

Cost Studies at Northern California Kaiser Permanente

Connie Weisner, DrPH, LCSW

Associate Director for Health Services
Division of Research, Kaiser Permanente
Professor, Department of Psychiatry
University of California, San Francisco

County Alcohol & Drug Program Administrators
Association of California
Sacramento, California
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- Investigators/Staff Scientists

- **Jennifer Mertens, PhD**

- **Cynthia Campbell, PhD**

- **Derek Satre, PhD**

- Group Leader & Dissemination Lead

- **Stacy Sterling, MSW, MPH**

- Health Economist

- **Sujaya Parthasarathy, PhD**

- Analysts

- **Felicia Chi, MPH**

- **Andrea Hessel, MS**

- **Wendy Lu, MPH**

- **Tom Ray, MBA**

- **Connie Uratsu, MPH**

- Project Coordinators

- **Agatha Hinman, BA**

- **Aliza Silver, MA**

- Research Associates

- **Gina Smith Anderson**

- **Georgina Berrios**

- **Virginia Browning**

- **Diane Lott-Garcia**

- **Melanie Jackson**

- **Cynthia Perry-Baker**

- **Barbara Pichotto**

- **Martha Preble**

- **Lynda Tish**

- **Sandra Wolter**

- Intern

- **Tina Valkanoff**

- **Christine Lou**

- KP Clinicians

- **David Pating, MD**

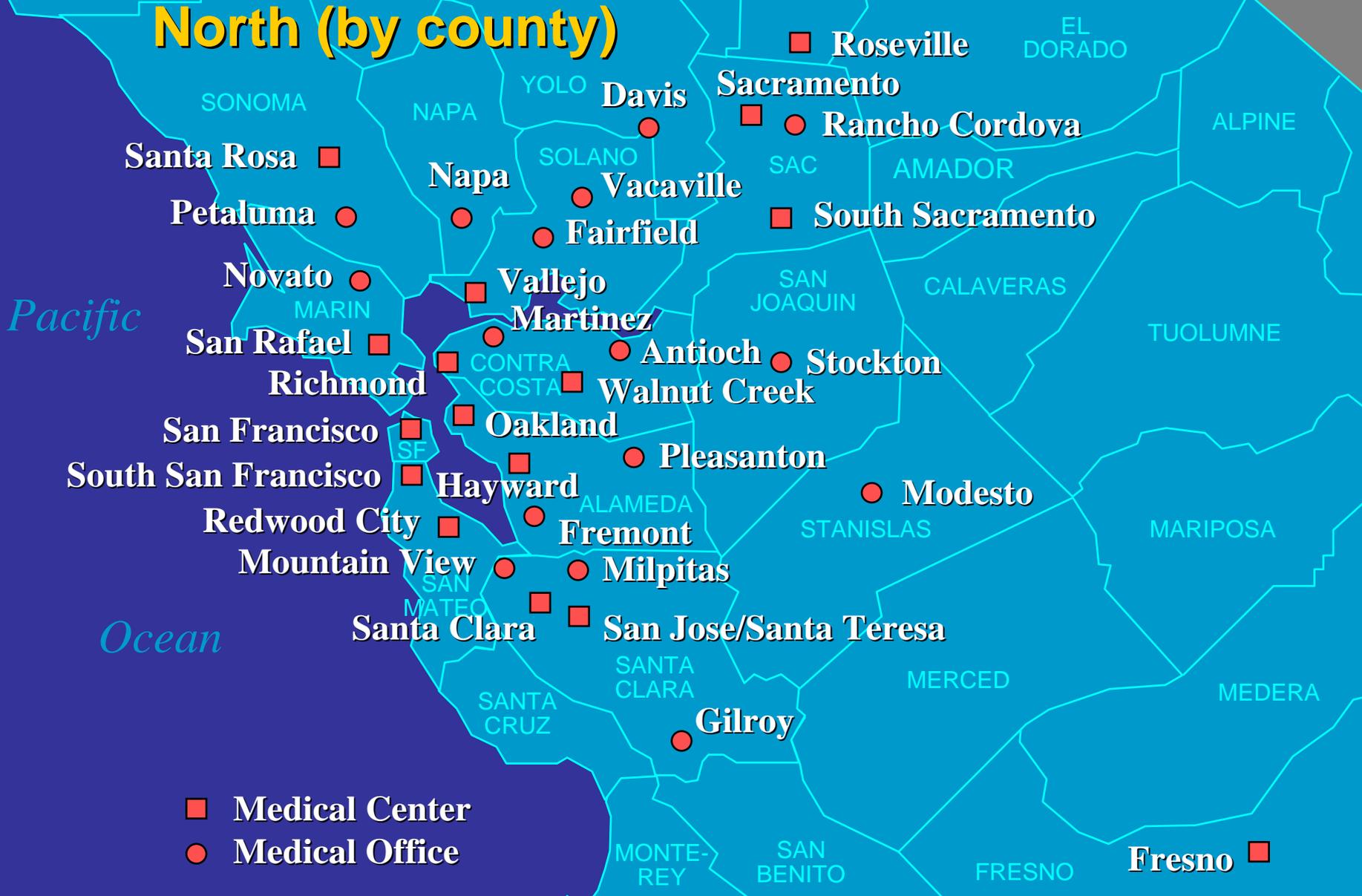
- **Steve Allen, PhD**

- **Matthew Tarran, PhD**

- **Charles Moore, MD**

- **Chemical Dependency Quality Improvement Committee**

California Division North (by county)



Overview



- Approach and rationale for cost studies
 - Business case to be made
 - Different interventions/different patient characteristics
- Overview of study examples at Kaiser
 - Adult studies
 - Adolescent studies
 - Family studies
- Applicability to other systems
 - “thousands of flowers blooming”

Approach and Rationale



- Context of a health plan
 - Employers are primary purchasers
- Alcohol and drug problems as primary problems and as risk factors for other health conditions
- Treatment can be effective
- Not treating them causes lack of improvement in other health conditions (and problems in work productivity)
- Not treating them causes more ER and inpatient utilization
- Not treating them causes health problems and cost for family members
- Who are the main stakeholders?

Recommendations for SBIRT in General Health Care Settings



National Institute on Alcohol Abuse and Alcoholism, 1995, 2003

US Preventive Services Task Force, 1996 & 2004

American Society of Addiction Medicine, 1997

American Medical Association, 1999

National Quality Forum, 2007

National Business Group on Health, 2008

Office on National Drug Control Policy, 2009

Rankings of Preventive Services

National Commission on Prevention Priorities

25 USPSTF- recommended services ranked by:

Clinically preventable burden (CPB)-

How much disease, injury, and death would be prevented if services were delivered to all targeted individuals?

Cost-effectiveness (CE)- return on investment

How many dollars would be saved for each dollar spent?



Maciosek MV, Coffield AB, Edwards NM, et al. Priorities among effective clinical preventive services: results of a systematic review and analysis. *Am J Prev Med.* 2006;31(1):52-61.

Solberg LI, Maciosek MV, Edwards NM. Primary care intervention to reduce alcohol misuse ranking its health impact and cost effectiveness. *Am J Prev Med.* 2008;34(2):143-152.

Rankings of Preventive Services

#	Service	CPB	CE
1	Aspirin- Men- 40+, Women- 50+	5	5
2	Childhood immunizations	5	5
3	Smoking cessation	5	5
4	Alcohol screening & intervention	4	5
5	Colorectal cancer & treatment	4	4
6	Hypertension screening & treatment	5	3
7	Influenza immunization	4	4
8	Vision screening – 65+	3	5

For rankings: 1= highest 25=lowest

For CPB/CE: 1=lowest; 5 = highest

Maciosek MV, Coffield AB, Edwards NM, et al. Priorities among effective clinical preventive services: results of a systematic review and analysis. *Am J Prev Med.* 2006;31(1):52-61.

Solberg LI, Maciosek MV, Edwards NM. Primary care intervention to reduce alcohol misuse ranking its health impact and cost effectiveness. *Am J Prev Med.* 2008;34(2):143-152.

Rankings of Preventive Services (cont.)



#	Service	CPB	CE
9	Cervical cancer screening	4	3
10	Cholesterol- men 35+, women 45+	5	2
11	Pneumococcal immunization	3	4
12	Breast cancer screening	4	2
13	Chlamydia screening – women <25	2	4
14	Calcium supplementation- women	3	3
15	Vision screening – preschool children	2	4
16	Folic acid supplementation - women	2	3

For rankings: 1= highest 25=lowest

For CPB/CE: 1=lowest; 5 = highest

Maciosek MV, Coffield AB, Edwards NM, et al. Priorities among effective clinical preventive services: results of a systematic review and analysis. *Am J Prev Med.* 2006;31(1):52-61.

Solberg LI, Maciosek MV, Edwards NM. Primary care intervention to reduce alcohol misuse ranking its health impact and cost effectiveness. *Am J Prev Med.* 2008;34(2):143-152.

Rankings of Preventive Services (cont.)



#	Service	CPB	CE
17	Obesity screening -adults	3	2
18	Depression screening – adults	3	1
19	Hearing screening – adults 65+	2	2
20	Injury prevention- young children	1	3
21	Osteoporosis screening	2	2
22	Cholesterol- high-risk, younger	1	1
23	Diabetes screening- adults at risk	1	1
24	Diet counseling- adults at risk	1	1
25	Tetanus- diphtheria booster- adults	1	1

For rankings: 1= highest 25=lowest

For CPB/CE: 1=lowest; 5 = highest

Maciosek MV, Coffield AB, Edwards NM, et al. Priorities among effective clinical preventive services: results of a systematic review and analysis. *Am J Prev Med.* 2006;31(1):52-61.

Solberg LI, Maciosek MV, Edwards NM. Primary care intervention to reduce alcohol misuse ranking its health impact and cost effectiveness. *Am J Prev Med.* 2008;34(2):143-152.

