE staff worked approximately 80 hours during the 2-week time study period. Of the 80 hours in the time study, 49.6 hours were dedicated to direct time using the 62% direct time ratio ($80 \times 0.62 = 49.6$).

To obtain the number of FTE staff required to serve the 2,401.57 hours of total direct time reported by all APS staff (*Direct Time* column), the total direct time was divided by 49.6 hours per FTE to yield 48.42 FTEs. That is, approximately 48.42 FTE staff were required to work the 2,401.57 hours of reportable direct client time over the 80-hour period. The actual number of staff available during the time study was 48.79 FTEs. The

difference between FTE staff required and actual FTE staff is approximately one-third of an FTE staff person.

**Table 10
Staff Required Over Two Week Based on Regional and Statewide
Direct Time Averages**

Region	Direct Time (Hrs)	Actual % Direct Time	Hrs Direct Time /80 hours*	Staff Required (FTE)	Staff Available (FTE)	Difference (FTE)
1	597.68	0.59	47.21	12.05	12.66	-0.61
2	274.48	0.60	48.15	5.53	5.70	-0.17
3	597.95	0.61	48.81	12.06	12.25	-0.19
4	721.85	0.65	52.16	14.55	13.84	0.71
5	209.68	0.61	48.43	4.23	4.33	-0.10
Statewide	2401.57	0.62	49.22	48.42	48.79	-0.37

*80 hours = approximate number of hours in 2-week time study period

As mentioned earlier, the percentage of direct time as a proportion of total time may be exaggerated due to the limited amount of time captured in the time study and the additional effort put forth by caseworkers who may have dedicated a greater amount of their time to direct client service. Table 11 shows the staff required if the direct time percentage is 60% which may be closer to an actual representation of direct time rather than the average actual direct time(62%) as described in Table 10.

**Table 11
Staff Required Over Two Week Period Based on 60% Direct Time**

Region	Direct Time (Hrs)	60% Dtime	Hrs Dtime/Period	Staff Required (FTE)	Staff Available (FTE)	Difference (FTE)
1	597.68	0.6	48	12.45	12.66	-0.21
2	274.48	0.6	48	5.72	5.7	0.02
3	597.95	0.6	48	12.46	12.25	0.21
4	721.85	0.6	48	15.04	13.84	1.20
5	209.68	0.6	48	4.37	4.33	0.04
Statewide	2401.57	0.6	48	50.03	48.79	1.24

Based on a direct time ratio of 60%, the difference between staff required and staff available was 1.24 FTE. Approximately one and a quarter additional FTE staff would be required to serve the 2,401.57 hours of direct client time if direct time is calculated as 60% of total hours worked.

B. Application of the APS Case Mix Algorithm

Although 1,129 clients were encountered during the time study, only 969 clients were included in the data analysis for reasons explained in Section I. The case mix algorithm (grouping procedure) was applied to the entire 1,129 clients to show the number of clients in each case mix group at the state and regional levels (Table 12).

**Table 12
Case Mix Algorithm Application:
Number of Clients in Each Case Mix Group Statewide and Regionally**

Case Mix Group	Case Mix Weight	# of Clients State-Wide	# of Clients by Region				
			1	2	3	4	5
Court Time							
GX70 – Yes	5.97	11	4	0	1	3	3
GX70 – No	4.36	14	1	0	2	7	4
No Court Time and Stable Living Arrangement							
Compliant w/meds – Never	3.81	13	7	1	2	3	0
Compliant w/meds – Somewhat, almost always, no meds:							
GX70 case and hospitalized in last 90 days	3.39	36	6	7	7	11	5
GX70 case and no hospitalization in last 90 days	1.97	141	36	19	28	47	11
Not a GX70 case	1.48	166	36	19	53	49	9
Compliant with meds – Always:							
>= Age 65 and an AR11/AS11 case	1.73	45	17	5	11	5	7
>= Age 65 and not an AR11/AS11 case	1.00	285	71	52	53	75	34
< Age 65 and hospitalized in last 90 days	3.24	27	2	4	7	9	5
< Age 65 and no hospitalization in last 90 days	1.86	114	25	16	26	26	21
No Court Time and Unstable Living Arrangement							
GX70 and dementia dx	2.93	18	5	1	5	5	2
GX70 and no dementia dx	4.73	26	5	4	8	7	2
Not a GX70 case and dementia dx	3.28	44	2	6	13	19	4
Not a GX70 case and no dementia dx	1.63	100	24	12	23	32	9
TOTAL	N/A	1,040	241	146	239	298	116
Missing	N/A	89	26	9	28	18	8

