What's new in ADHD? An update on clinical diagnosis and treatment guidelines

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Disclosures

- I have no financial disclosures

Objectives

- Review current DSM V criteria for ADHD and recognize ADHD impostors
- Identify racial disparities in ADHD diagnosis and treatment
- Discuss the new assessment and treatment guidelines for complex ADHD
- Describe new pharmacological treatments for ADHD

DSM V Criteria for Attention Deficit/ Hyperactivity Disorder (ADHD)

DSM V Criteria

- Symptoms must be present before age 12
- Occur in multiple environments (at least 2)
- Interfere with or decrease quality/productivity of academic, occupational or social functioning
- Be present for at least 6 months
- Inconsistent with developmental level

Need 6 symptoms of Inattention for ADHD – Inattentive subtype (5 for > 17 y.o.)

Need 6 symptoms of Hyperactivity/Impulsivity for ADHD –HI (5 for > 17 y.o.)

Need both sets of criteria above to be met for ADHD- Combined type

Inattention	Hyperactivity/Impulsivity
Fails to give close attention; makes careless mistakes	Fidgets with hands/feet, squirms in seat
Difficulty sustained attention in tasks or play	Leaves seat in class or other settings (when not meant to)
Does not pay attention when spoken to directly	Runs about or climbs excessively
Does not follow through with instructions, schoolwork, chores	Has difficulty playing quietly
Has difficulty organizing tasks/activities	“On the go” acts like “driven by a motor”
Avoids/dislikes/reluctant to perform sustained mental effort	Talks excessively
Loses things necessary to accomplish tasks or activities	Blurts out answers before questions are asked
Easily distracted	Difficulty awaiting turn
Forgetful in daily activities	Interrupts or intrudes on others

ADHD Impostors

INATTENTION	HYPERACTIVITY/ IMPULSIVITY
Learning/Cognitive problems	Learning/ cognitive problems
Language problems	Language problems
Anxiety/Depression	Anxiety/ Depression
Sensory Impairments	Externalizing Behaviors
Trauma	Trauma
Tic Disorders	Tic Disorders
Absence Seizures	Seizures/ Sensory Impairments
Medication Side Effects	Medication Side Effects

ADHD Clinical Practice Guidelines 2011 (AAP)

