

# Psychopathological Antecedents to Substance Use Disorders in Youth

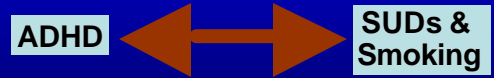


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Massachusetts General Hospital  
Harvard Medical School

## Overlap between ADHD and Substance Use Disorders (SUDs)



Bidirectional overlap between ADHD & SUDs and smoking

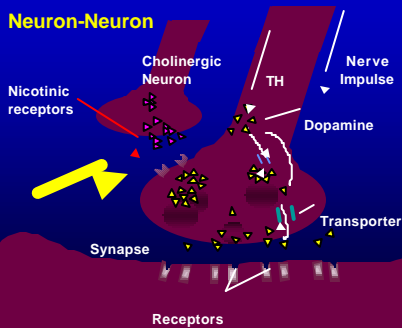
Wilens TE, Biederman J, et al. J Nerv Ment Dis. 1997 Aug;185(8):475-82.

## Is ADHD a Risk Factor for Smoking?

## ADHD and Nicotinic Receptors

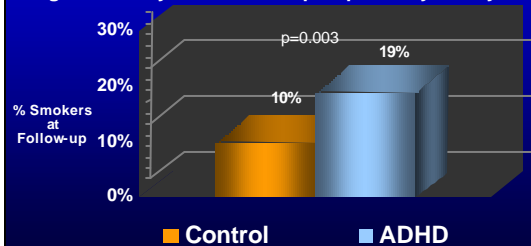
- The neurobiology of ADHD may involve deficits in cholinergic nicotinic receptors
- ADHD individuals may have genetic or acquired deficits in nicotinic cholinergic receptors

## Potential Areas of Neurochemical Manipulation: Treatment of ADHD with Cholinergic Agents



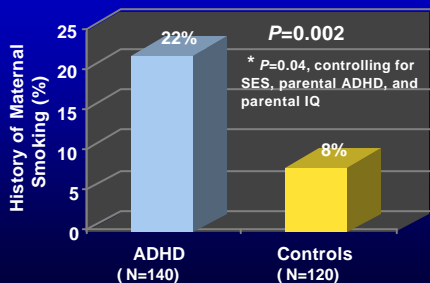
## ADHD and Smoking in Youth

Clinic-referred ADHD boys (n=128) and controls (n=109) ages 6 to 17 years followed prospectively for 4 years



Milberger et al. JAACAP 1997;36:38.

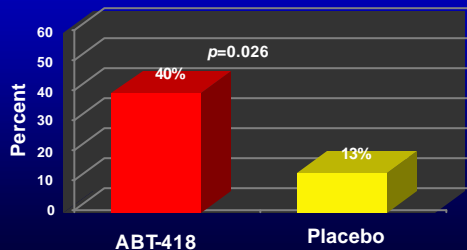
## Maternal Smoking During Pregnancy: Results in Children



Milberger et al. *Am J Psychiatry* 1996;153:1138.

## MGH Study of ABT-418 for Adult ADHD

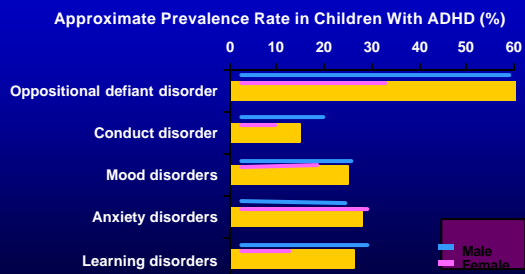
### ADHD Clinical Global Impression Percent Much or Very Much Improved at Endpoint



Wilens et al. *Am J Psychiatry* 1999;156:1931.