Initiation of Alcohol and Drug Dependence Treatment

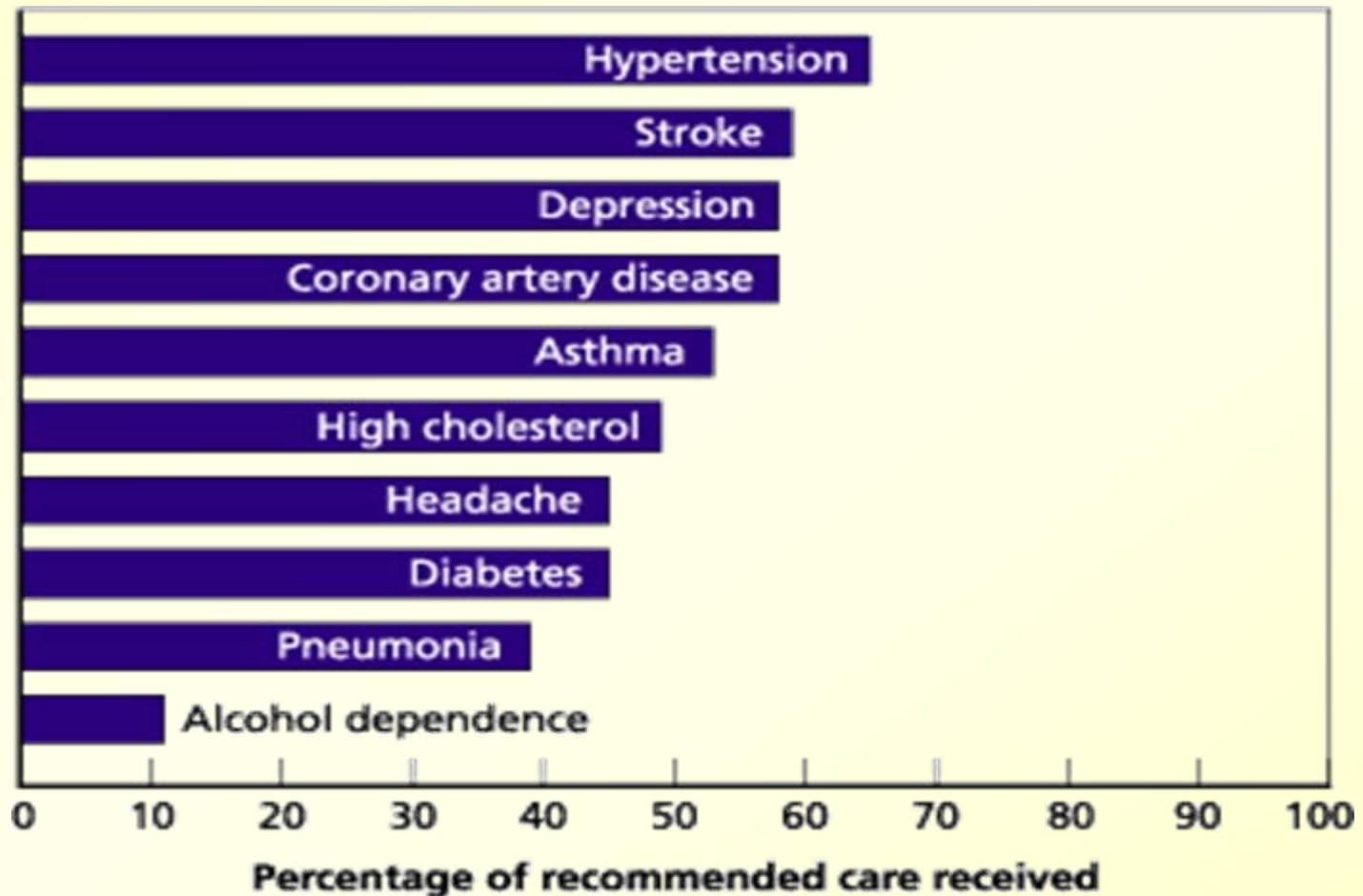
Engagement of Alcohol and Drug Dependence Treatment

NIAAA Physician's Guide

- How many times in the past year have you had
 - 5 or more drinks in a day (14/week)? (for men)
 - 4 or more drinks in a day (7/week)? (for women)
- On average, how many days a week do you have an alcoholic drink?
- On a typical drinking day, how many drinks do you have?

National Institute on Alcohol Abuse and Alcoholism. Helping patients who drink too much: a clinician's guide, updated 2005 edition. Rockville, MD: NIAAA; 2005:
http://pubs.niaaa.nih.gov/publications/Practitioner/CliniciansGuide2005/clinicians_guide.htm. Accessed Jan 9, 2009.

Quality of Care Varied Substantially Across Conditions



McGlynn EA, Asch SM, Adams J, et al. The quality of health care delivered to adults in the United States. *N Engl J Med.* Jun 26 2003;348(26):2635-2645.

Approaches to examine cost



Approaches to examine cost

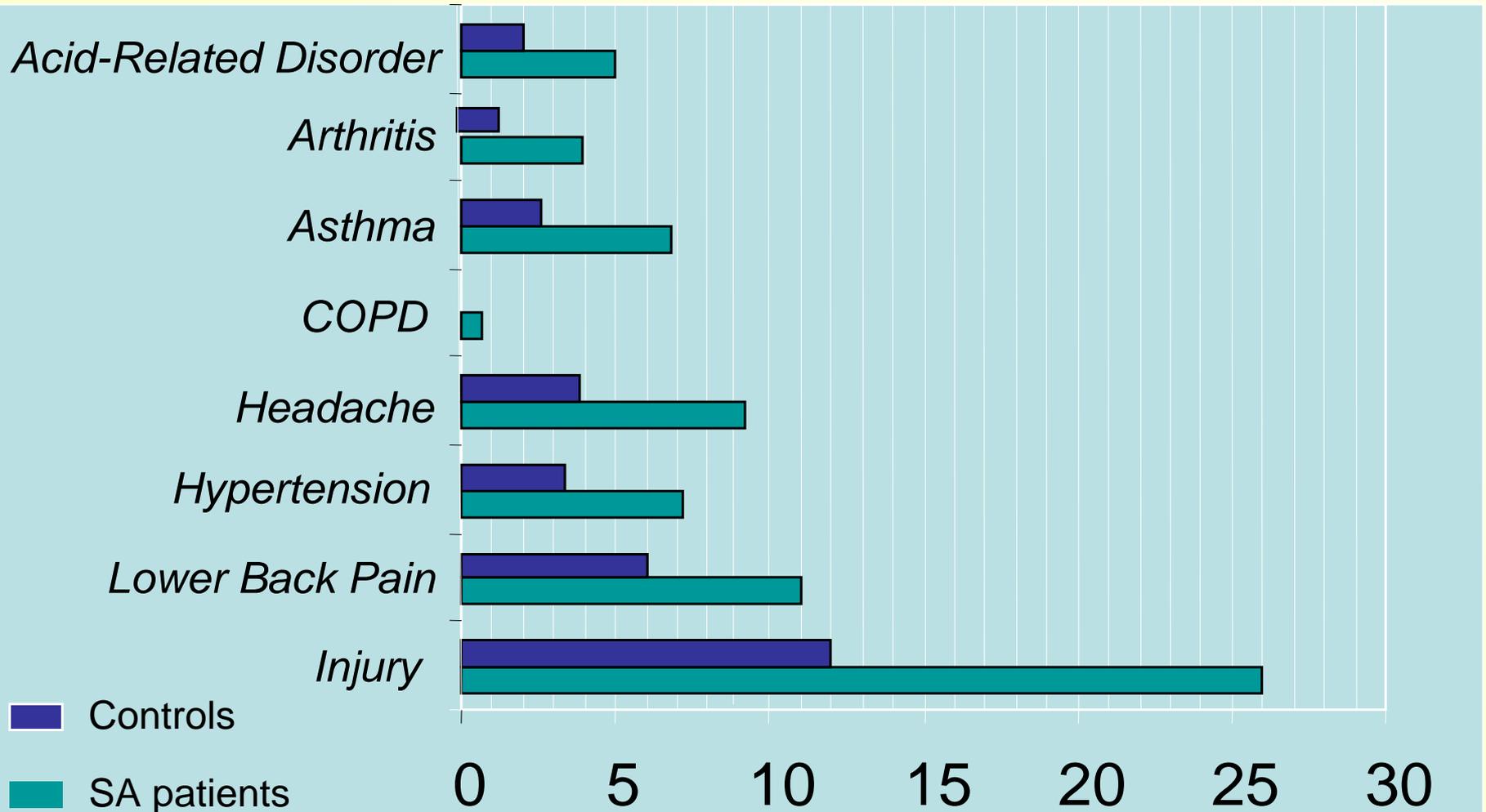
- First – examine outcome (especially for cost-effectiveness)
- Examine full costs to programs
- Examine period prior to treatment and after treatment
 - Avoid biasing the cost by the ramp-up of costs that often precedes treatment
 - Make a distinction between primary care costs and inappropriate costs (ER and inpatient)
- Use the denominator of all intakes
- Emphasize the medical conditions associated with alcohol and drug problems
- Argue for continuing care conceptual approach

Adult Studies



- Epidemiology of problems
- Outcomes
- Costs

Prevalence in Substance Abuse Patients Vs. Matched Controls



Conditional Logistic Regression Results: $p < 0.01$ for all conditions shown

Mertens et al. (2003). *Archives of Internal Medicine* 163: 2511-2517.