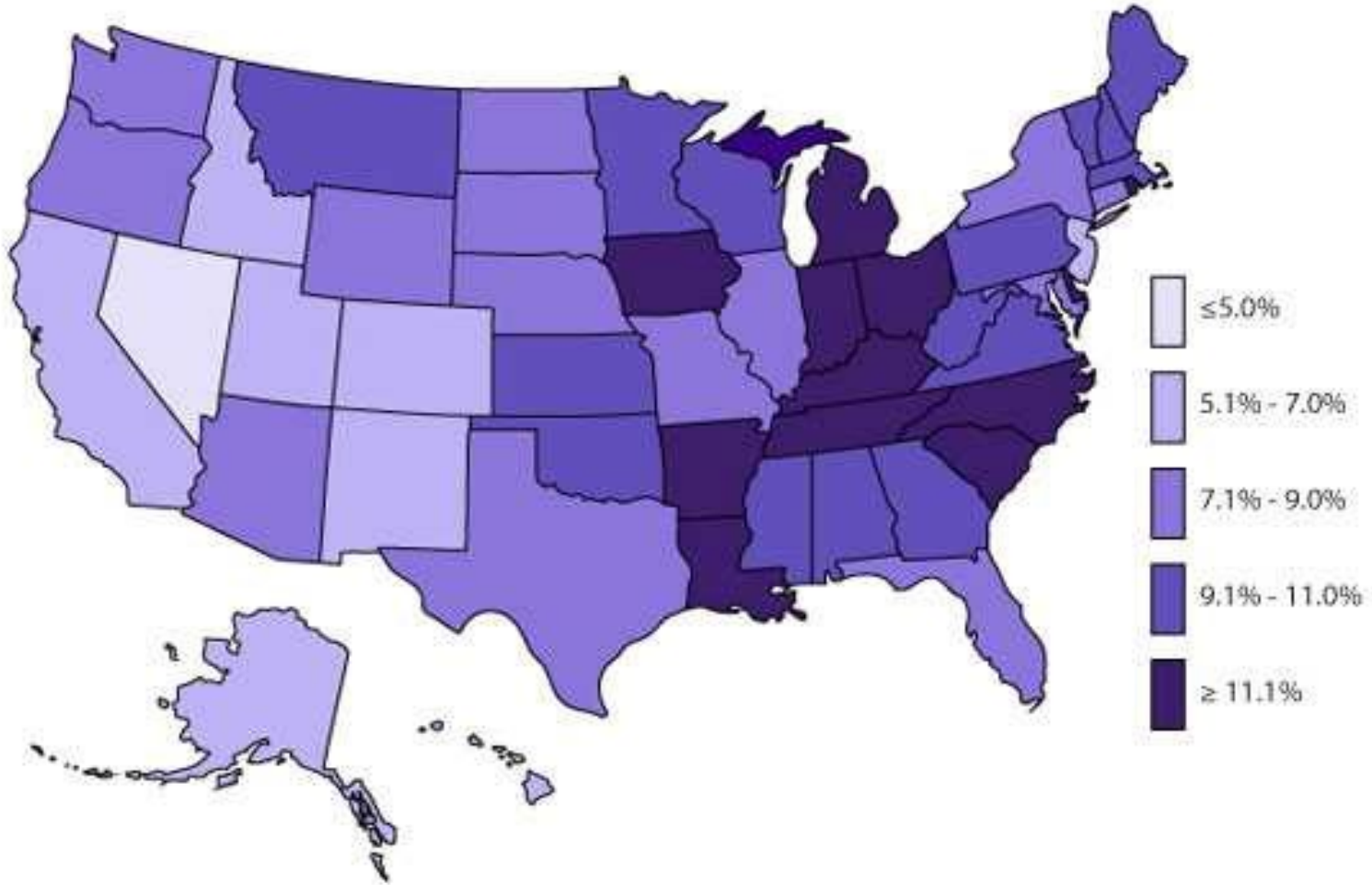
Age Group	Recommendation	Quality of Recommendation
Preschoolers (4-5 yrs)	Evidence-based parent and/or teacher-administered behavior therapy Med management with Methylphenidate (MPH) if no significant improvement and moderate to severe impact on the child's function or if behavioral interventions are not available	**A**- strong recommendation **B**-recommended
School Age (6-11 yrs)	FDA approved medications for ADHD Parent/teacher behavior therapy, preferably both	**A**- strong recommendation **B**- strong recommendation
Adolescents (12-18 yrs)	FDA approved medications for ADHD with the **assent** of the adolescent Behavior therapy	**A**- strong recommendation **C**-recommendation

https://pediatrics.aappublications.org/content/pediatrics/early/2011/10/14/peds.2011-2654.full.pdf

Children Currently Dx w/ ADHD (2011)

- The percent of children with an ADHD diagnosis increased from 7.8% in 2003 to 9.5% in 2007 and to 11.0% in 2011-12 (Children ages 4-17)