## Smoking and Comorbidity

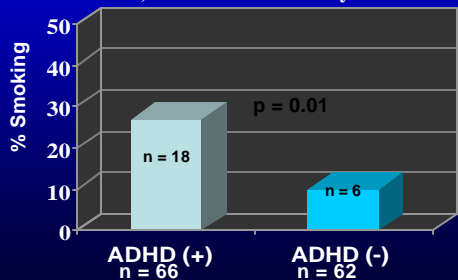
## ADHD: Childhood Common Comorbid Diagnoses



Biederman et al. *JAACAP* 1996;35:343. Pliszka. *J Clin Psychiatry* 1998;59(suppl 7):50.  
Biederman et al. *JAACAP* 1999;38:966. Spencer et al. *Pediatric Clin N Am* 1999;46:915.

## ADHD and Smoking in Youth

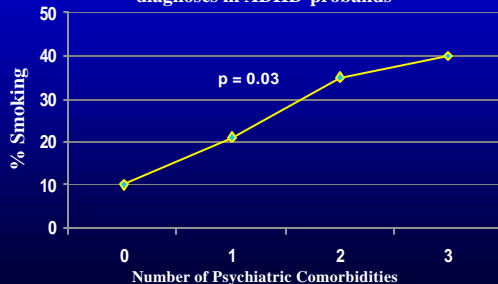
### Impact of psychiatric comorbidity with Mood, Conduct or Anxiety Disorder



Milberger et al. *JAACAP* 1997;36:38.

## ADHD and Smoking in Youth

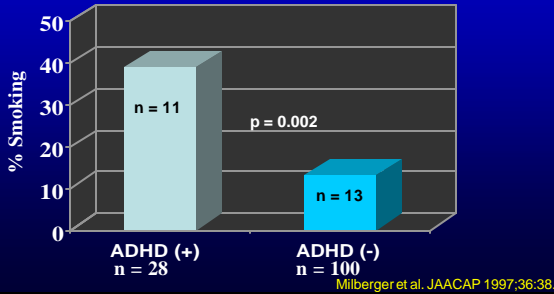
### Impact of psychiatric comorbidity: Number of comorbid diagnoses in ADHD probands



Milberger et al. *JAACAP* 1997;36:38.