Table 13 shows the percentage of clients within each case mix group at the state and regional level. The greatest percentage of clients at the state level as well as regionally are in the baseline case mix group. Region 2 has the highest percentage of clients in this group with 35.6% clients included in this category (see shaded area on Table 13). Region 5 had the greatest percentage of clients in the most resource intense group, with 2.6 % of clients requiring court time and classified as a public guardianship case.

Table 13
Percentage of Clients in Each Case Mix Group
Statewide and Regionally

Case Mix Group	Case Mix Weight	% Of Clients State-Wide	% Of Clients By Region				
			1	2	3	4	5
Court Time							
GX70 – Yes	5.97	1.1	1.7	-	0.4	1.0	2.6
GX70 – No	4.36	1.3	0.4	-	0.8	2.3	3.4
No Court Time and Stable Living Arrangement							
Compliant w/meds – Never or almost never	3.81	1.3	2.9	0.7	0.8	1.0	-
Compliant w/meds – Somewhat, almost always, no meds:							
GX70 case and hospitalized in last 90 days	3.39	3.5	2.5	4.8	2.9	3.7	4.3
GX70 case and no hospitalization in last 90 days	1.97	13.6	14.9	13.0	11.7	15.8	9.5
Not a GX70 case	1.48	16.0	14.9	13.0	22.2	16.4	7.8
Compliant with meds – Always:							
>= Age 65 and an AR11/AS11 case	1.73	4.3	7.1	3.4	4.6	1.7	6.0
>= Age 65 and not an AR11/AS11 case	1.00	27.4	29.5	35.6	22.2	25.2	29.3
< Age 65 and hospitalized in last 90 days	3.24	2.6	0.8	2.7	2.9	3.0	4.3
< Age 65 and no hospitalization in last 90 days	1.86	11.0	10.4	11.0	10.9	8.7	18.1
No Court Time and Unstable Living Arrangement							
GX70 and dementia dx	2.93	1.7	2.1	0.7	2.1	1.7	1.7
GX70 and no dementia dx	4.73	2.5	2.1	2.7	3.3	2.3	1.7
Not a GX70 case and dementia dx	3.28	4.2	0.8	4.1	5.4	6.4	3.4
Not a GX70 case and no dementia dx	1.63	9.6	10.0	8.2	9.6	10.7	7.8

III. Summary

Case mix classification groups for APS clients are needed to better understand the differences in resource use requirements across APS clients. Without it, caseload allocation is determined by the number of clients per caseworker, without regard for the specific characteristics of the clients.

With data collected by APS staff during a two-week time study and additional client specific data, the case mix classification model constructed results in fourteen case mix groups using eight client specific characteristics, many of which are collected at intake: court time, age, stable living arrangement in past 30 days, compliance with medications, hospitalized in past 90 days, diagnosis of dementia, and whether or not the case is assigned as a public guardianship case (GX70) or as an investigation (AR11/AS11).

The clients who were least resource intensive were age 65 and older, lived in a stable living arrangement (primarily nursing homes and adult boarding homes), were always compliant with their medications, and required no court time. This group was considered the baseline group against which all other groups were compared and case mix weights were derived. These weights can be applied to current and future caseloads for a more accurate representation of actual caseworker caseloads.