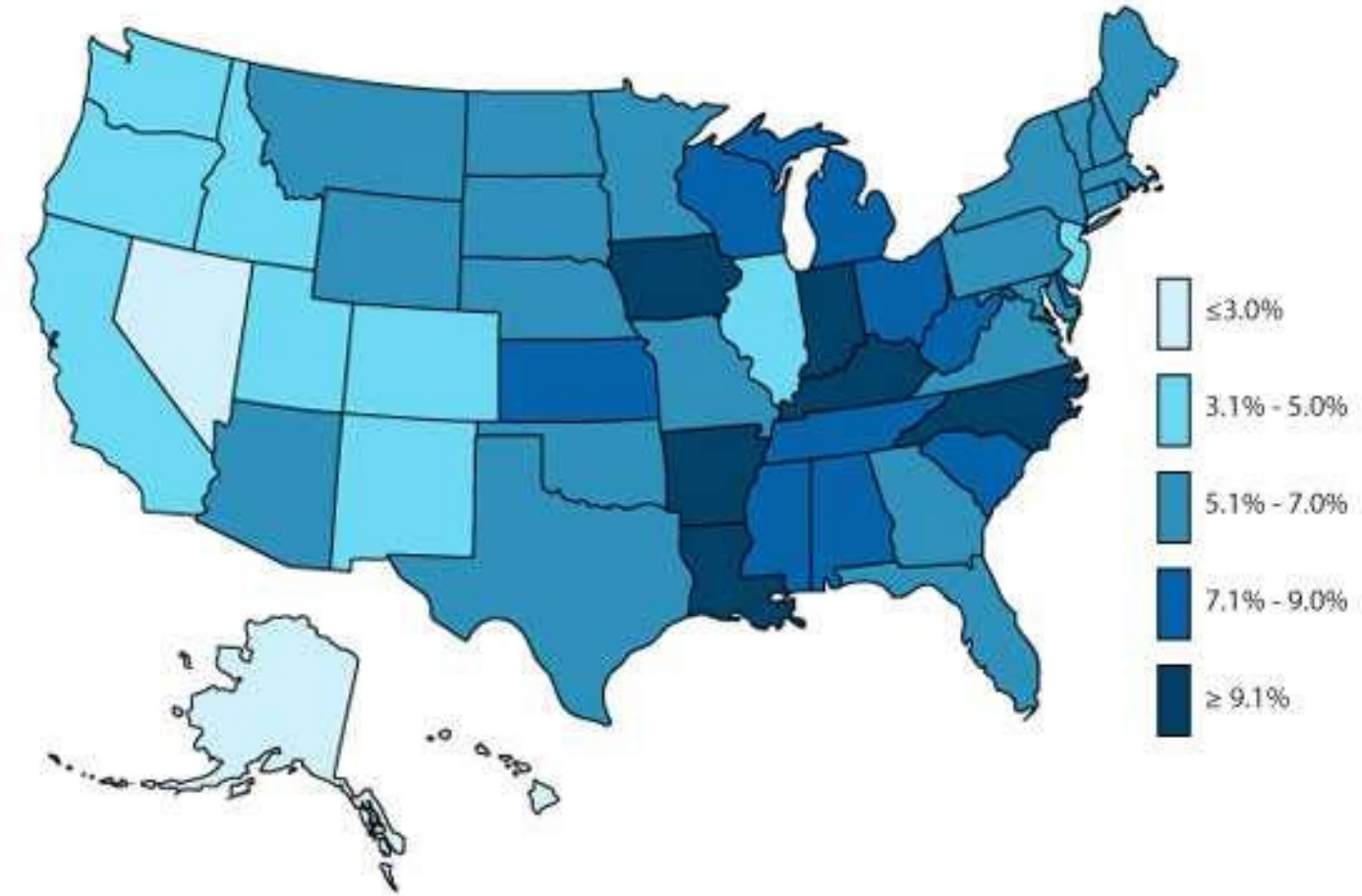
- The number of young children (ages 2-5) with ADHD increased by more than 50% from 2007 to 2011



"Trends in the Parent-Report of Health Care Provider-Diagnosed and Medicated ADHD: United States, 2003—2011." on www.cdc.gov

Taking Medication for ADHD (2011)

- About 3 in 4 children ages 2-5 y w/ ADHD received ADHD medication, and only about ≤ 50% received any form of psychological services, based on healthcare claims data (2011)
- The percent of children 4-17 y taking ADHD medication increased from 4.8% in 2007 to 6.1% in 2011
- 17.5% of children with current ADHD were not receiving either medication for ADHD or mental health counseling in 2011



Percentage of 4-17 years old currently taking Medication for ADHD by National Survey of Children's Health (2011)