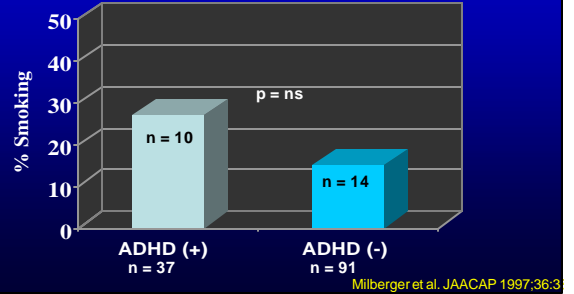
## ADHD and Smoking in Youth

Impact of psychiatric comorbidity:  
Conduct Disorder



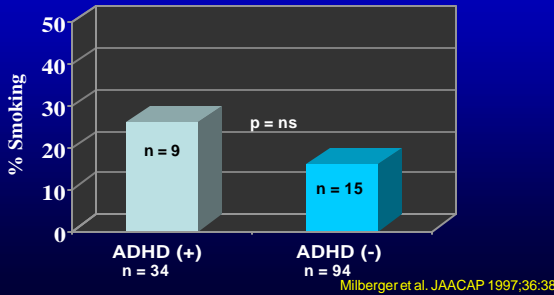
## ADHD and Smoking in Youth

Impact of psychiatric comorbidity:  
Major Depression



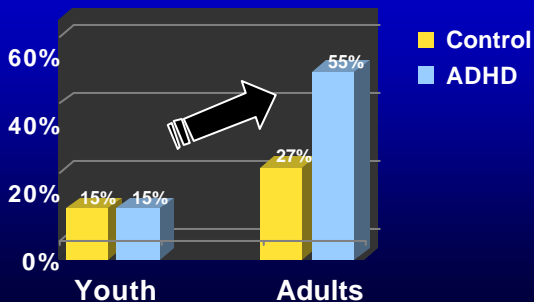
## ADHD and Smoking in Youth

Impact of psychiatric comorbidity:  
Multiple (=2) Anxiety Disorders

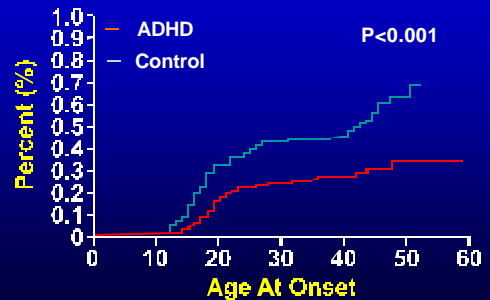


Is ADHD a Risk Factor for  
SUDs?

## ADHD & SUDs

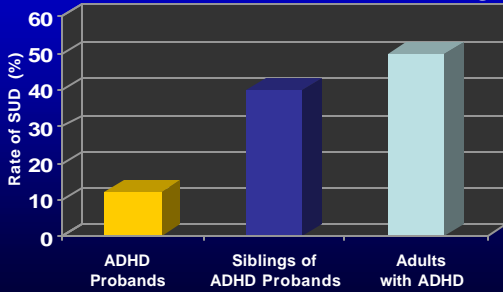


## Kaplan-Meier Curves for PSUD Onset in ADHD Adults



## SUD and ADHD

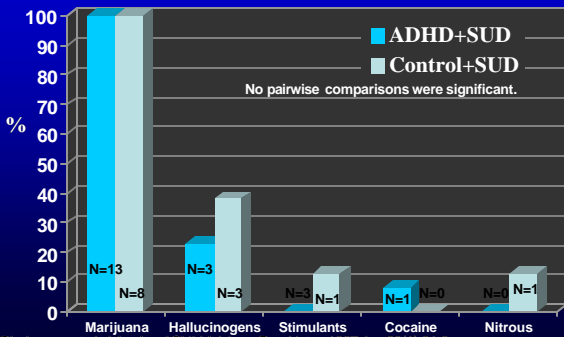
Rate of SUD in ADHD Probands and Siblings



Biederman et al, JAACAP, 1997

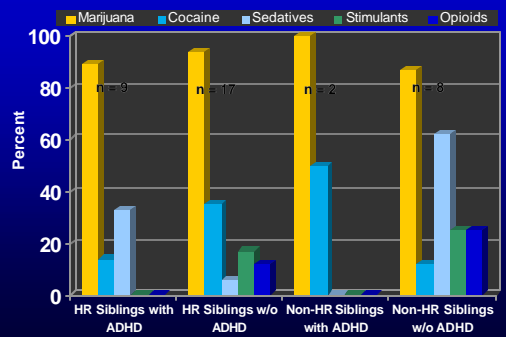
Is ADHD a Risk Factor for Specific Types of SUDs?

## Preferred drugs of abuse by ADHD probands vs controls



Biederman et al, J Am Acad Child Adolesc Psychiatry, 1997, 36(1):21-8.

## Preferred Drugs of Abuse Among High-Risk Siblings of ADHD Probands

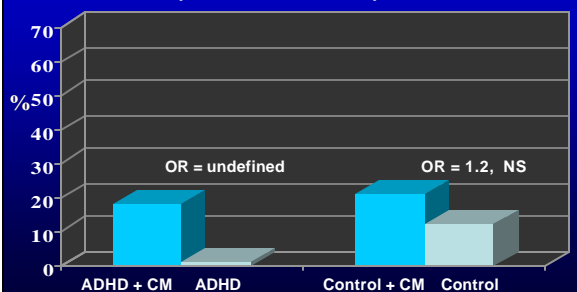


Biederman, Faraone, et al, Am J Addict, 1997;6:310-20.

Are ADHD-Associated Comorbidities Risk Factors for SUDs?