CD Patients and Matched Health Plan Members: ICD-9 Psychiatric Conditions *

	CD Patients (N=747)	Matched Members (N=3,690)
Depressive Disorders	28.5%	2.7%
Anxiety Disorders	17.1%	2.2%
Psychoses	6.7%	0.4%

*all p<.001

Adults in Treatment with Substance Abuse Medical Conditions: Medical Services Predicting Abstinence at 6 Months



<u>Independent Variable</u>	<u>O.R.</u>	<u>95% C.I.</u>
Integrated Medical Care (vs. Usual Care)	1.90	(1.22, 2.96)

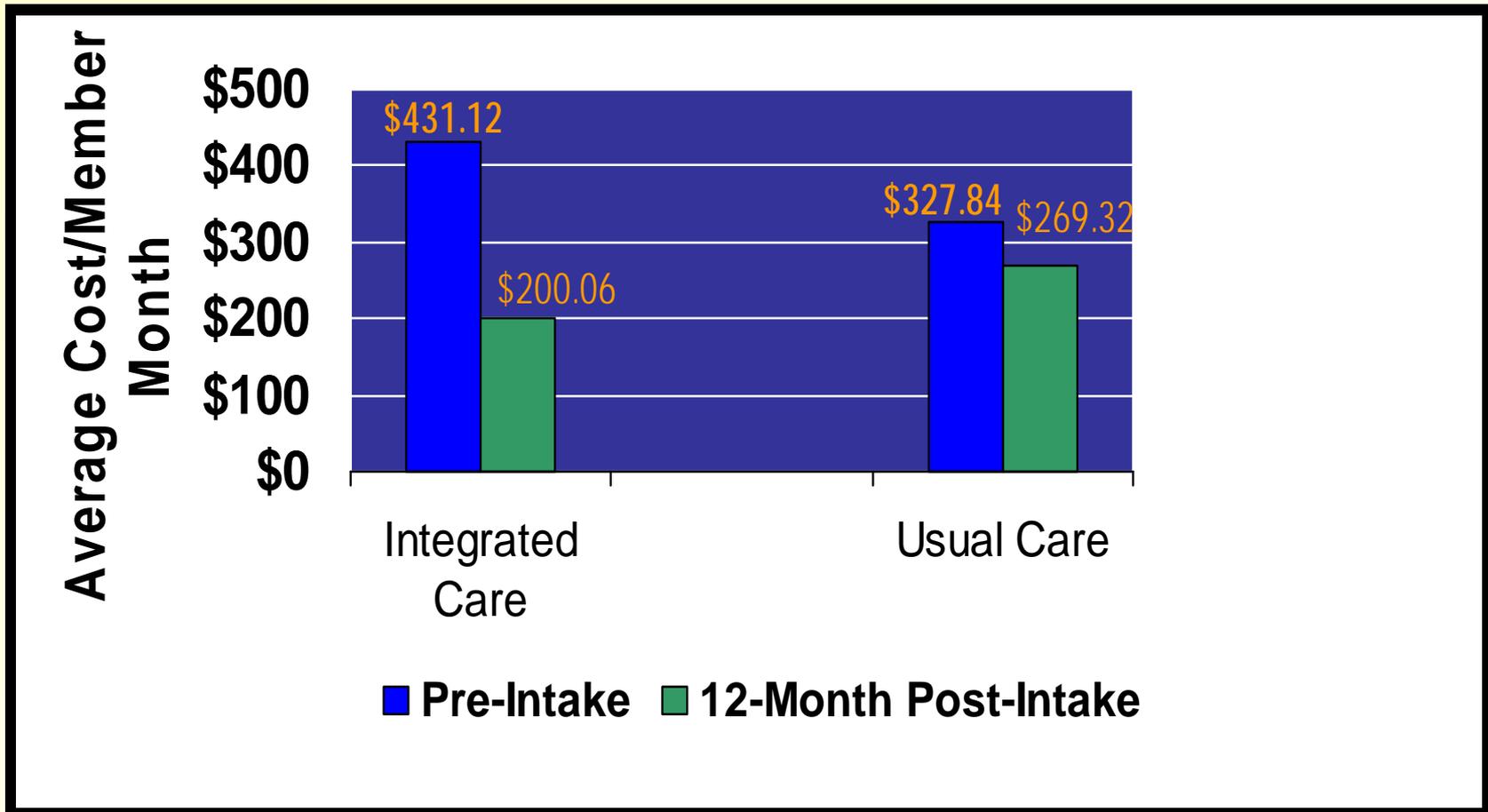
Controlling for baseline alcohol ASI severity and baseline drug ASI severity

Weisner C, Mertens J, Parthasarathy S, Moore C. Integrating primary medical care with addiction treatment: A randomized controlled trial. *Jama*. Oct 2001;286(14):1715-1723.

Short and Long-Term Costs



Medical Costs after Treatment for Integrated Medical Care for Those with Substance Abuse-Related Medical Conditions



Parthasarathy S, Mertens J, Moore C, Weisner C. Utilization and cost impact of integrating substance abuse treatment and primary care. *Med Care*. Mar 2003;41(3):357-367.

18 months Pre & Post Treatment: Average Medical Cost/Member Month (\pm SE)

	<u>Pre-treatment</u>	<u>Post-treatment</u>
Treatment Cohort (N=1011)	\$239 (\pm \$21)	\$208 (\pm \$23)
Matched Sample (N=4925)	\$109 (\pm \$5)	\$103 (\pm \$6)

Treatment group had a 26% reduction in cost, and had reduced ER and hospitalizations post treatment ($p < .01$) compared to matched controls

General estimating equation (GEE) methods

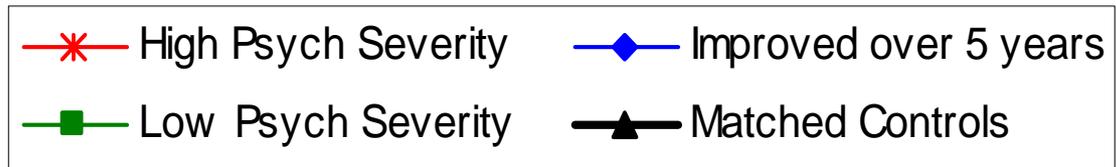
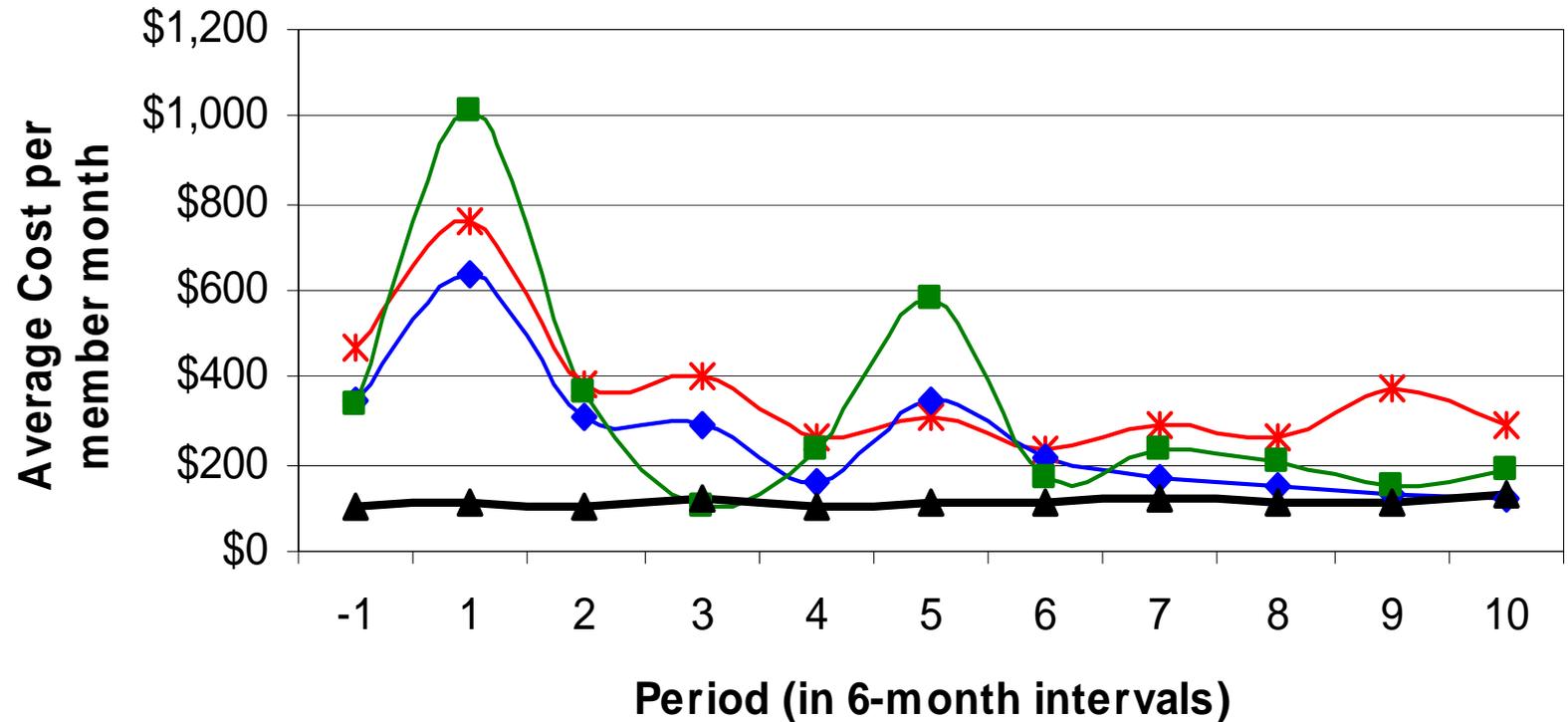
Psychiatric Services Predicting Abstinence at Five-Years (among adults with psychiatric symptoms after CD Treatment)



**2.1 or more hours psychiatric services/yr vs.
less/none O.R. = 2.22, $p < .01$**

Logistic regression controlling for age, gender, type of dependence, abstinence goal, readmission, # of AA meetings, recovery-oriented social support, treatment intensity

Distribution of Total Costs by Psychiatric Profiles



The Role of Primary Care Services in 5-Year Outcome

Model Predicting Remission at Five Years Among Those with SAMCs¹ (n=333)

<u>Predictors:</u>	<u>Odds Ratio</u>	<u>95% C.I.</u>	<u>p-value</u>
Primary Care			
2-10 Visits (vs. 0-1)	4.12	1.33 -12.82	0.014
11+ Visits (vs. 0-1)	2.32	0.77 -7.04	0.137

¹Controlling for age group, and ASI alcohol severity

Mertens JR, Flisher AJ, Satre DD, Weisner C. (2008). The role of medical conditions and primary care services in 5-year substance use outcomes among chemical dependency treatment patients. *Drug and Alcohol Dependence* 98(1-2):45-53.