MMWR Weekly / June 16, 2017 / 66(23);625

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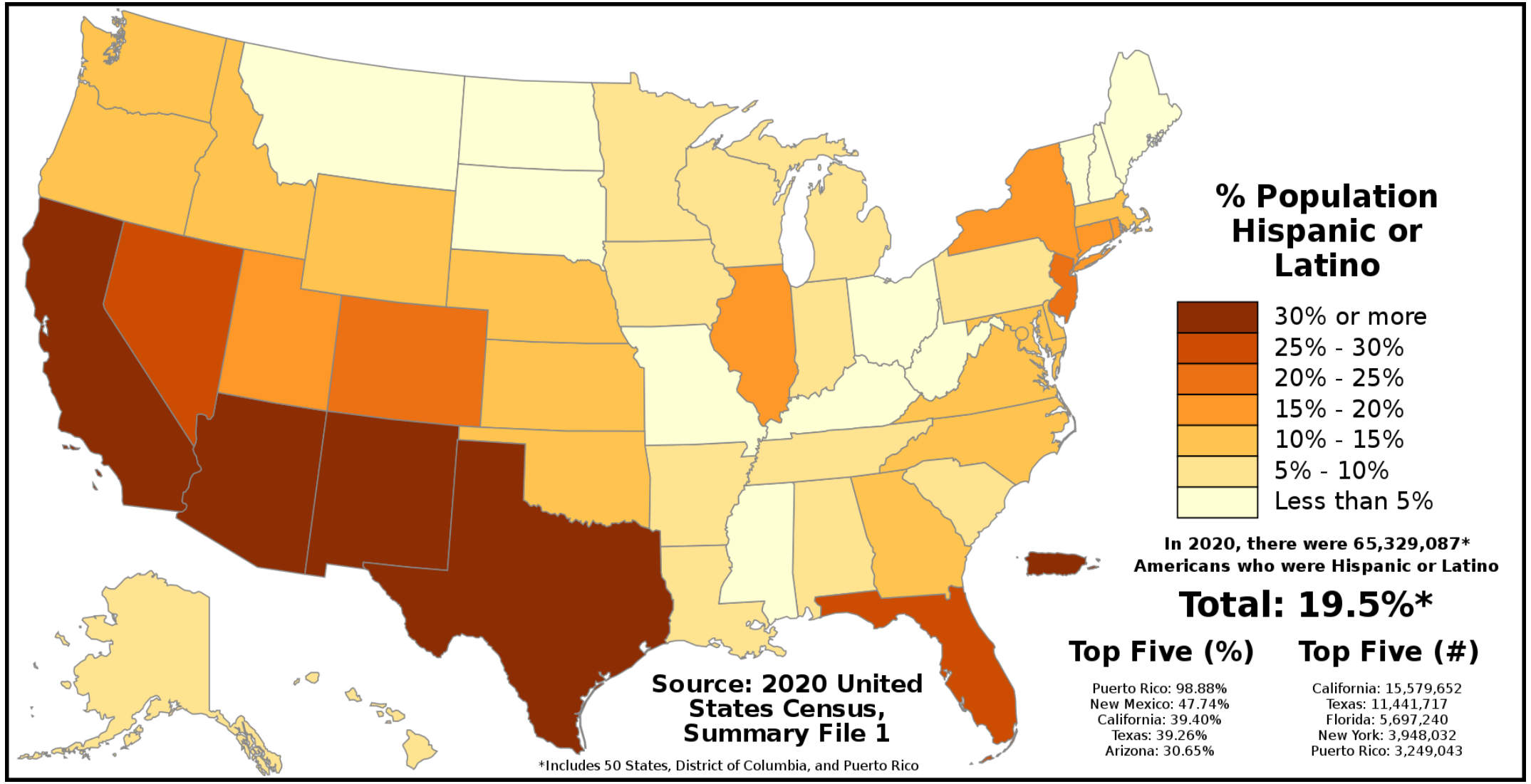