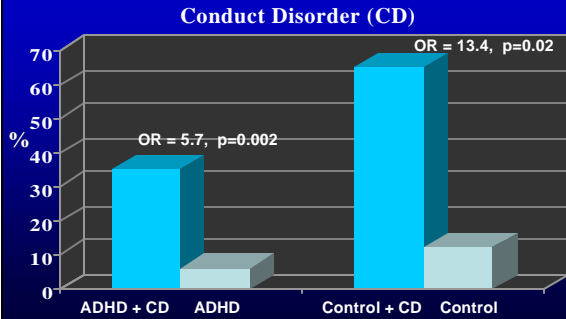
## SUD in ADHD and Control Probands

Psychiatric Comorbidity (CM)



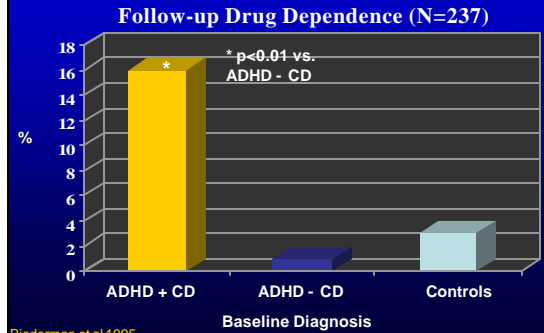
Biederman et al, J Am Acad Child Adolesc Psychiatry, 1997, Jan;36(1):21-8.

## SUD in ADHD and Control Probands



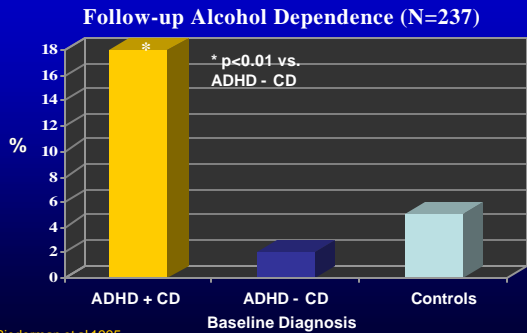
Biederman et al; J Am Acad Child Adolesc Psychiatry. 1997;36(1):21-9.

## 4 Year Follow-Up Study of ADHD



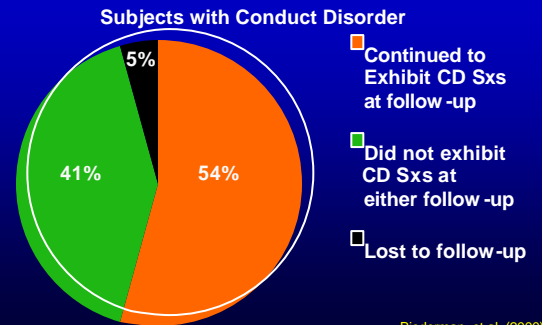
Biederman et al 1995

## 4 Year Follow-Up Study of ADHD



Biederman et al 1995

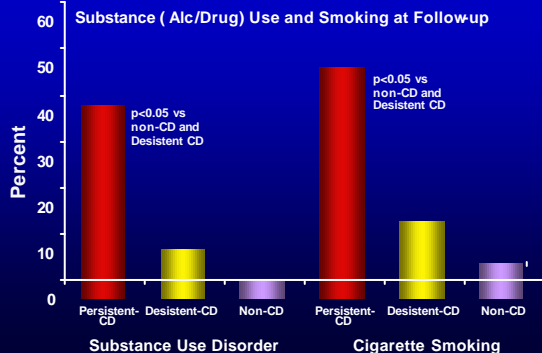
## Remission and Symptom Decline in CD



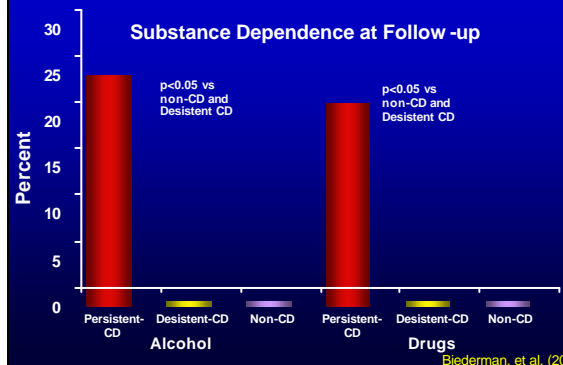
Biederman, et al. (2000)