What might continuing care for substance use problems look like?

Lessons from disease management

Screen and treat in PC if moderate problem

Continue monitoring

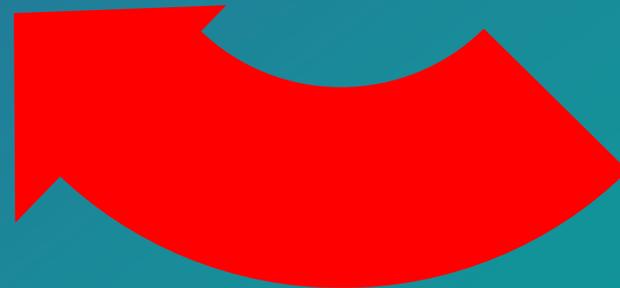
Specialty care if needed

Back to PC for monitoring

Continuing care

Primary Care

Specialty Care
(CD and Psychiatry)



Von Korff M, Gruman J, Schaefer J, Curry SJ, Wagner EH. Collaborative management of chronic illness. *Ann Intern Med.* 1997;127:1097-102.

Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness. *JAMA* 2002; 288:1775-9.

Continuing Care

- Alcohol and drug treatment when needed
- Psychiatric services when needed
- Primary care at least every day

- WHY IN PRIMARY CARE?

Continuing Care Outcomes

- Patients receiving continuing care were more than twice as likely to be remitted at each follow-up over 9 years ($p < .0001$)*
 - Particular ingredients were CD readmissions when needed and regular primary care. (Psychiatric services alone was not significant)

* mixed-effects logistic regression model controlling for time/follow-up wave, demographic characteristics, severity at each timepoint

Continuing Care Cost Impacts

- Those receiving continuing care in the prior interval were less likely to have ER visits and hospitalizations subsequently ($p < .05$).*
 - The moderating effect of remission status on the relationship was not significant.
(Receiving continuing care reduces inappropriate utilization, even when not in remission).

Adolescent Studies



Study Setting



- Kaiser Permanente Medical Care Program of Northern California
- Four outpatient alcohol and drug abuse treatment programs from the Northern California region.
- Non-profit, group practice prepaid HMO
- 3.4 million *members* (39% of commercially insured population)
- “Carved-in” chemical dependency services and psychiatry

Data Sources



- Baseline interviews with adolescents (and a parent collateral) at intake to CD treatment at 4 Kaiser sites
- Follow-up interviews with adolescents and parents at 6 months and 1,3 and 5 years (Response rates = 92%, 92%, 86% and 85%, respectively)
- Clinical diagnoses from automated records
- Health plan administrative utilization and cost databases

Adolescent CD Patients & Matched Controls

Sample:

- 419 adolescents, aged 13-17 (143 girls, 276 boys)
- Ethnicity: 9% Native American/Asian
16% African-American
20% Hispanic
49% White
- Matched Controls:
- 2084 adolescents from the health plan
- No alcohol or drug history
- Matched on gender, age, length of health plan enrollment, and geographic area.

Substance use (%) in past 6 months at treatment entry

	<u>Girls</u>	<u>Boys</u>	<u>p value</u>
Any alcohol	92	80	.004
3+ drinks of alcohol at one time	66	58	
5+ drinks of alcohol at one time*	50	45	
Marijuana	90	91	
Tobacco	76	76	
Hallucinogens	30	27	
Stimulants	31	17	.003
Party drugs	37	15	<.0001
Sedatives	17	6	.0008
Opiates or painkillers**	30	24	
Cocaine (powder or crack)	24	12	.002
Heroin	5	<1	.003

*Risk factor for boys reporting multiple HIV risk behaviors

** Risk factor for girls reporting multiple HIV risk behaviors

Sterling S, Kohn C, Lu Y, Weisner C. Pathways to substance abuse treatment for adolescents in an HMO. *Journal of Psychoactive Drugs*. Dec 2004;36(4):439-453.

Ammon L, Sterling S, Mertens J, Weisner C. Adolescents in private chemical dependency programs who are most at risk for HIV? *J Subst Abuse Treat*. 2005;29(1):39-45

Alcohol use 2-3 times or more each month in the 6 months prior to treatment entry

Any alcohol	68 %
3+ drinks at one time	34 %
5+ drinks at one time	24 %

Main beverage type:

Hard liquor	57 %
Beer	24%
Malt liquor	14 %
Wine coolers	3%
Fortified wine	1 %
Wine	1%

Medical Conditions among Adolescent CD Treatment Intakes (%)

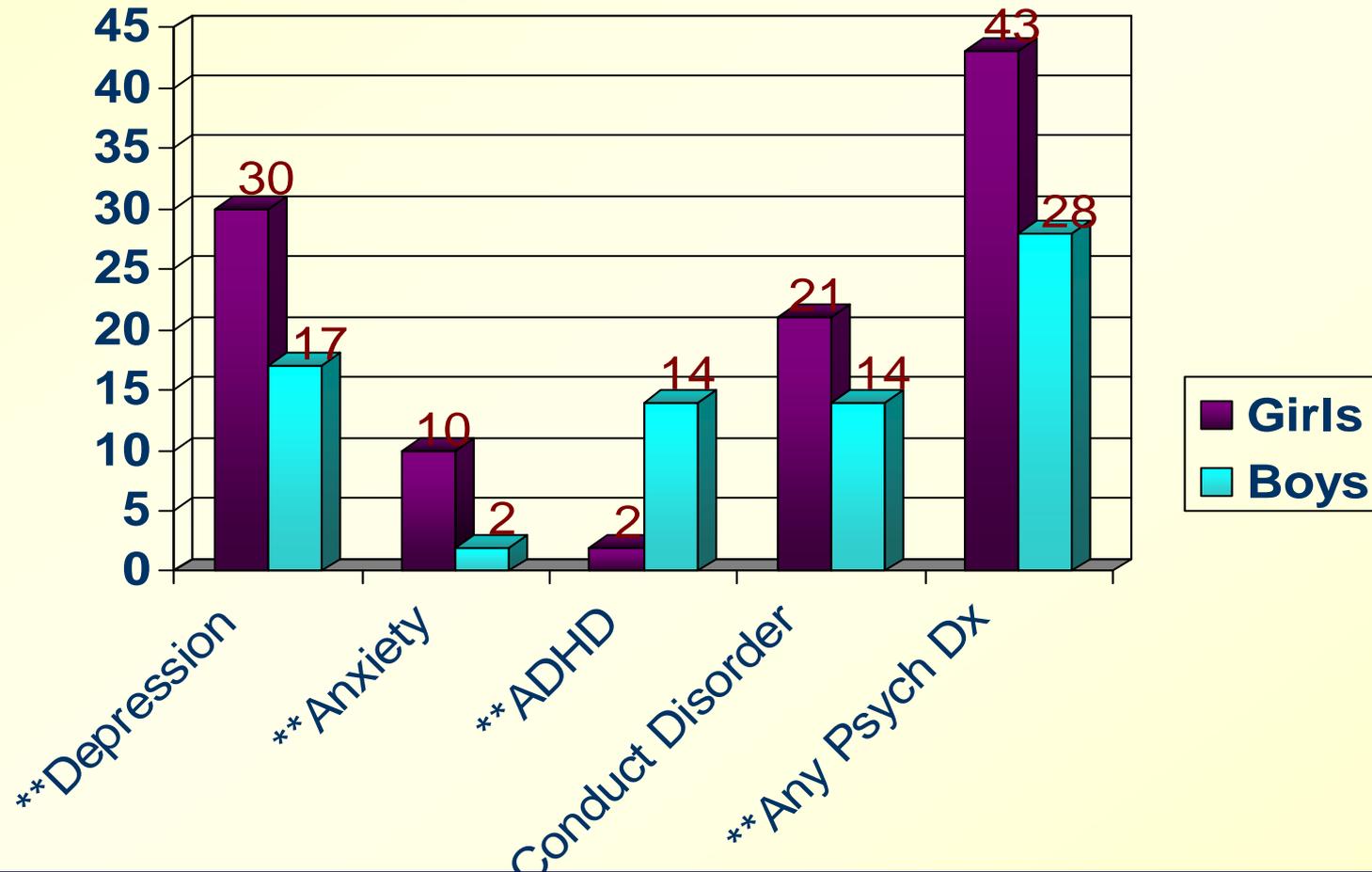
	Controls
Abdominal Pain	5.7
Respiratory System Cond.	37.8
Gastroenteritis	3.9
Conjunctivitis	3.2
Muscle Pain	3.9
Scoliosis	1.3
Benign Uterine Cond.	3.2
Injury & Poisoning	36.4
Urinary Tract Infection	2.0
STDs	1.5

***One-third of parents reported that their child had chronic health problems (asthma and allergies most commonly). Past pregnancies: 15% of girls**

Psychiatric Conditions of Adolescents in CD Treatment & Matched Controls (%)

	<u>Controls</u>
Depression	4.2
Anxiety Disorder	2.3
Eating Disorders	0.43
ADHD	3.0
Conduct Disorder	1.2
Conduct Disorder (w/ODD)	2.3
Any Psychiatric DX	9.0

Gender Differences in Psychiatric Comorbidities: Adolescents in CD Treatment (in %)



HIV Risk Behaviors among Adolescents in CD Treatment

Risky Behaviors	Boys (N=276) %	Girls (N=143) %
Injection drug use (IDU)	2	4
Sharing needles or works	1	1
Never/inconsistent condom use (of those reporting ever having sex)	35	53*
Sex with multiple partners, past 6 months + never/inconsistent condom use	39 43	37 52
Male homosexual activity or female related sexual activity	3	14*

Age of Treatment Entry and Long-Term Outcomes

- Younger age predicted abstinence at 3 years:
 - For every year increase in age, the chance of being abstinent is reduced by 22% ($p=.04$).