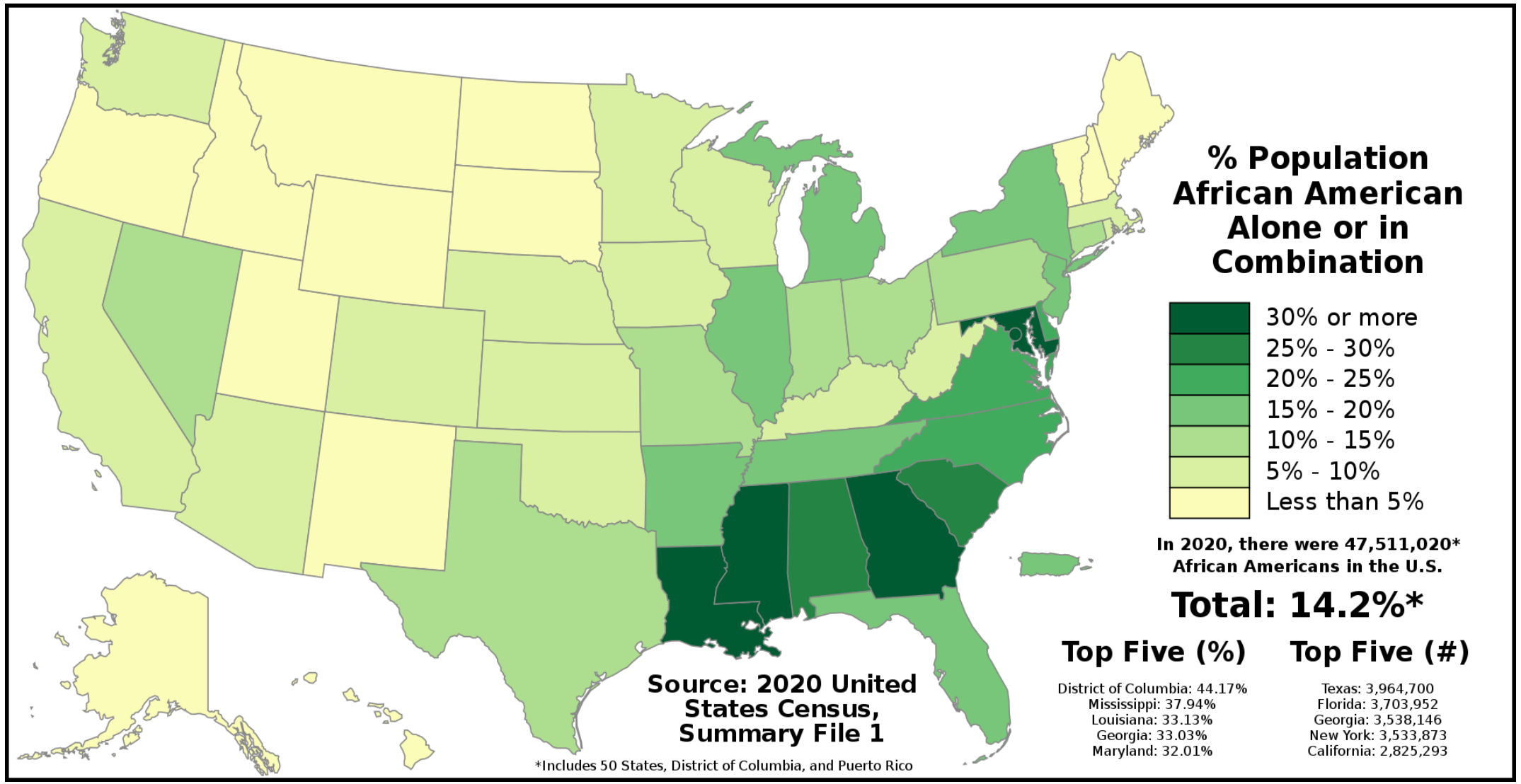
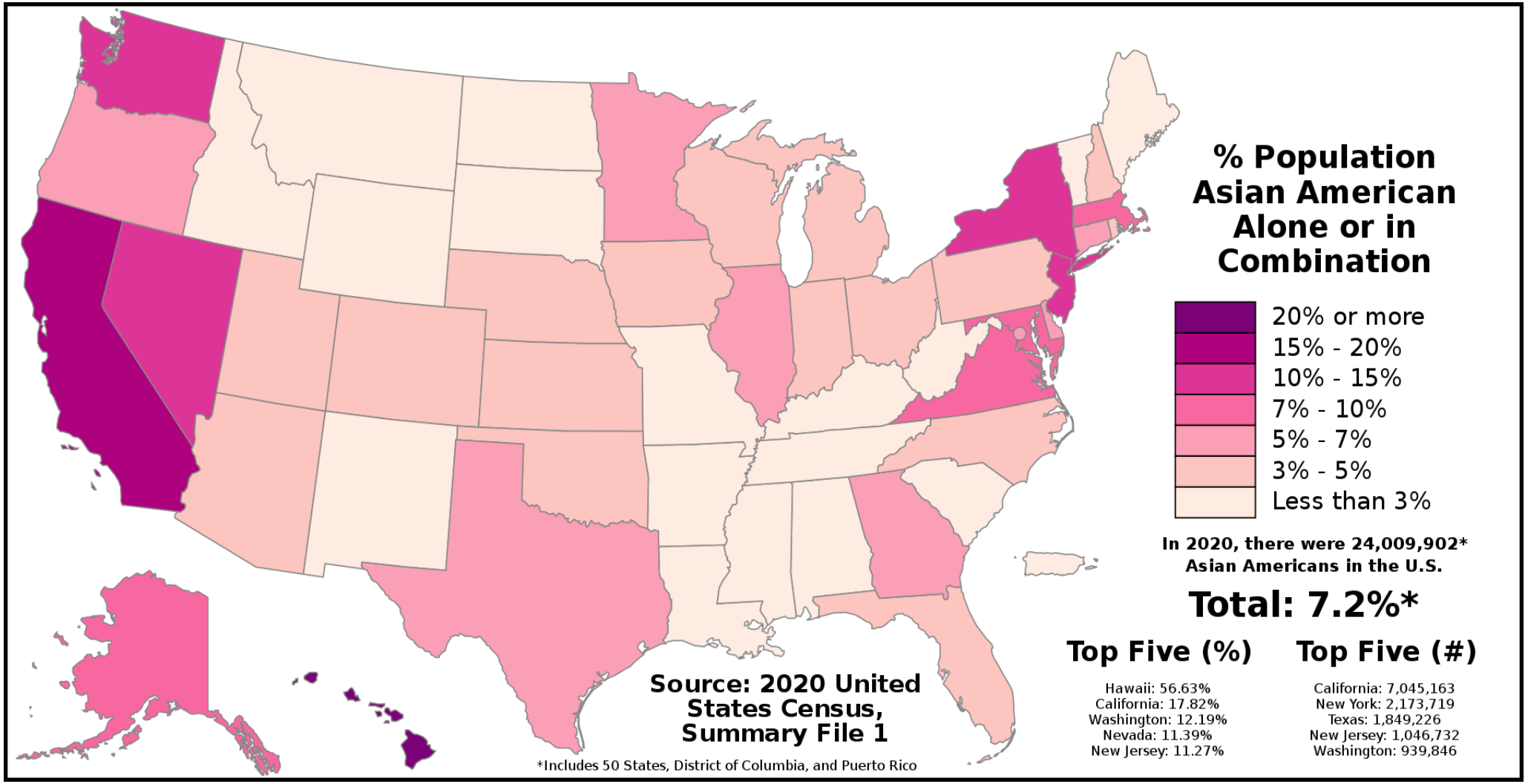
Census Data 2020