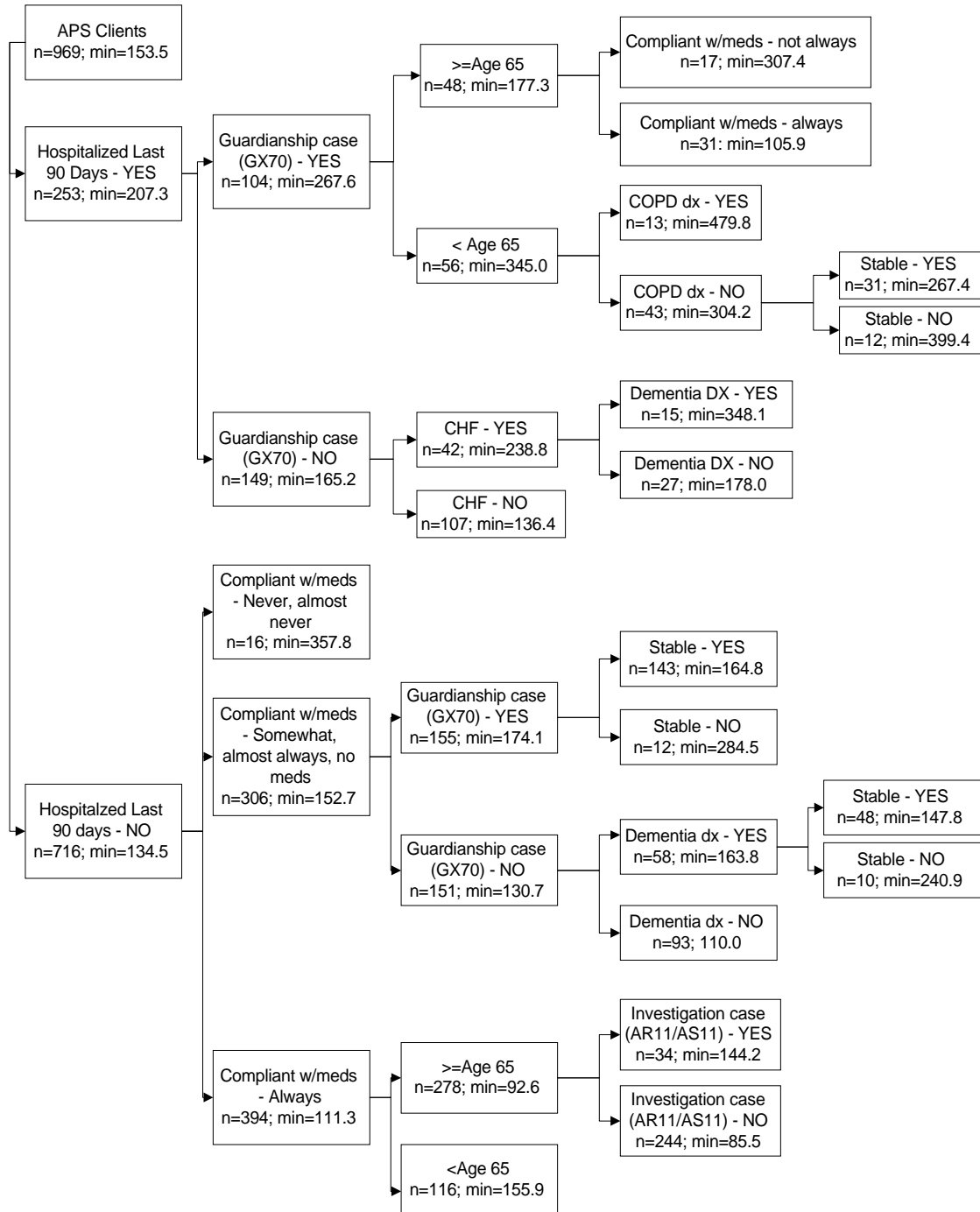
To implement a pilot test of the utility of this case mix classification, data used to arrive at the case mix groupings (court time involvement, compliance with medications, stability of living arrangement, age, diagnosis of dementia, hospitalization in the past 90 days, and case type) must be obtained upon intake. Alternatively, new clients could be assigned to a “holding group” if assignment to a case mix group is not possible initially. These clients could then be classified when sufficient information is made available to the caseworker. APS supervisors and caseworkers will be able to best establish whether introduction of the classification strategy is of sufficient value to introduce APS information changes to support automation or ease of classification and client tracking by group.

