ADHD and Behavioural Paediatrics

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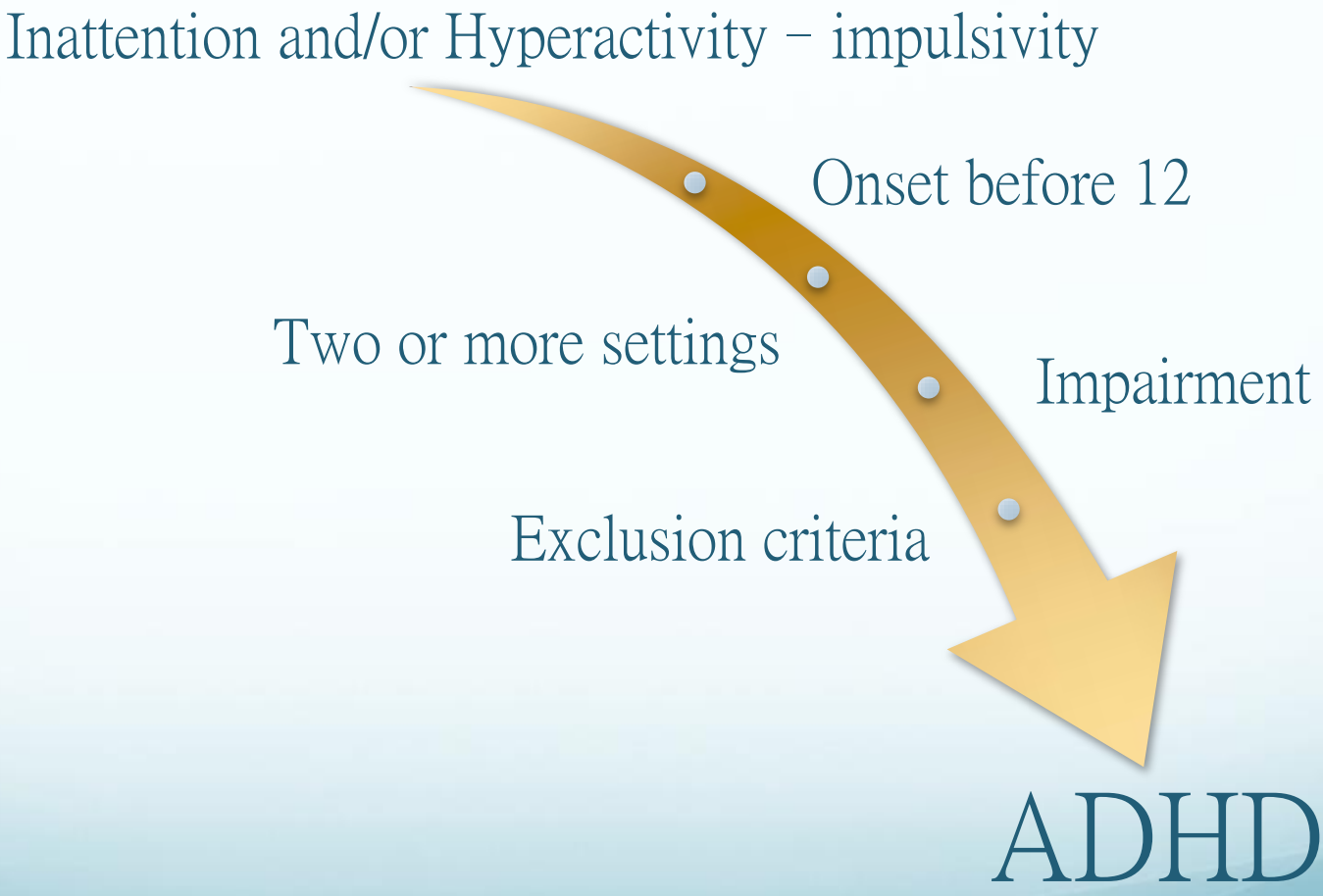
DSM V Diagnostic Criteria



Doctor, you have to see my son today, because he was just knocked down by a car …

He has no friends in school … he can’ t go to private tuition …he is too talkative, intrusive, disturbing …

He didn’ t hand in his works, even the completed ones …

I have to quit my job to look after him …

When do you go to sleep? … … 11 pm may be 1 am some time …

She is more happy in school now, because she has her recess time …

I can’ t reward him with extra time on TV or computer, he spends the whole evening on homework … …

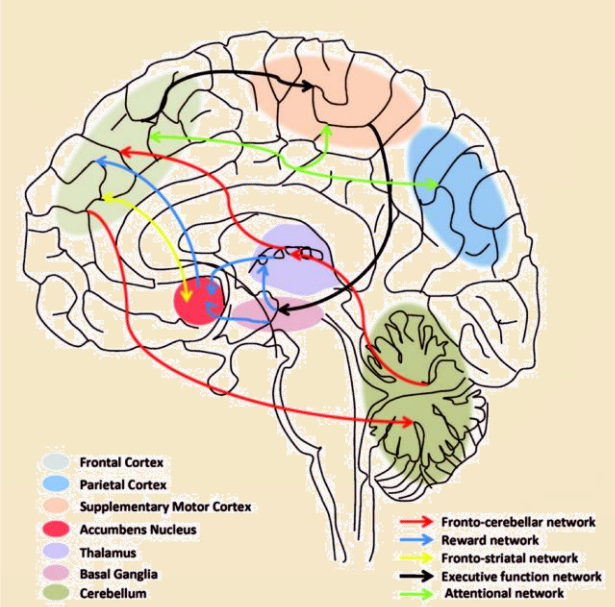
Can I tell you something in private … his teacher put him sitting at the back of classroom …