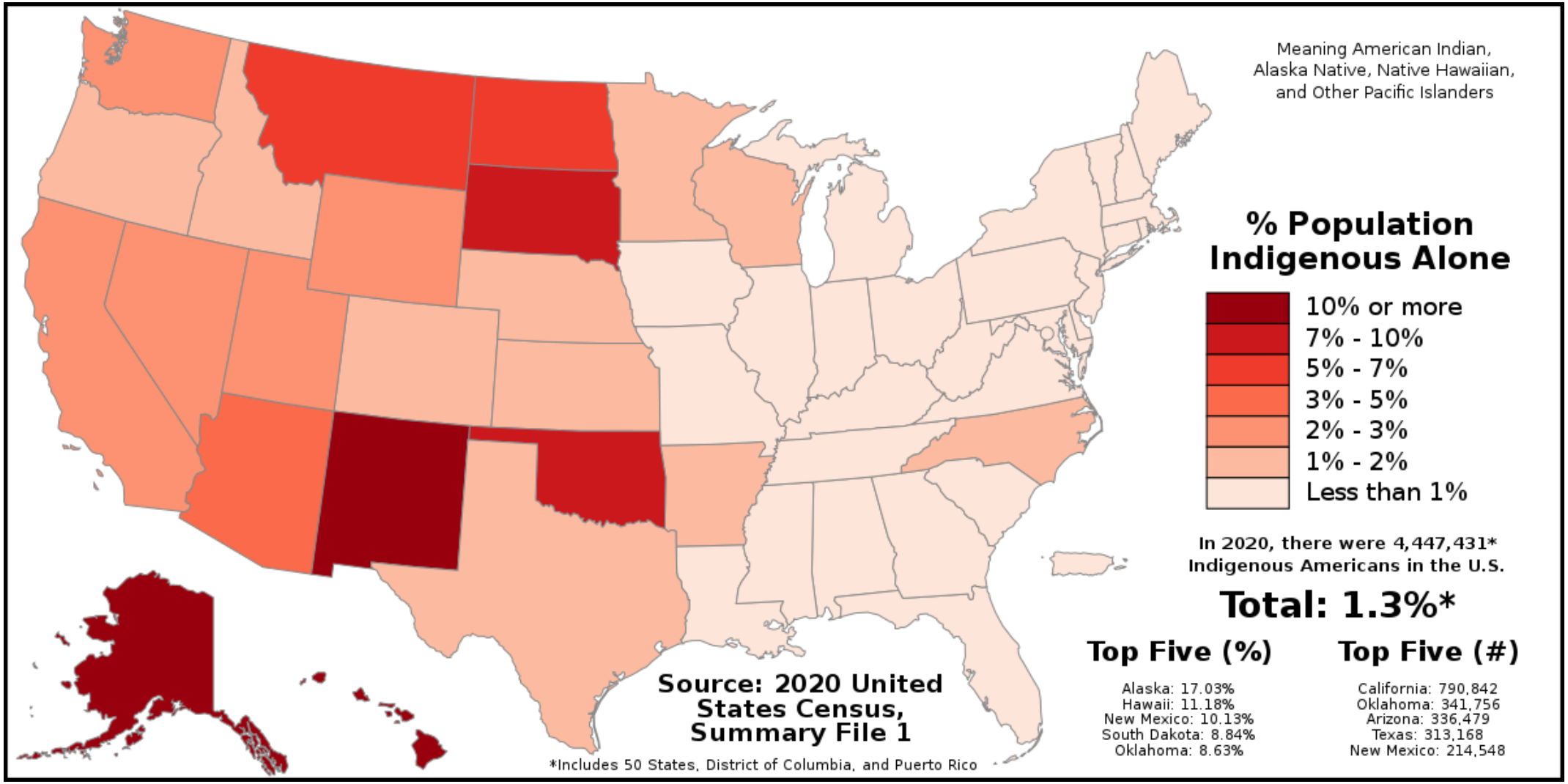
Census Data 2020



Census Data 2020



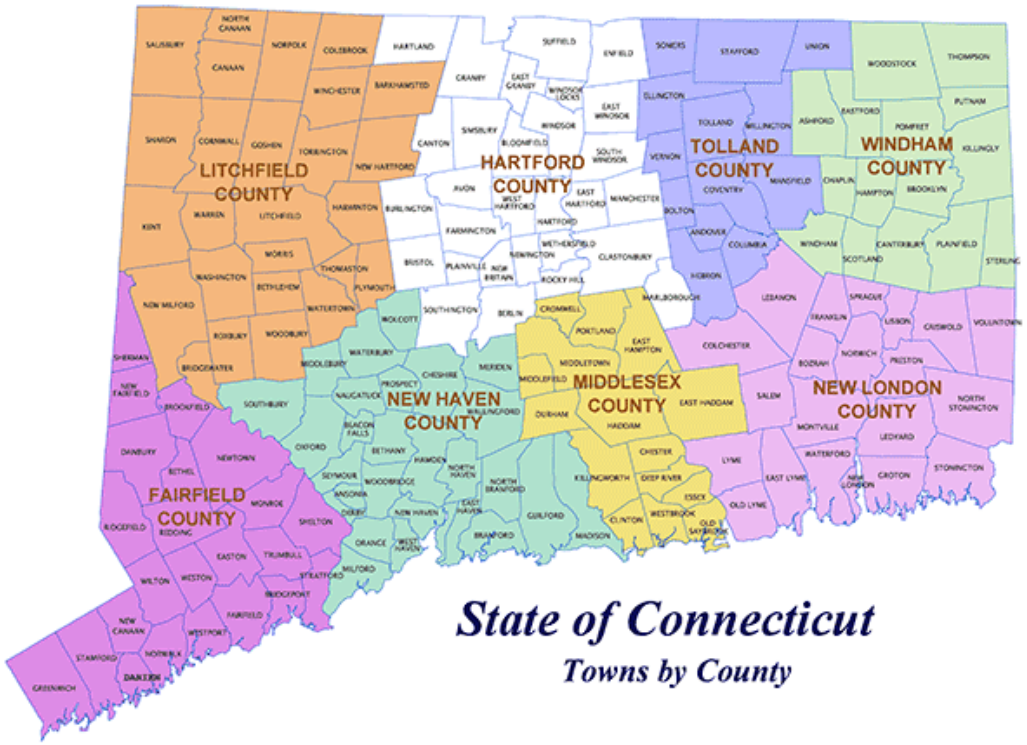
Census Data 2020



Connecticut 2020 Census Data

Changes in population between 2010-2020

People Identifying as	Percentage Change
Asian population	+27.1%
Black population	+7.7%
Hispanic population	+30.1%
Other race population	+122.1%
2+ races population	+131.2%
White population	-10.5%
Ages 0-17	-9.8%
Ages 18+	+4.1%



Racial Disparities in ADHD

- Multiple studies have shown that racial/ethnic minorities are diagnosed with ADHD at lower rates than white children
- Racial/ethnic minorities diagnosed with ADHD are also less likely to use prescription medications
- Multiple studies have shown these differences are present as early as preschool/kindergarten

Racial Disparities in ADHD

- Factors impacting seeking of care for ADHD:
  - Recognition of a 'problem' behavior (cultural beliefs, stigma, education on ADHD)
  - Decision to seek help (when to engage with the system and for what)
  - Service selection (ie who to ask for help and how to access it?)
  - Service utilization (insurance, access to care)
- Explicit and implicit bias impacting clinician decision making
- Under representation of minority children in population diagnosed with ADHD vs. Over representation of white children being identified

Eiraldi et al. Service Utilization among ethnic minority children with ADHD: a model of help-seeking behavior. *Adm Policy Ment Health.*2006;33 (5):607-622.
Hall et al. Implicit racial/ethnic bias among health care professionals and its influence on health care outcomes: a systematic review. *Am J Public Health.* 2015; 105(12):e60-e76.