Predicting Abstinence at Six Months: Dual Treatment for Adolescents in CD Treatment

Adolescents who **received treatment in both CD and Psychiatry** had greater odds of being abstinent at 6 months compared to those who received only CD treatment (**OR: 1.56, p=.06**).

Controlling for gender, age, ethnicity, YSR internalizing & externalizing scores, and severity of substance problems

Cost Considerations for Earlier Screening



- Medical costs decrease after CD treatment for adults.

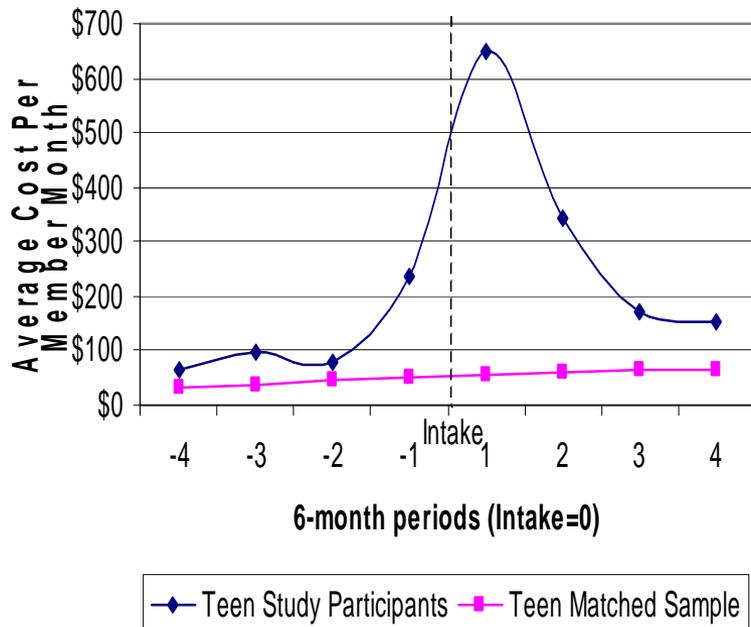
Parthasarathy S, Weisner CM, Hu T-W, Moore C. Association of outpatient alcohol and drug treatment with health care utilization and cost: revisiting the offset hypothesis. *J Stud Alcohol*. Jan 2001;62(1):89-97.

- Medical costs for adolescent CD patients did not decrease in the year after treatment as they do for adults.

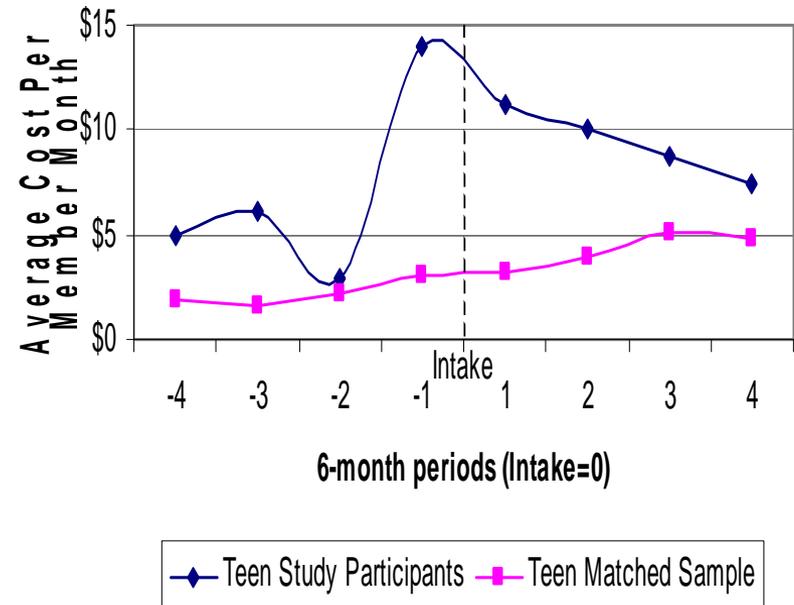
Parthasarathy S, Weisner C. (2006). Health care services use by adolescents with intakes into an outpatient alcohol and drug treatment program. *The American Journal on Addictions* 15(Supp 1):113-21.

Distribution of Costs: Cases versus Controls

Distribution of Overall Costs by 6-month Window

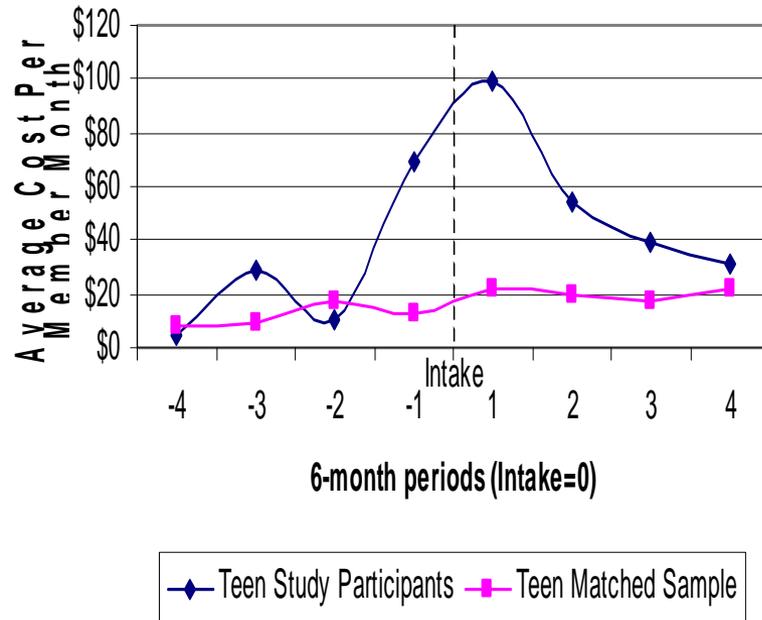


Distribution of ER Costs by 6-month Window

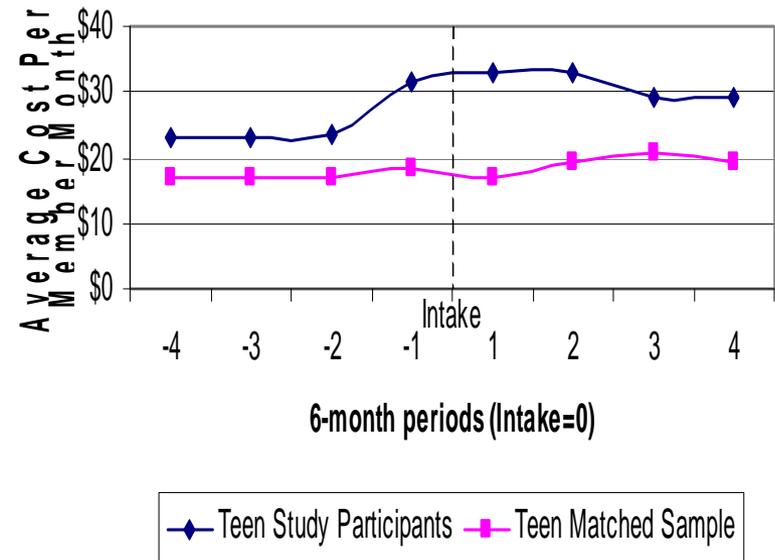


Distribution of Costs: Cases versus Controls

Distribution of Hospital Costs by 6-month Window



Distribution of Primary Care Costs by 6-month Window



Summary of Results

- Utilization and costs for adolescents with AOD problems are higher in the year prior to intake than a non-clinical, demographically matched sample. Costs appear to reach a peak in the period immediately preceding intake.
- In the 2 years post intake, costs have declined from the highest pre-treatment levels but continue to remain higher than the non-AOD sample.
- Primary care visits appear to be increasing among all adolescent girls although they appear to do so most rapidly among the AOD sample (not shown).

Medical Costs 3 and 5 Years after Treatment

- At 3 years, both abstainers and non-abstainers had higher average costs than the matched sample ($p < .05$).
 - Abstainers had higher costs in all departments except ER and inpatient. (They may be obtaining appropriate care to address medical issues or maintain abstinence).
- Preliminary analysis at 5 years shows costs reducing, based on patient characteristics.

One Reason for Continuing Care: Alcohol and Drug Use after Treatment

- 1 year after treatment – doing better, but many not abstinent*
 - 61% abstinent from alcohol
 - 59% abstinent from drugs
 - 47% abstinent from both
 - 36% in remission (non problematic use)
- 3 years after treatment
 - 38% abstinent from alcohol
 - 57% abstinent from drugs
 - 30% abstinent from both
 - 26% in remission

* 30-day abstinence

* Remission: used alcohol but no more than once/week and never more than 2 drinks, OR used marijuana, but only once/month or less, AND b) Used no other drugs (excluding tobacco); AND, c) Had no dependence/abuse symptoms

Costs of Family Members

- What are the medical conditions and costs of family members of individuals with alcohol and drug problems?
 - Compared to matched members in the general membership?
 - Compared to matched members with other chronic diseases?
- Do these costs change after successful treatment?