Neurobiological basis

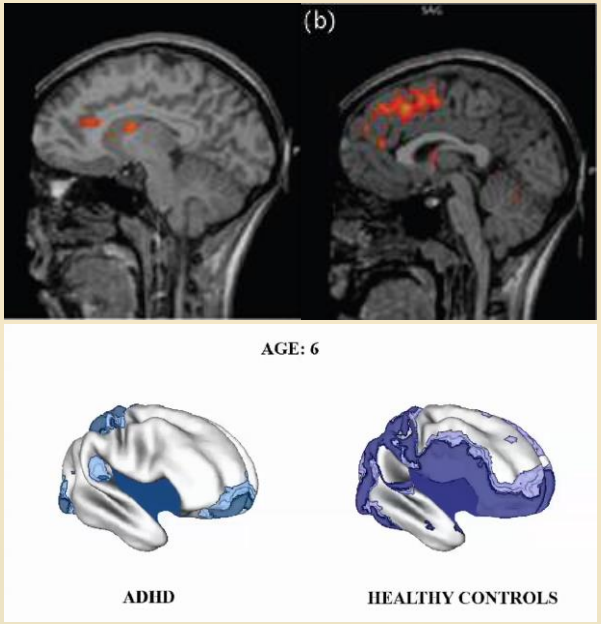
Genetics

(twins and adoption studies, polymorphism in dopaminergic and noradrenergic genes, ……)

Neurocognitive function (executive dysfunction)



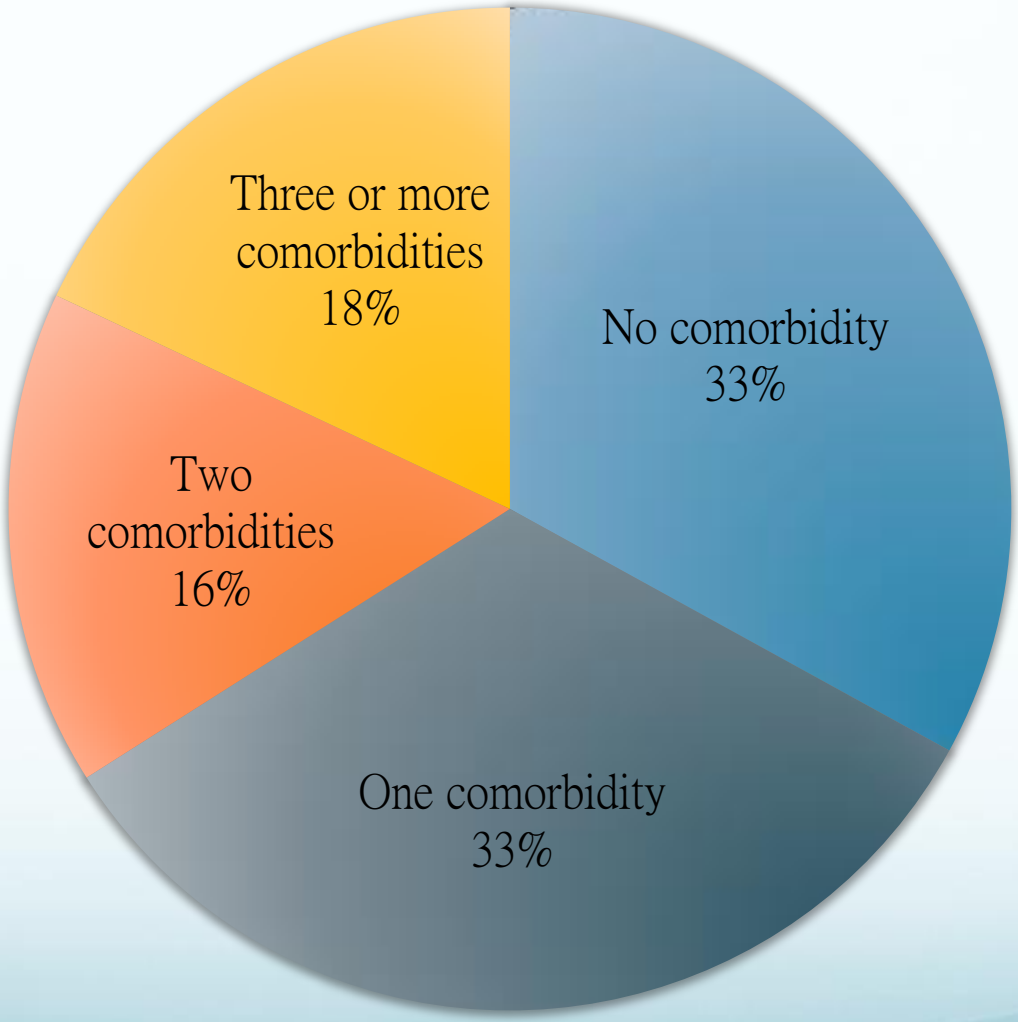
Neuroimaging (brain structure)



Environmental

(prematurity, brain injury, prenatal exposure to tobacco and alcohol, social adversity, toxins ……)