## Remission and Symptom Decline in CD

Biederman, et al. (2000)



## Remission and Symptom Decline in CD

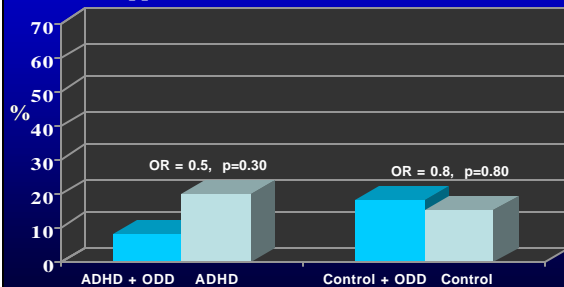


Biederman, et al. (2000)

Does ODD share with CD the risk for SUD?

## SUD in ADHD and Control Probands

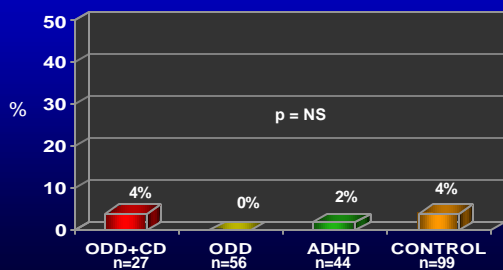
### Oppositional Defiant Disorder (ODD)



Biederman et al, J Am Acad Child Adolesc Psychiatry, 1997, Jan,30(1):21-8.

Is Childhood ODD a Precursor to Adolescent CD?

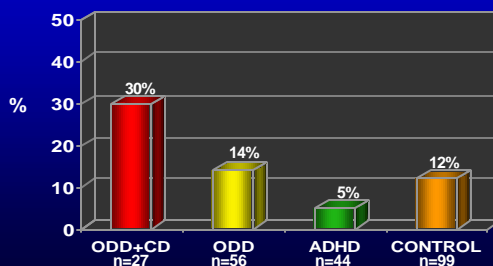
### Rate of PSUD at Baseline



Biederman J, J Am Acad Child Adolesc Psychiatry, 1996 Sep,35(9):1183-204

Is Childhood ODD a Precursor to Adolescent CD?

### Rate of PSUD at Follow-Up

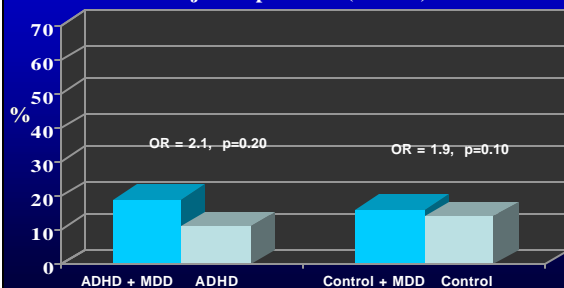


Biederman J, J Am Acad Child Adolesc Psychiatry, 1996 Sep,35(9):1183-204

Do Mood Disorders Increase the Risk for SUD?

## SUD in ADHD and Control Probands

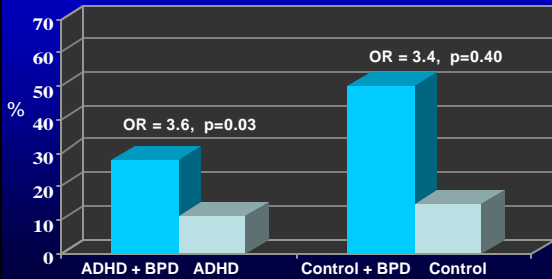
### Major Depression (Severe)



Biederman et al, J Am Acad Child Adolesc Psychiatry, 1997, Jan,30(1):21-8.