Ray GT, Mertens JR, Weisner C. The excess medical cost and health problems of family members of persons diagnosed with alcohol or drug problems. *Med Care*. Feb 2007;45(2):116-122.

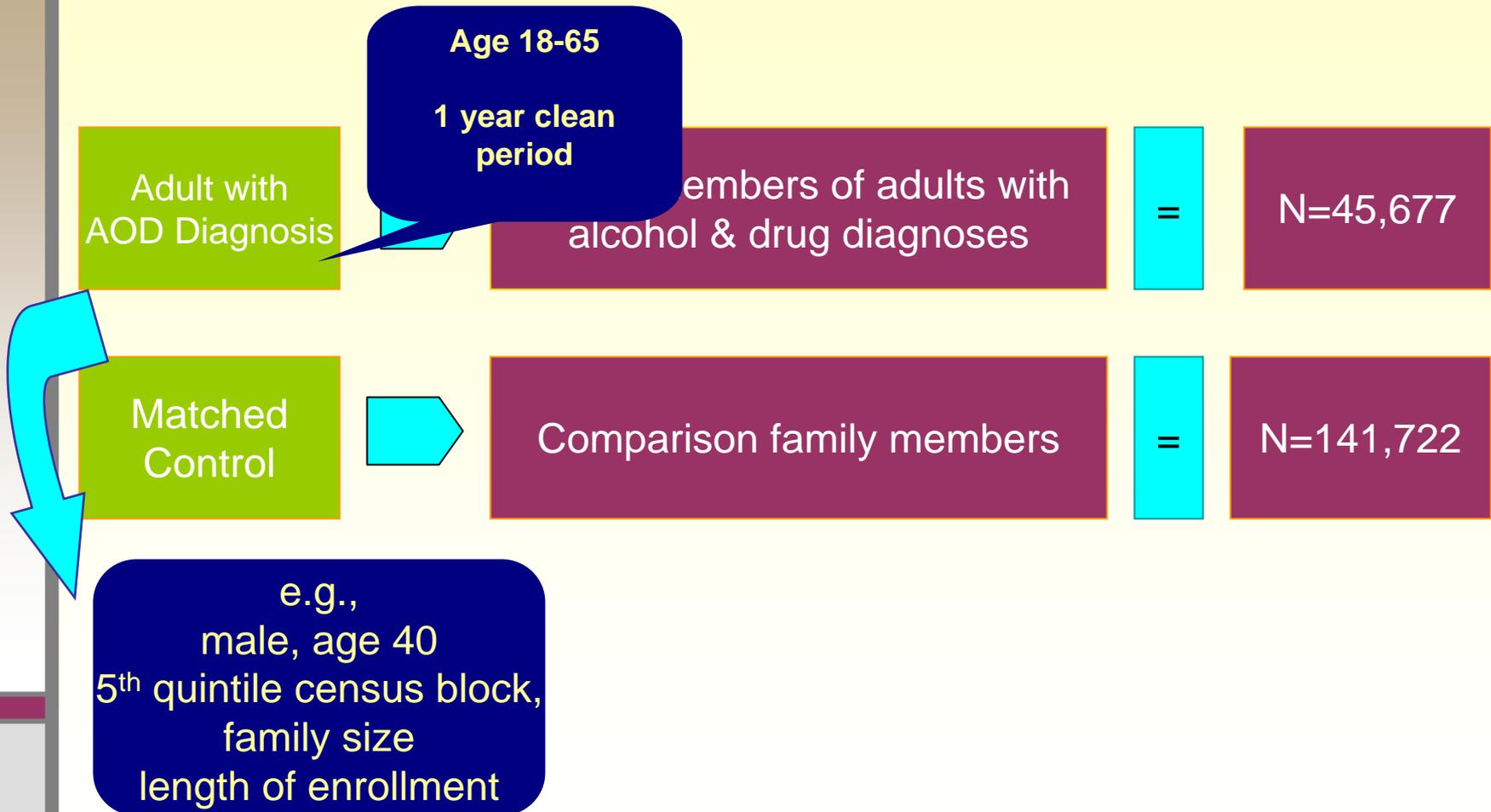
Ray GT, Weisner C, Mertens JR. (2009). Family members of persons with alcohol or drug dependence: health problems and medical cost compared to family members of persons with diabetes and asthma *Addiction* 104(2):203-14.

Weisner C, Parthasarathy S, Moore C, Mertens JR. (in press). Individuals receiving addiction treatment: are medical costs of their family members reduced? *Addiction*.

Health conditions and medical costs of family members of individuals with alcohol and drug problems

Health plan membership-based sample of individuals with AOD diagnoses

Study of Family Members of Individuals with Alcohol and Drug Conditions in Health Plan Membership



Study of Family Members of Individuals with Alcohol and Drug Conditions in Health Plan Membership

Family members of adults with
alcohol & drug diagnoses

=

N=45,677

Comparison family members

=

N=141,722

Medical Conditions of Adult Family members of Individuals with AOD Disorders and Control Adult Family Members (all differences significant)

Medical Conditions

Trauma

Lower back pain

Hypertension

Conditions of the uterus

Depression

Headache

Acid related disorders

Asthma

Pneumonia

Otitis media

Diabetes

Alcohol/Drug

Medical Conditions of Children Family members of Individuals with AOD Disorders and Control Children Family Members

(all differences significant)

Medical Conditions

Trauma

Otitis media

Asthma

Pneumonia

ADD

Headache

Depression

Acid related disorders

Alcohol/Drug

Excess cost of each family member of individuals with alcohol and drug diagnoses over time compared to comparison family members *

– Higher costs in **each** department within the health plan.

- 2 years before the index date, excess costs were \$490
- 1 year before the index date, excess costs were \$433

*Independent of gender, age, census block income group, and family size

*All differences are statistically significant

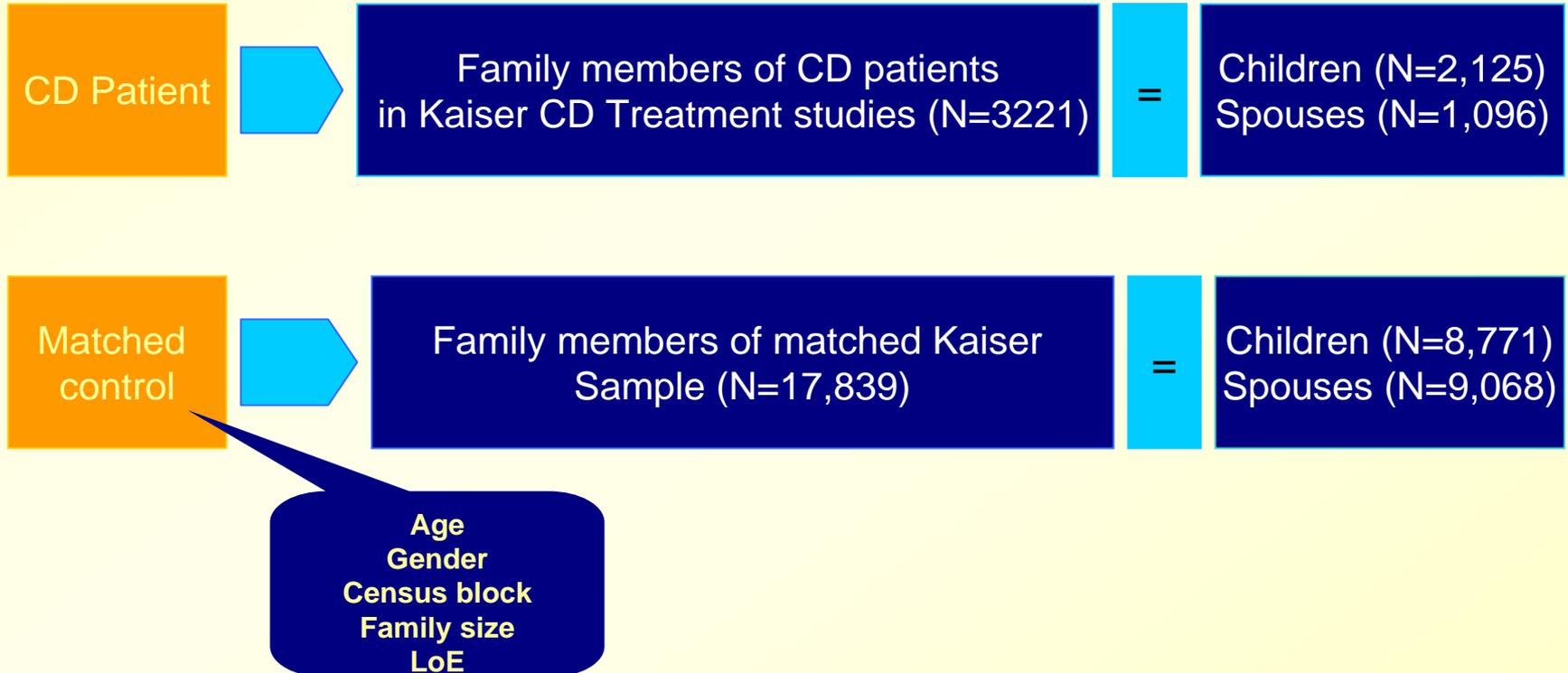


Do cost of family members change after
successful treatment?