Pattern of comorbidity in children with ADHD



Larson et al, 2011

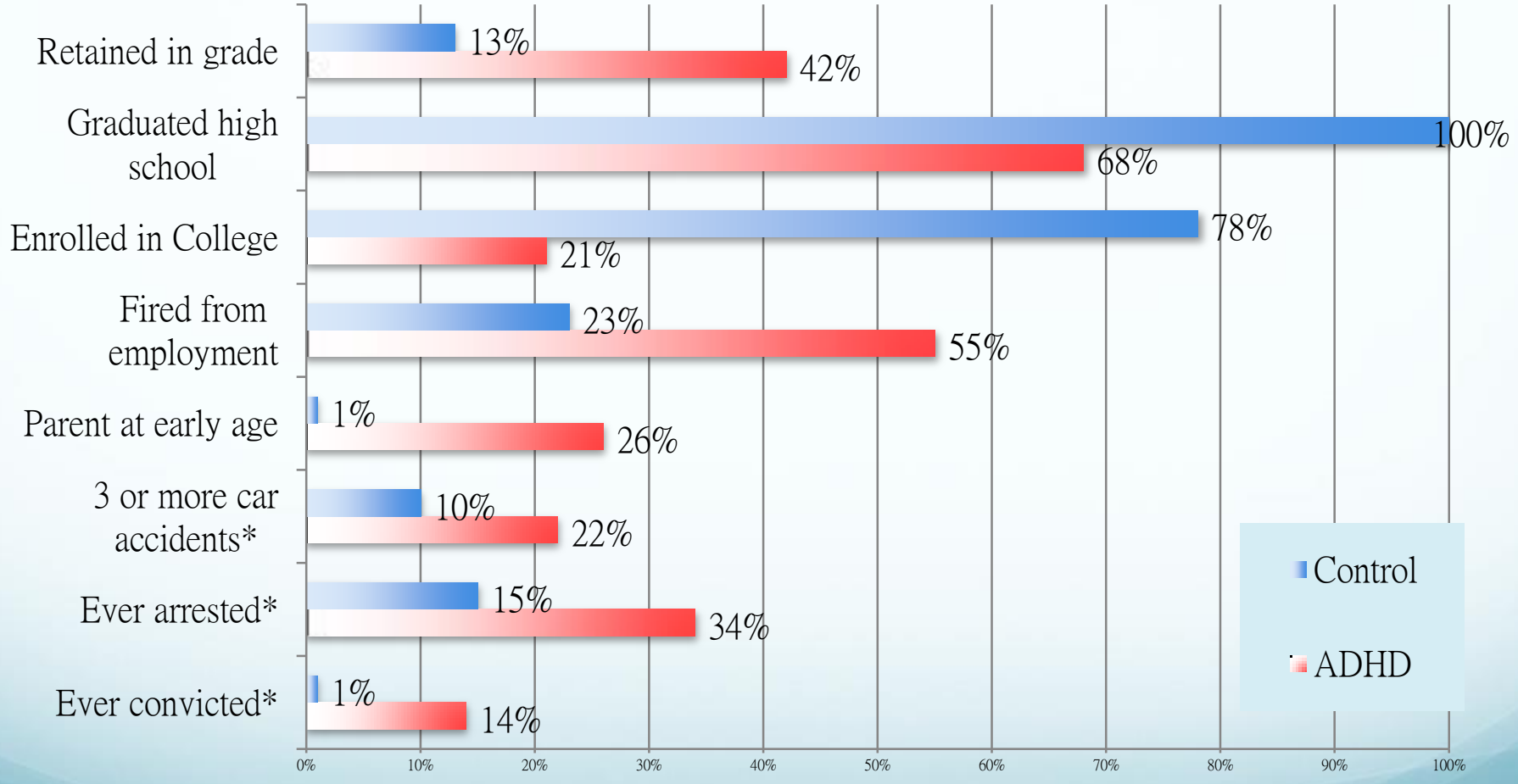
Up to TWO-THIRD of children with ADHD has at least one of the following disorders as comorbidities

1. Fine motor and coordination problem (30 – 50%)
2. Tics and Tourette syndrome (20%)
3. Oppositional defiant disorder (35%)
4. Conduct disorder (25%)
5. Sleep disturbance (20%)
6. Anxiety disorder (25%)
7. Depressive disorder (18%)
8. Learning disabilities (30 - 50%)
9. Autistic Spectrum Disorder
10. Social and communication problems
11. Substance abuse (up to 75% in untreated adolescents ≥ 15 years)