## SUD in ADHD and Control Probands

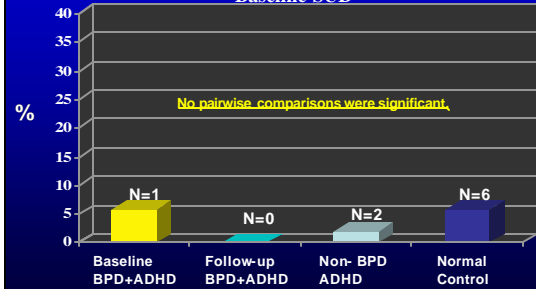
### Bipolar Disorder (BPD)



Biederman et al; J Am Acad Child Adolesc Psychiatry. 1997;Jan;36(1):21-9.

## ADHD and Mania

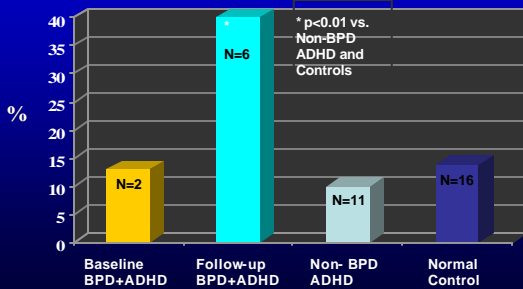
### Baseline SUD



Biederman et al 1995

## ADHD and Mania

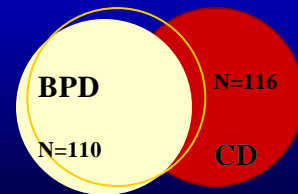
### Follow-up SUD



Biederman et al 1995

## Towards Defining A Dysphoric Subtype of CD

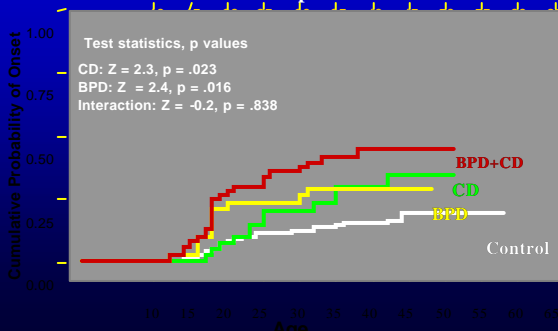
### Diagnostic Overlap Between CD and BPD



Biederman et al., 1998

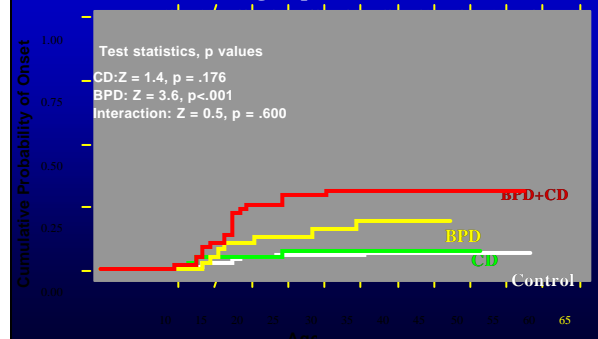
## Kaplan-Meier Survival Estimates in Relatives >14 Yrs, Stratified by Diagnosis

### Alcohol Dependence



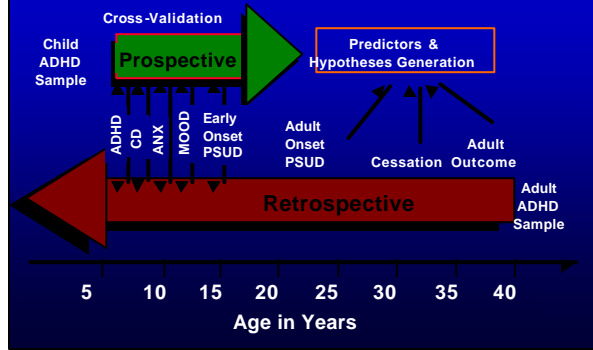
## Kaplan-Meier Survival Estimates in Relatives >14 Yrs, Stratified by Diagnosis