Combined Treatment Sample at Intake (used to study their family members)

Average Age	38 years
Women	36%
Ethnicity	
White	74%
African-American	12%
Hispanic	10%
Other	4%
Employed	59%
High School graduate	86%
Household income \$40K+	45%
Married/Living as Married	45%
Had children under age 18	73%

Family Utilization Study: Family Members of Treatment Sample and Controls



Family Member Utilization 5 Years after Treatment

- Pre-treatment, families of all treatment patients have higher costs than control families.
- At 2-5 years post-intake, each year family members of AOD patients who were **abstinent at 1 year** had similar average per member-month medical costs as control family members – they were no longer higher.
- Family members of AOD patients who were **not abstinent at 1 year** had a trajectory of increasing medical cost relative to control family members. Their costs were higher.
- Successful AOD treatment is related to medical cost reductions for family members; these reductions may be considered a proxy for improved health.

Limitations of Family Study

- Only measured health costs and medical conditions – not other systems or quality of life
- Those who were living in the family but not covered not included
- Family members who left the health plan not included
- Not looking at causal relationships
- Probably conservative findings

Next Steps

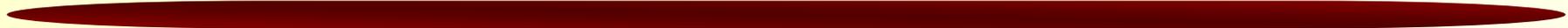


- New SBIRT study
- Continuing Care study
- Adaptation to other health systems

Summary/Discussion

- What kinds of services are needed?
 - Where can they be received?
- Importance of involving health care
 - How do people see themselves
- Cost arguments – outcomes, benefits
- Tailoring the business case

Constance.Weisner@kp.org

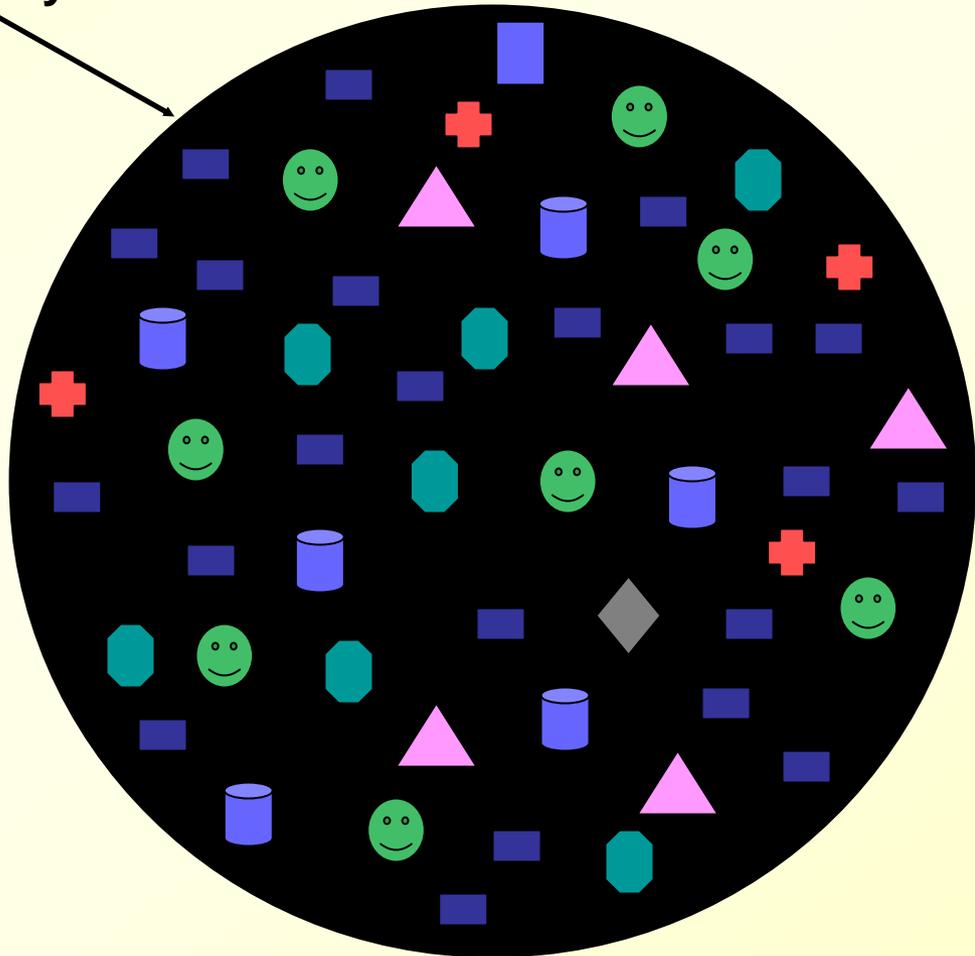


Community Epidemiology Laboratory

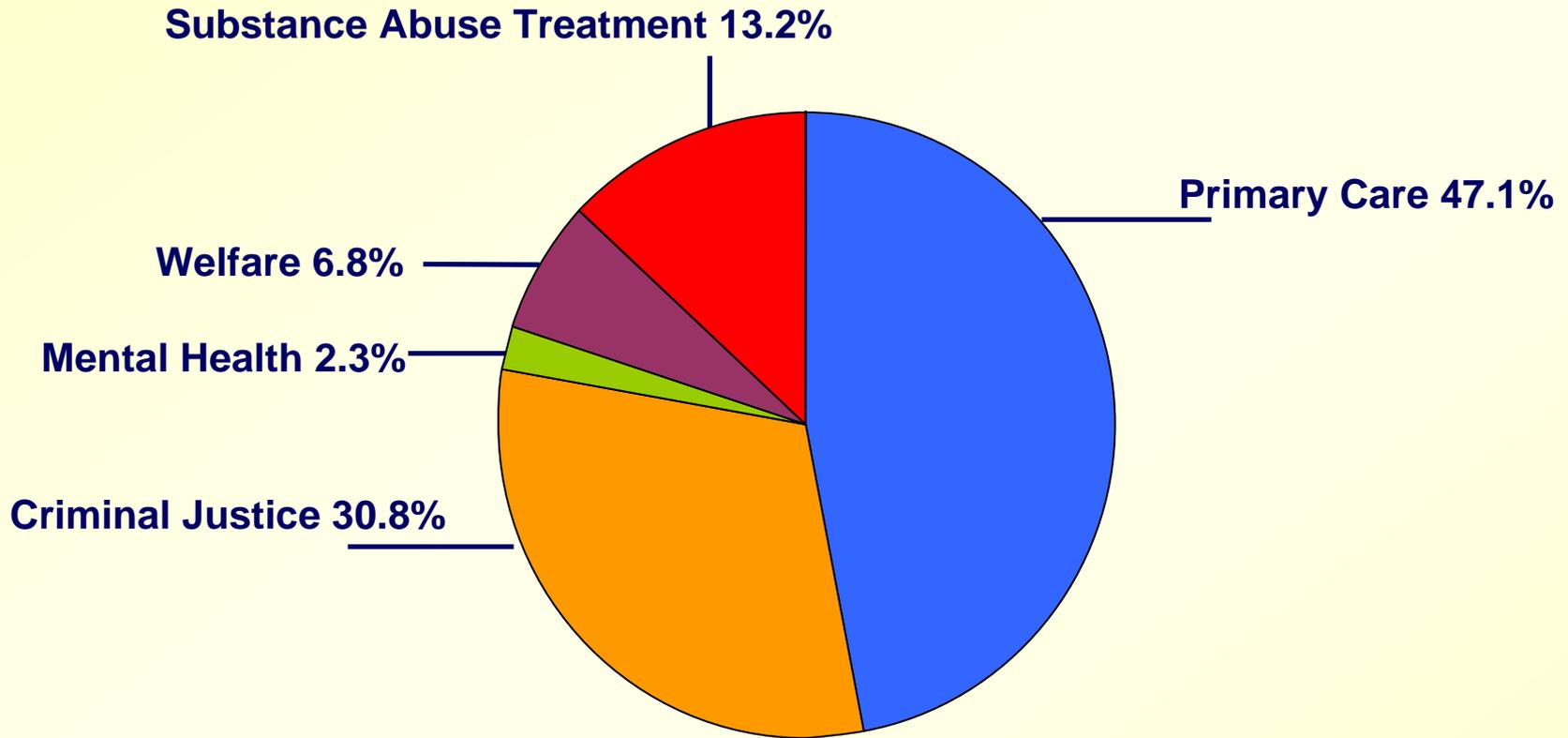
General Population Survey

Agency Systems

-  Alcohol Treatment (22)
-  Drug Treatment (8)
-  Mental Health (8)
-  Welfare (7)
-  Emergency Room (4)
-  Primary Health Care (5)
-  Criminal Justice (1)