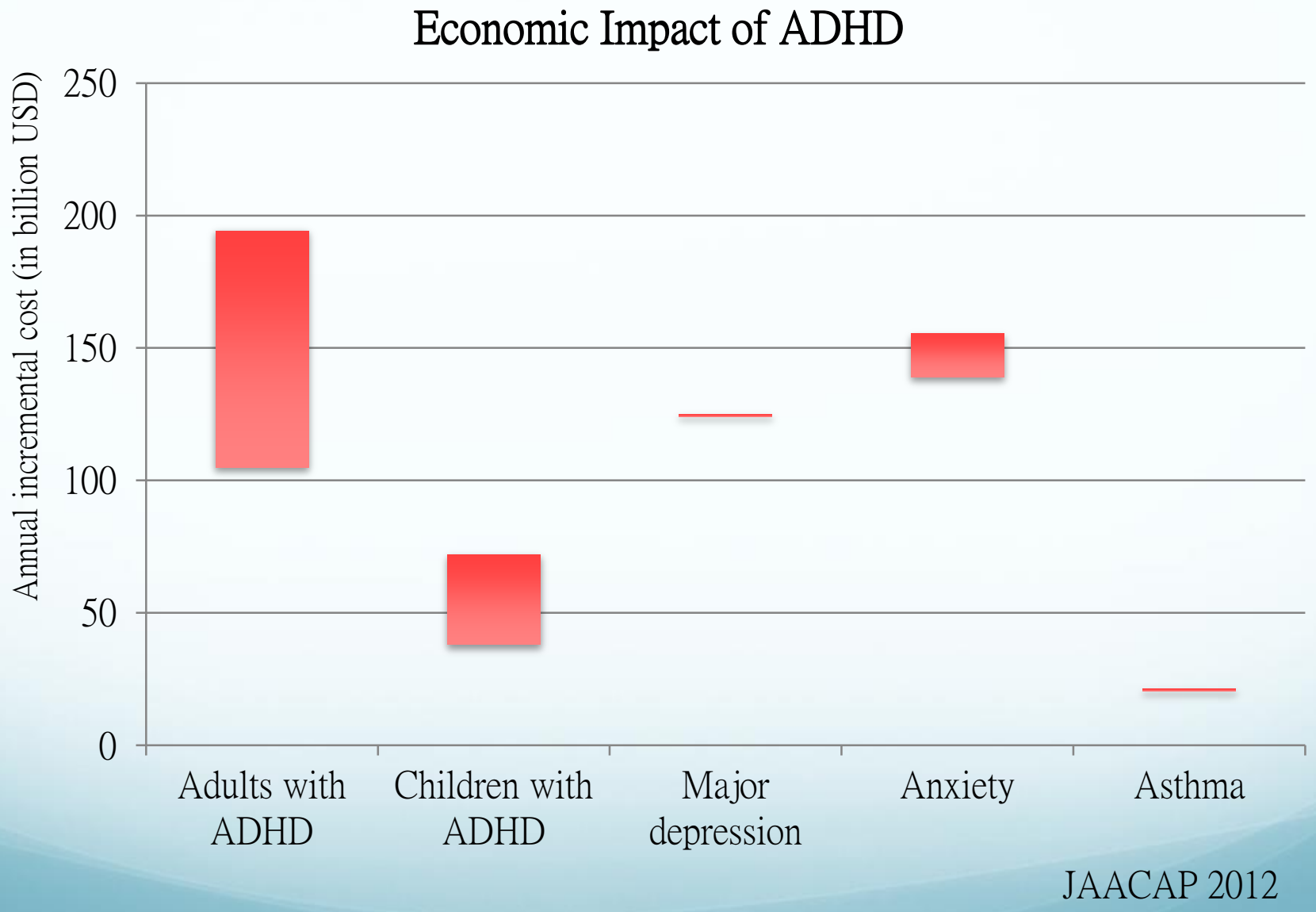
Degree of poor functioning in children with ADHD increases stepwise with increasing number of comorbid disorders.

There are long term effects

Outcome of children with ADHD



Pediatrics, August 2011; *Psych Res, May 2011


Economic Impact of ADHD
Annual incremental cost (in billion USD)
250
200
150
100
50
0
Adults with ADHD
Children with ADHD
Major depression
Anxiety
Asthma
JAACAP 2012

MTA Study, 1999

- Proportion of children have a restoration to normal or near-normal functioning:
  - Medication group – 56%
  - Behavioural group – 34%
  - Combined group – 68%
  - Community group – 25%
- Taking into consideration that vast number of patients with ADHD have comorbidity, use of combined provides additional benefits.

There is NO magic pill

Two Levels of Deficits in ADHD

Performance Deficit

- Medication
- Improve attention and reduce hyperactivity
- Consistent performance

Skill Deficit

- Behavioral Management
- Direction instruction and increase opportunities
- Acquisition of new skills

Mata-analysis on behavioral therapy

"… … results clearly support the effectiveness of behavioral treatments for ADHD. … … efforts should be redirected from debating the effectiveness … …to disseminating, enhancing, and improving the use of behavioral interventions in community, school, and mental health setting."