### Drug Dependence

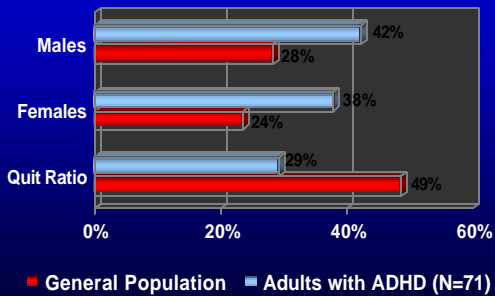


# ADHD and SUDs in Adults

## Prospective and Retrospective Methodology

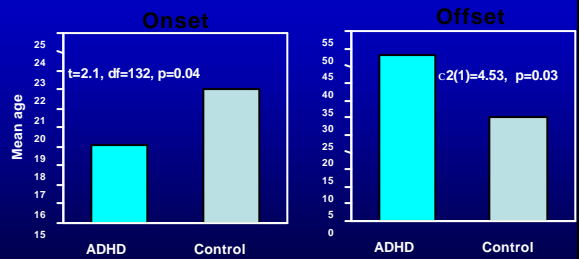


## ADHD and Smoking in Adults



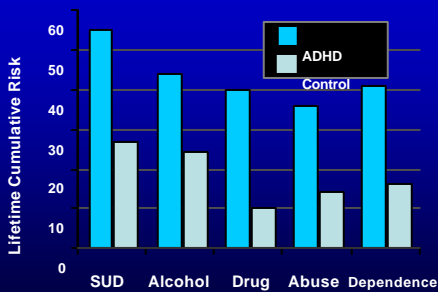
Pomerleau et al. J Subst Abuse 1995;7:373.

## SUD in ADHD Adults: Age at Onset and offset of SUD



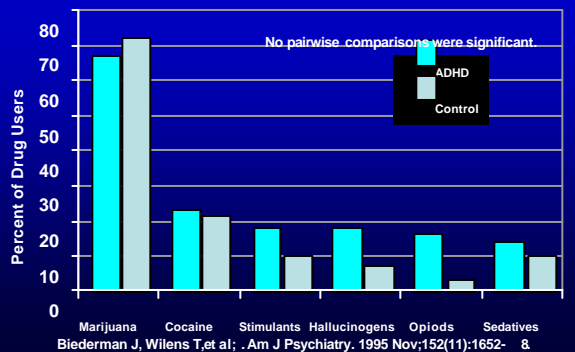
Biederman J, Wilens T, et al; . Am J Psychiatry. 1995 Nov;152(11):1652- 8

## SUD in ADHD Adults Subtypes of SUD



Biederman J, Wilens T, et al; . Am J Psychiatry. 1995 Nov;152(11):1652- 8

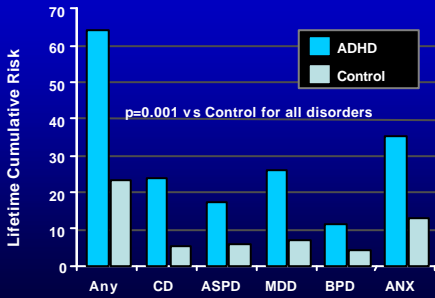
## SUD in ADHD Adults: Type of Drugs used in Subjects with Drug A/D