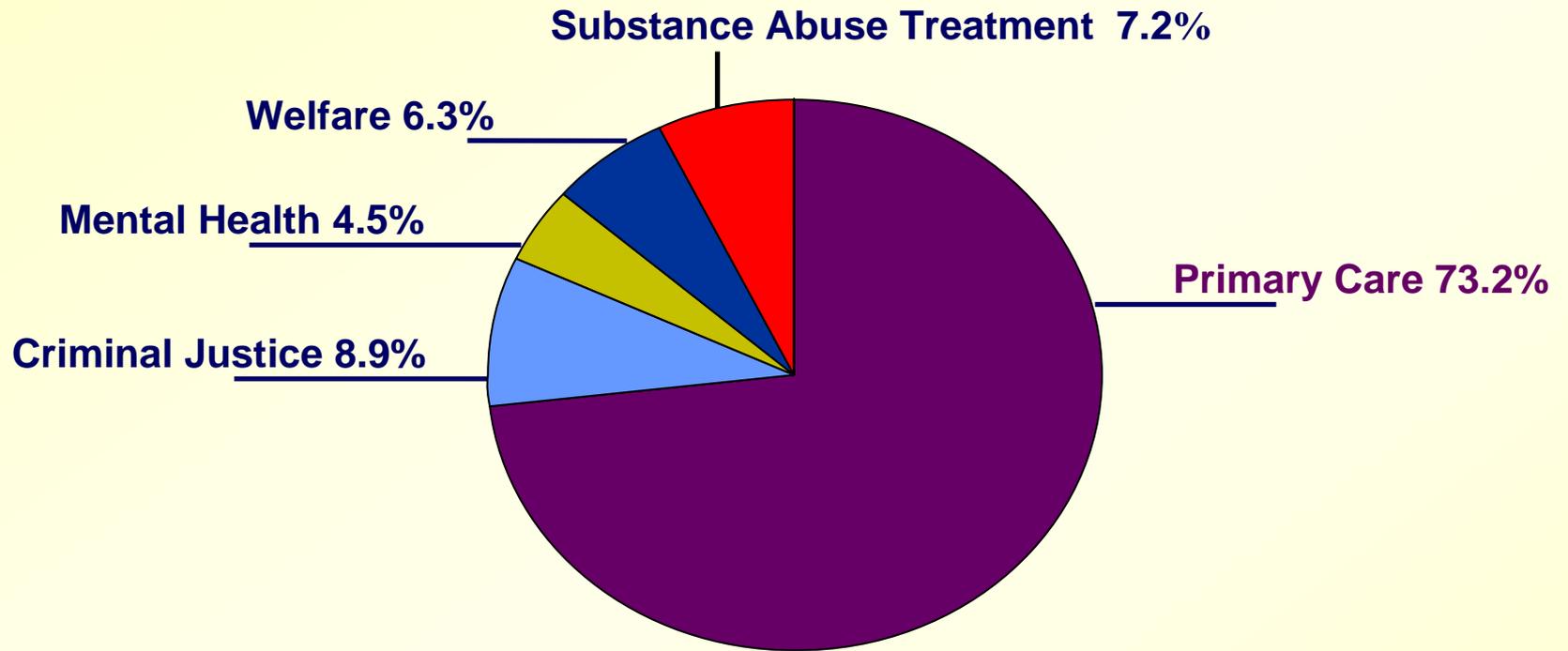
Distribution of New Admissions¹ of Alcohol Dependent² Men in Community Agency Systems



¹ Data weighted for design effects, non-response, and to a common fieldwork duration so that each agency system sample is shown to its size.

² Alcohol dependence rates over a base of alcohol dependent men across all agency systems.

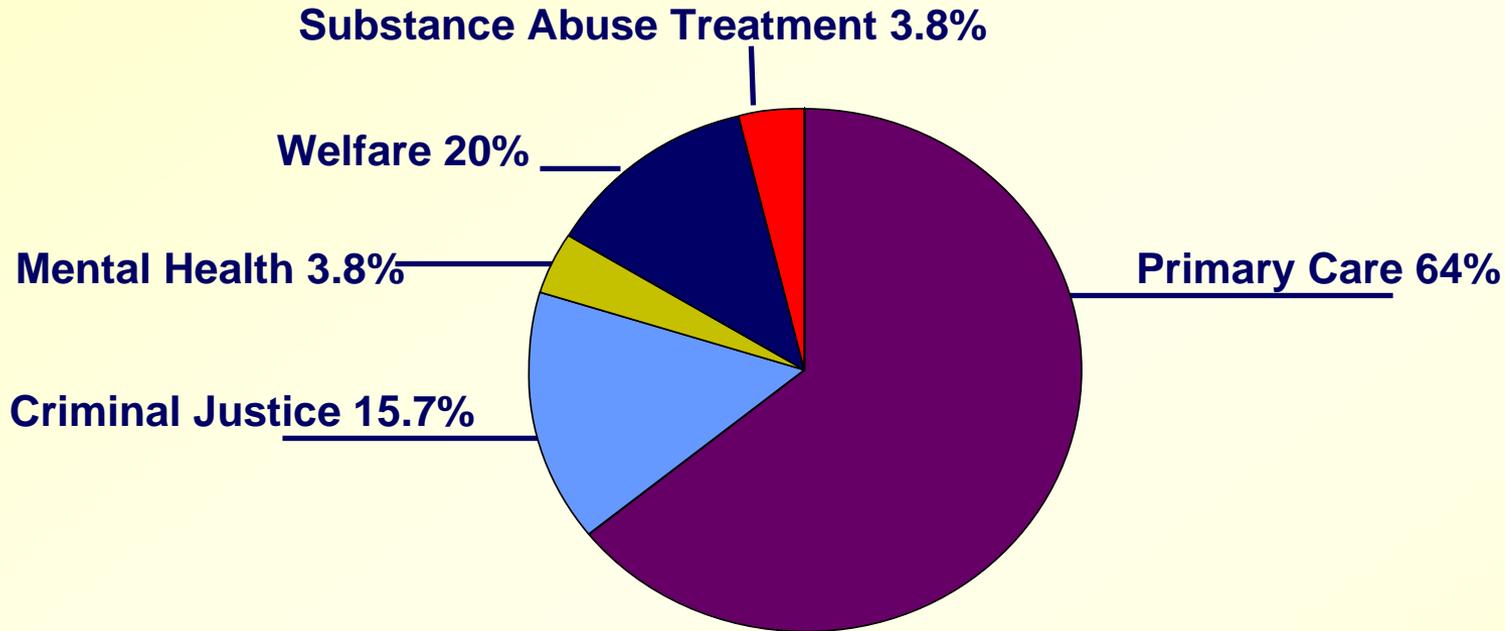
Distribution of New Admissions¹ of Alcohol Dependent² Women in Community Agency Systems



¹ Data weighted for design effects, non-response, and to a common fieldwork duration so that each agency system sample is shown to its size.

² Alcohol dependence rates over a base of alcohol dependent women across all agency systems.

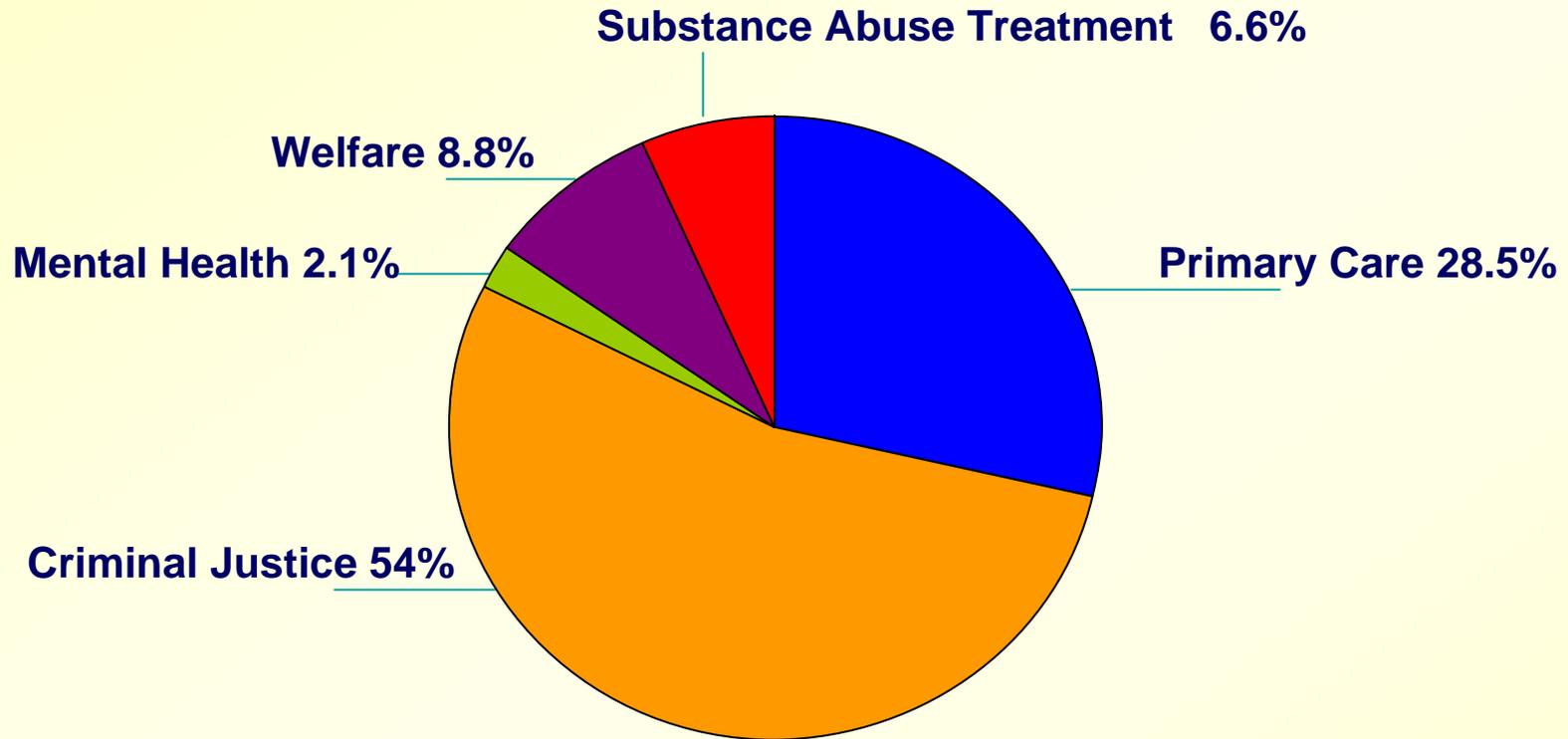
Distribution of New Admissions of Female Weekly Drug Users² in Community Agency Systems¹



¹ Data weighted for design effects, non-response, and to a common fieldwork duration so that each agency system sample is shown to its size.

² Weekly drug use rates over a base of women weekly drug users across all agency systems.

Distribution of New Admissions of Male Weekly Drug Users² in Community Agency Systems¹



¹ Data weighted for design effects, non-response, and to a common fieldwork duration so that each agency system sample is shown to its size.

² Weekly drug use rates over a base of men weekly drug users across all agency systems. (Weighted N=421)