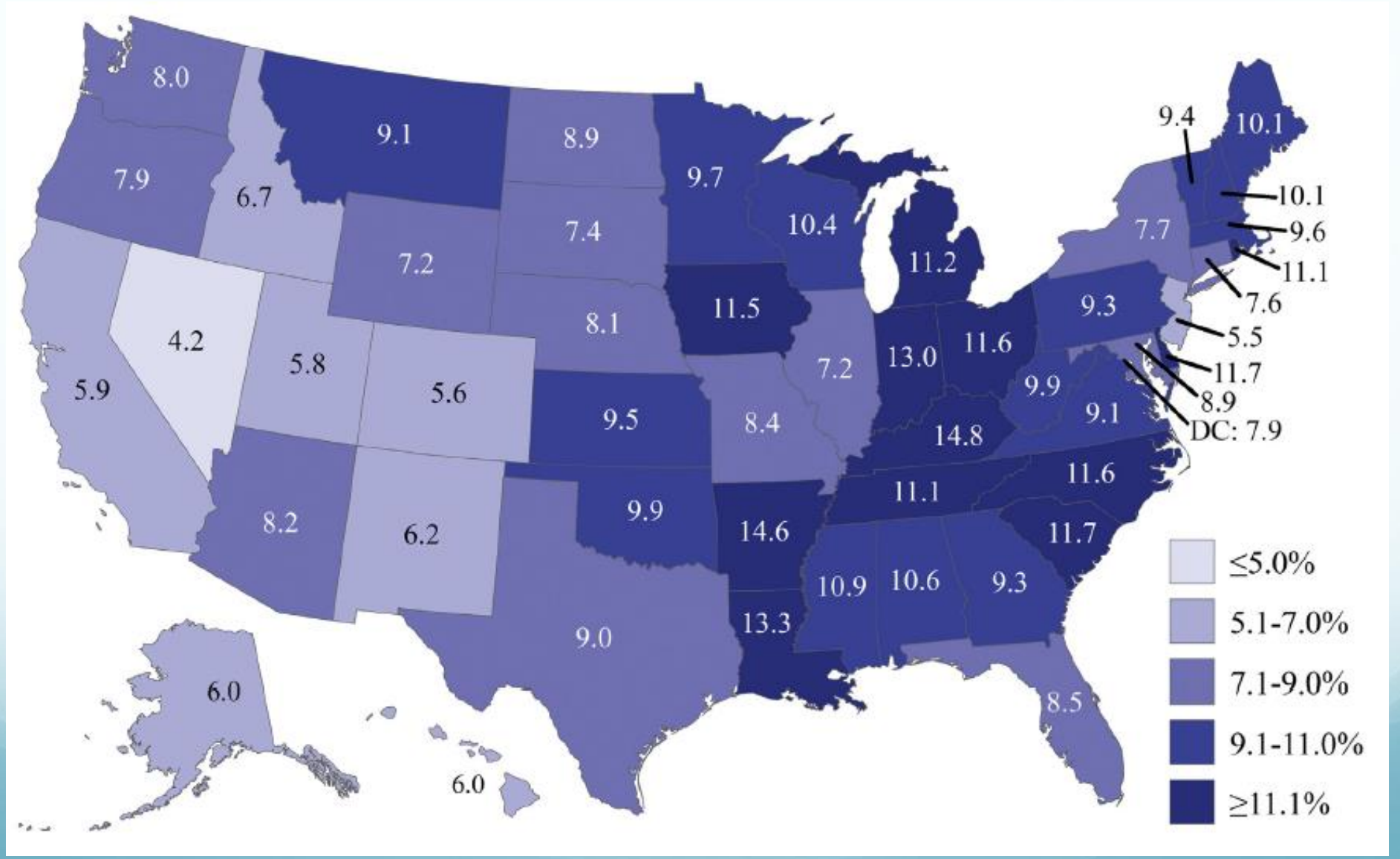
G.A. Fabiano et al. 2009


Family support
Behavioral Treatment
Medication Mx
Education support

How many children is affected?

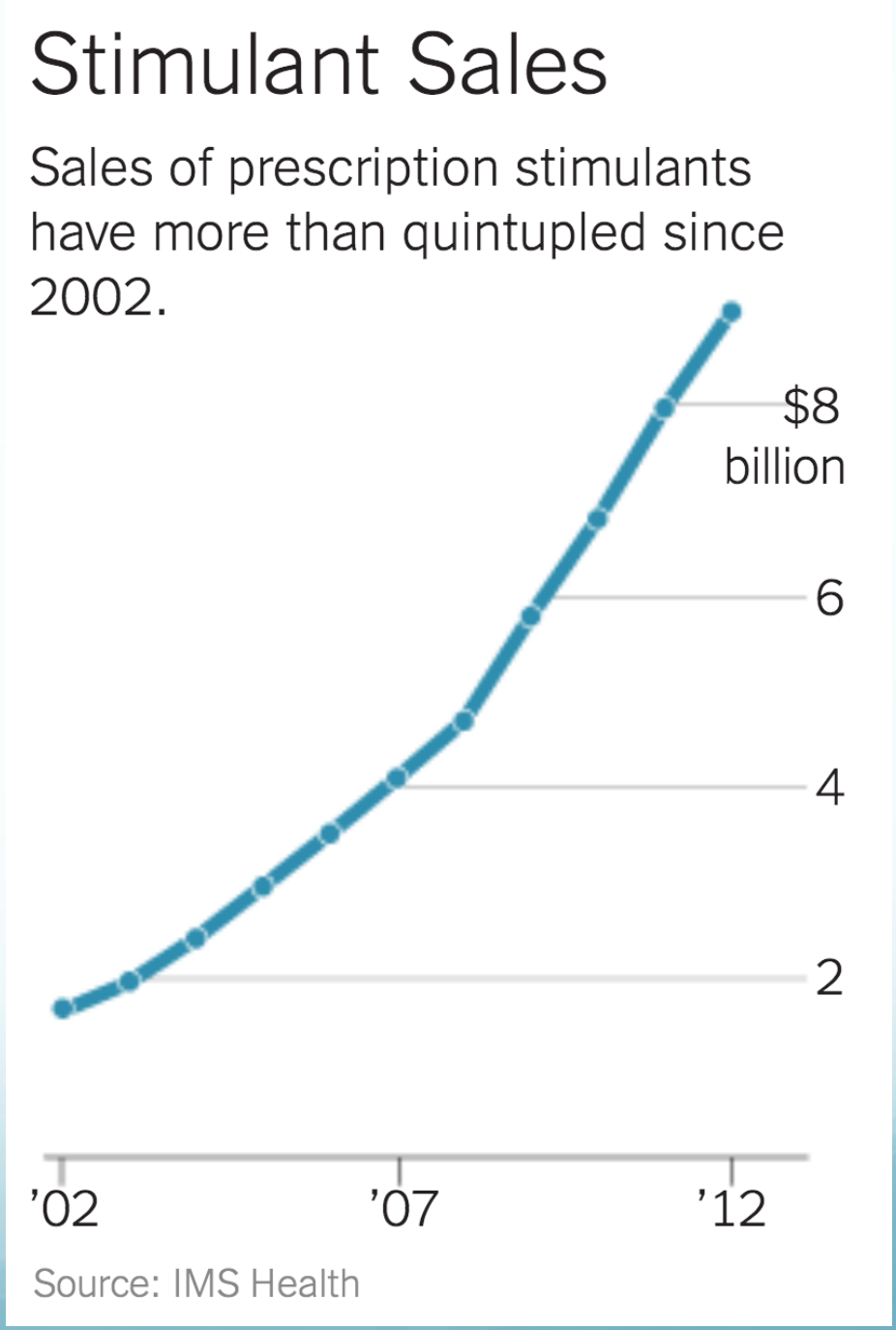
- ADHD is among one of the most common neurobehavioural problem in children
- Prevalence:
  - US: 7.2% at age 8 (Kashani et al, 1989) DSM III, 5-8% of childhood population (AACAP,1997)
  - 4.4% of Adults in US, DSM IV (Kessler et al, 2006)
  - Hong Kong:
    - 6.1 % DSM III, 8.9% DSM III-R (Leung et al,1996)
    - 3.9 % in grade 7, 8 and 9 students (Leung et al, 2008)
  - Male to female ~ 4:1