Biederman J, Wilens T, et al; . Am J Psychiatry. 1995 Nov;152(11):1652- 8

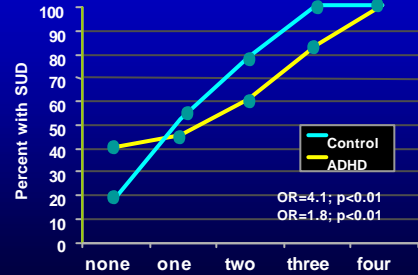


## SUD in Adult ADHD Psychiatric Comorbidity



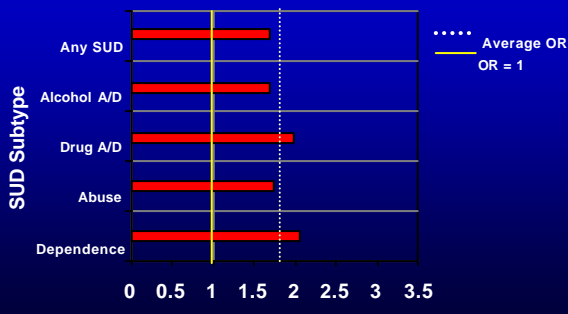
Biederman J, Wilens T, et al; . Am J Psychiatry. 1995 Nov;152(11):1652-8

## SUD in ADHD Adults: Association with Number of Comorbid Psychiatric Disorders



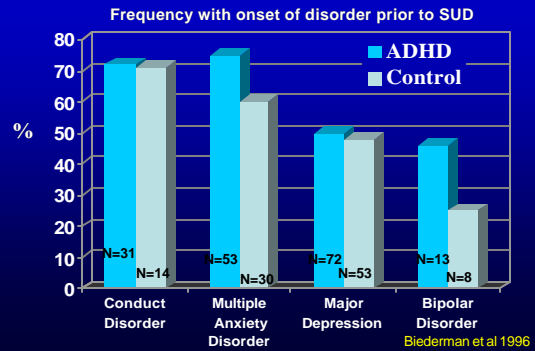
Biederman J, Wilens T, et al; . Am J Psychiatry. 1995 Nov;152(11):1652-8

## SUD in ADHD Adults: Increased Risk for SUD in Adults with ADHD and No Comorbidity



Biederman J, et al; . Am J Psychiatry. 1995;152:1652-8

## Age of SUD Onset in ADHD and Control Adults

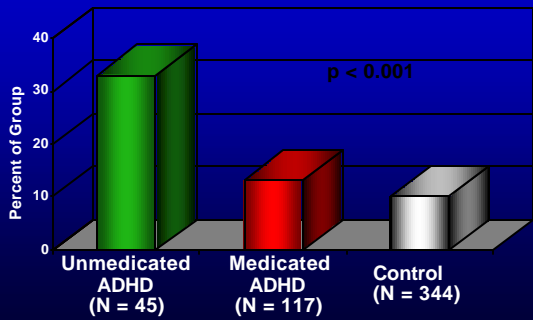


Biederman et al 1996

Is ADHD  
Pharmacotherapy  
a Risk Factor for  
Subsequent  
SUDs?

Myth - Stimulant Medication  
Causes Substance Abuse

## SUD in ADHD Youth Growing Up



Biederman, J et al., *Pediatrics*, 1999; 104(2)

## Is ADHD Pharmacotherapy a Risk Factor For Subsequent Substance Abuse?

### Conclusions

- The bulk of studies indicate that in ADHD youth treated with medication (typically stimulants), there is a reduction in the risk of substance abuse.
- These data are particularly robust when treated and untreated groups are matched at baseline for severity of illness.
- These data are among the strongest within Child Psychiatry indicating the preventive influence of treatment on the development of substance abuse.

## Myth - Stimulant Medication Causes Substance Abuse

- Fact – Stimulant treatment lowers the risk of ADHD patients abusing alcohol and drugs

Wilens, Faraone, et al., *Pediatrics*, 2003

## ADHD + SUDs : Summary

- ADHD is a risk factor for cigarette smoking and SUDs
- Comorbidity increases smoking and SUDs risks
- Pharmacotherapy for ADHD reduces the risk of SUD in ADHD youth (association less clear with smoking)
- ADHD and comorbid disorders onset in childhood whereas smoking and SUDs onset in adolescence:
  - opportunity for prevention and early intervention strategies