REFERENCES

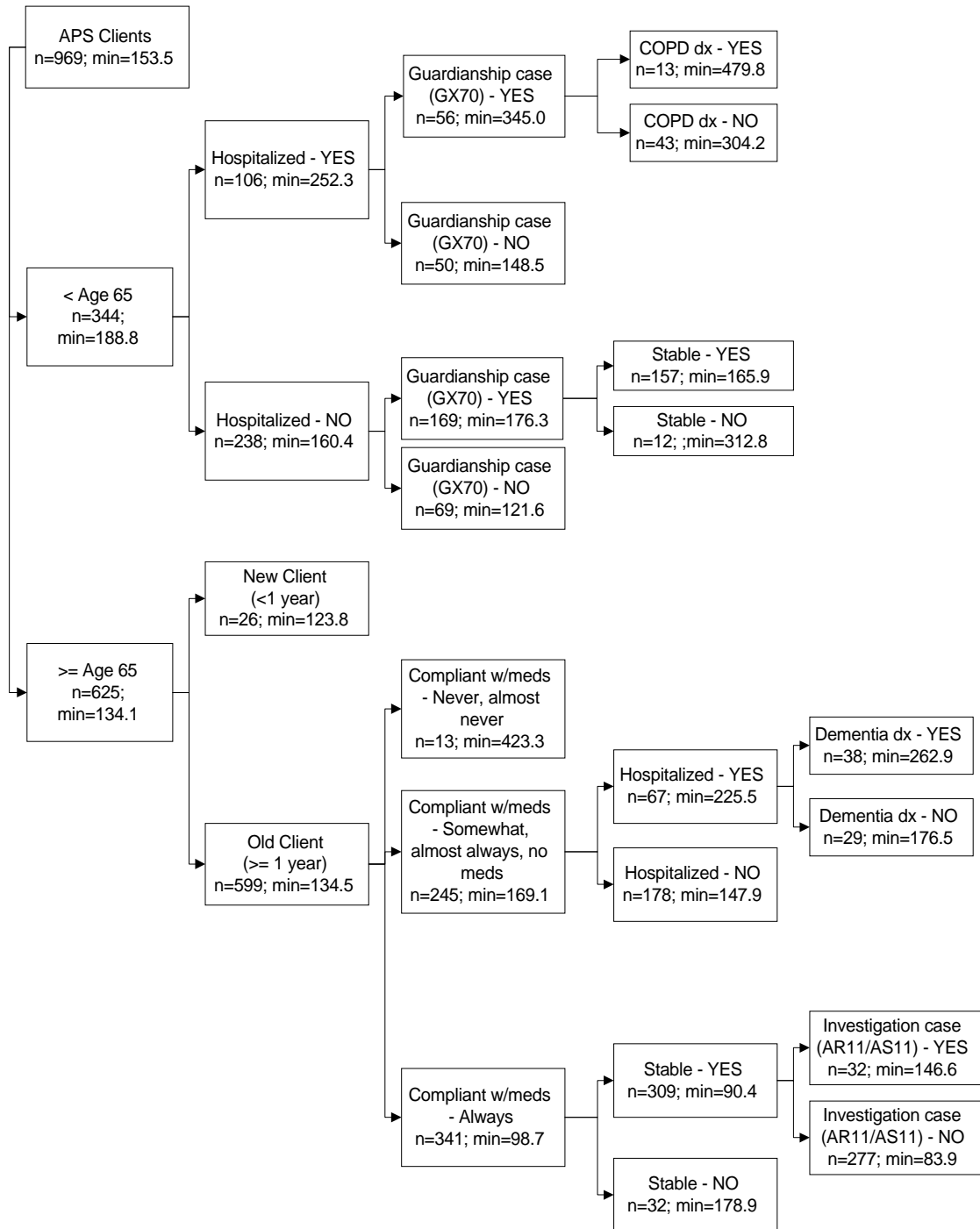
National Association of Adult Protective Services Administrators. APS Compilation of Workload Studies and Caseload Data, 1997.

**APPENDIX A:
ALTERNATE CASE MIX MODELS 2 and 3**

Model 2: Explanation of Variance for APS Client Direct Time
Variance Reduction 18.00%



Model 3: Explanation of Variance for APS Client Direct Time
Variance Reduction 17.05%





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