Prevalence of ADHD among children/adolescents 4 to 17 years of age in the United States, 2011 (JAACAP 2013)



"Selling of Attention Deficit Disorder"

New York Times
Dec 14, 2013



Different thoughts

? More children is diagnosed with ADHD and given appropriate treatment

? The society is more aware of the condition;

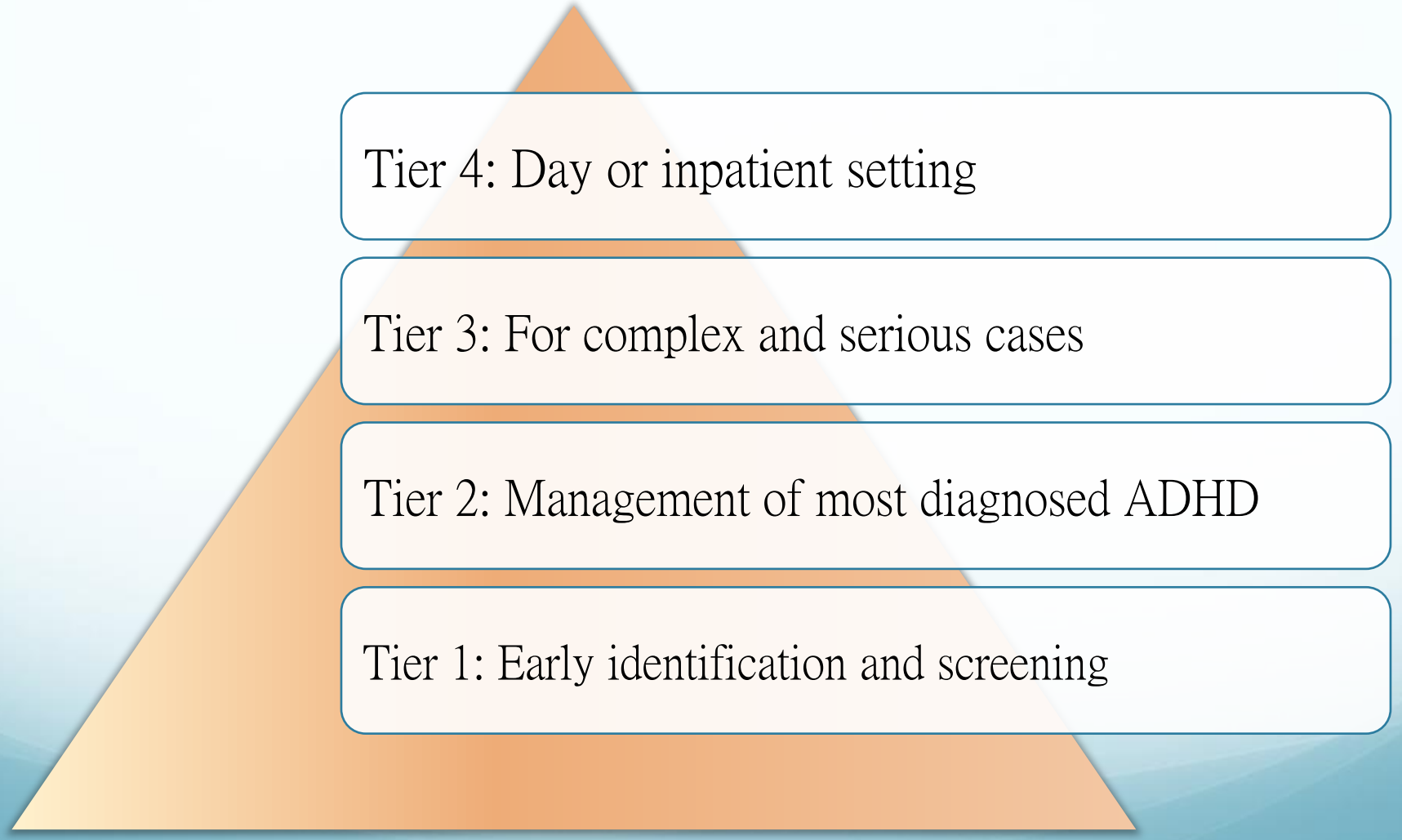
? Doctors and other health workers are more able to recognize and manage ADHD…

? School and society are getting too competitive;

? Parents are pushing for a diagnosis which can be "cured" ;

? Sale strategies of pharmaceutical companies…

4 Tiers system in the UK



An Example in the UK

- Neurodevelopmental team in Mary Sheridan Center
- Members: Child Psychiatrists, clinical psychologist, Community Paediatrician and mental health practitioners
- Basically tier 3 services for more complicated ADHD with comorbidities and challenging behaviours
- Besides assessment at clinic settings, provides home visit and school observation
- Short term treatment and refer back to local CAMHS team or community Paediatricians for further management

Setup related to ADHD and Behavioral Paediatrics in Kennedy Krieger Institute

Center for Development and Learning (Paediatrician lead service)

Speech and Language Outpatient Clinic

Child Psychiatric Clinic and Family Center

Center for Autism and Related Disorders

Social Worker Group

Behavioral Management Clinic

Neuropsychology Outpatient Clinic

Multidisciplinary Specialist Team

- Expert team focuses on management of ADHD, comorbidities and related behavioural problems.
- Improves organization of care and integration of Paediatrics and Child and Adolescent Mental Health Services (NICE guideline, UK).
- Provides evidence based practice
- Training and education of doctors and mental health workers
- Liaison with schools and educators
- Links with adult mental health team (separate team) for transitional care

Evidence based practice

Correct diagnosis Assessment of comorbidities and needs	No over-diagnosis No resources wastage
Provide treatment with proven values	Resources used in right ways
Strong advocacy	Get school support and social resources
Evaluate service in scientific ways	Meet ongoing needs and improve quality

Conclusion

- ADHD is the most common neurobehavioural problems in children.
- The problems will persist into adulthood leading to significant burden on personal, societal and economical future.
- Service gap exists locally and better organization of care with tier system should be adopted to meet the large demand of service.
- There is a need to set up a multidisciplinary specialist team to ensure evidence based practices so that the right resources could be used on the right patients in the right ways.

Thank you

Impairment and number of comorbid disorders

TABLE 3 Bivariate and Multivariable Associations Between ADHD, No. of Comorbid Disorders, and Child and Family Functioning

	No ADHD ($N = 56\,751$)[a]	ADHD ($N = 5028$)[a]	No. of Comorbid Disorders ($N = 5028$)[a]			
			0	1	2	3 or More
Bivariate						
Activity restriction (%)	5	24[b]	7	16	34	59[b]
School problems (%)	27	69[b]	57	68	81	81[b]
Repeat grade (%)	9	29[b]	17	32	32	46[b]
Social competence (mean)	13.3	11.5[b]	12.2	11.7	11.2	10.1[b]
Low social competence (%)	18	43[b]	33	43	45	61[b]
Parent aggravation (mean)	2.9	4.9[b]	4.1	4.6	5.1	6.5[b]
High parent aggravation (%)	19	53[b]	40	48	56	83[b]
Poor communication (%)	3	8[b]	2	6	6	21[b]
Multivariable[c]						
Activity restriction OR (95% CI)	—	4.14[b] (3.34–5.15)	—	2.35[b] (1.31–4.21)	5.72[b] (3.17–10.33)	12.58[b] (7.20–21.96)
School problems OR (95% CI)	—	5.18[b] (4.47–6.01)	—	1.49[b] (1.08–2.06)	2.58[b] (1.70–3.91)	2.45[b] (1.56–3.86)
Repeat grade OR (95% CI)	—	3.71[b] (3.02–4.55)	—	2.14[b] (1.38–3.29)	2.07[b] (1.35–3.18)	3.01[b] (1.93–4.70)
Social competence β (SE)	—	−1.50[b] (0.10)		−0.40 (0.22)	−0.61[b] (0.26)	−1.67[b] (0.29)
Low social competence OR (95% CI)	—	2.86[b] (2.46–3.31)	—	1.42 (0.99–2.04)	1.35 (0.89–2.05)	2.41[b] (1.55–3.77)
Parent aggravation β (SE)	—	1.80[b] (0.08)	—	0.38[b] (0.19)	0.70[b] (0.24)	1.96[b] (0.23)
High parent aggravation OR (95% CI)	—	4.30[b] (3.72–4.98)	—	1.37 (0.98–1.92)	1.67[b] (1.13–2.47)	6.25[b] (4.03–9.64)
Poor communication OR (95% CI)	—	2.55[b] (1.84–3.52)	—	2.39[b] (1.18–4.84)	2.01[b] (1.02–3.99)	8.53[b] (4.41–16.52)

Larson et al, 2011

Health and educational services and number of comorbid disorders

TABLE 5 Health and Educational Service Use by ADHD Status and No. of Comorbid Disorders

	No ADHD ($N = 56\,751$)[a]	ADHD ($N = 5028$)[a]	No. of Comorbid Disorders ($N = 5028$)[a]			
			0	1	2	3 or More
Bivariate						
Preventive health visit	84	92[a]	90	93	94	93
Mental health visit	6	48[b]	35	42	60	72[b]
Special education services	7	49[b]	19	55	68	79[b]
Needed care coordination	8	20[b]	9	18	24	42[b]
Multivariable[c]						
Preventive health visit OR (95% CI)	—	2.19[b] (1.69–2.83)	—	1.38 (0.81–2.36)	1.58 (0.82–3.04)	1.24 (0.62–2.50)
Mental health visit OR (95% CI)	—	11.42[b] (9.63–13.55)	—	1.33 (0.94–1.88)	2.73[b] (1.82–4.09)	4.55[b] (2.93–7.04)
Special education services OR (95% CI)	—	9.88[b] (8.34–11.69)	—	5.27[b] (3.55–7.82)	8.80[b] (5.58–13.87)	16.04[b] (9.84–26.14)
Needed care coordination OR (95% CI)	—	3.01[b] (2.38–3.80)	—	1.87 (0.98–3.58)	2.52[b] (1.27–4.99)	4.51[b] (2.21–9.21)

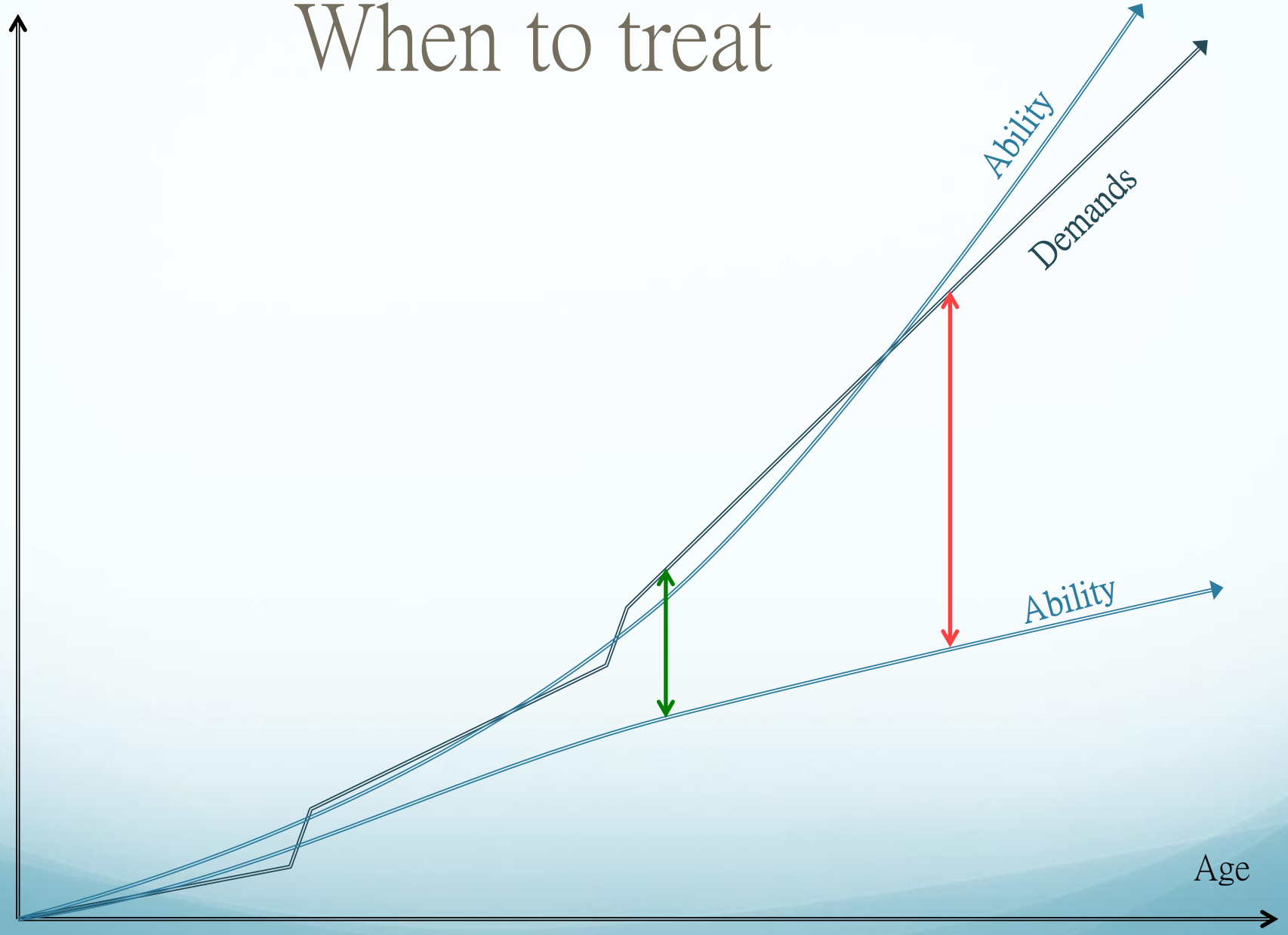
[a] Sample size varies slightly across different service use measures because of missing data on the outcome.

[b] $P < .05$. Bivariate results are based on χ^2 tests.

[c] Models include controls for child age, gender, race/ethnicity, parent education, household income, family structure, and global child health status.

Larson et al, 2011

When to treat



CARD at Greenspring