Racial Disparities in ADHD

Study looking at the perceptions of ADHD behavior between Black parents and White teachers

- Looked at:
  - Ratings of ADHD behaviors & ADHD Likelihood
  - ADHD stigma beliefs
  - Verve (value of movement expressiveness)
  - Experiences with Racial Discrimination
  - Racial attitudes

- Results showed:
  - White teachers and parents rated black boys with significant higher rate of ADHD behaviors than black parents
  - No difference between white vs black participants on ratings of ADHD stigma beliefs or verve
  - Black parents with higher experiences of racial discrimination noted higher ADHD behaviors in all groups
  - White teachers with more negative racial attitudes toward AA rated ADHD behaviors and ADHD likelihood of black boys' higher

Kang S, Harvey E. Racial Differences Between Black Parents' and White Teachers' Perceptions of Attention-Deficit/Hyperactivity Disorder Behavior. *Journal of Abnormal Child Psychology* (2020) 48:661-672.

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GUIDELINES FOR COMPLEX ADHD

- “Society for Developmental and Behavioral Pediatrics Clinical Practice Guideline for the Assessment and Treatment of Children and Adolescents with Complex Attention Deficit/Hyperactivity Disorder” (Published 2020)

- 5 Key statements based on expert opinion and literature review:
  - Defining “Complex ADHD”
  - Assessment of Complex ADHD
  - Psychosocial Treatment of Complex ADHD
  - Multimodal Treatment of ADHD and co-existing conditions
  - Long Term Monitoring

GUIDELINES FOR COMPLEX ADHD

- Complex ADHD is defined as:
  - Diagnosis at < 4 years of age or > 12 years of age
  - Presence or suspicion of a co-existing condition (Neurodevelopmental disorder, learning problems, mental health disorders, chronic medical conditions, genetic disorders, complicated psychosocial factors)
  - Moderate to severe functional impairment
  - Diagnostic uncertainty
  - Inadequate response to treatment

- Should be evaluated by clinician with specialized training or expertise
- Quality of Recommendation: B

Some patients with Complex ADHD who respond well to treatment provided by their PCP and can maintain good function do not require referral for specialized care

GUIDELINES FOR COMPLEX ADHD

- Appropriate assessment includes:
  - Comprehensive medical history and physical exam
  - Psychological assessment based on child's presenting problems and their severity
  - Assessment of functional impairment
  - Cognitive/developmental level
  - Judgment of treating clinician
- Data collected from multiple settings and sources
- Quality of Recommendation: B

GUIDELINES FOR COMPLEX ADHD

- Provide psychoeducation about ADHD and co-existing conditions

- Provide Evidence Based Interventions from the outset of treatment to all children and adolescents
  - Behavioral Parent Training
  - Behavioral Classroom Management
  - Behavioral Peer Interventions
  - Organizational Skills Training

- Quality of the Recommendation: B

GUIDELINES FOR COMPLEX ADHD

Co-morbid Conditions	Recommendation
Learning Disability	Academic Interventions for LD ADHD medication (Stimulants> atomoxetine)
Autism Spectrum Disorder	No meds for core ASD symptoms MPH (increased adverse events); 2nd line α-agonists or atomoxetine
Intellectual Disability	Training programs for skill building 35-75% Stimulant responsive (MPH with ↑ SE) Poor evidence for α agonists
Tics	Behavior modification (CBT) +/- Med of α agonists Stimulants can be 1st line treatment (monitor SE)
Substance Abuse Disorder	Prevention & Treatment are critical If needed: long-acting stimulant/transdermal
Internalizing D/o (anxiety/depression)	Need Immediate referral or crisis management ? Evidence Based Psychological Treatment (CBT); if persists, medication
Disruptive Behavior D/o	Behavior Interventions; if persists, intensify/modify interventions or combine with medication

GUIDELINES FOR COMPLEX ADHD

- Need ongoing scheduled monitoring throughout the lifespan
  - Initial visit within 30 days of initiating treatment
  - Visits 2-4 times per year
- Can be done by range of clinicians on care team
- Should include:
  - Assessment of ADHD related symptoms and functioning
  - Symptoms and impairment of function of co-existing conditions
  - Vitals
  - Assessment and support for psychosocial stressors
  - Identification and promotion of strengths
- Screen & Assess for co-existing conditions yearly
- Quality of the Recommendation: B

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Neurobiology of ADHD

Neurobiology of ADHD

Medication Options for ADHD

Pharmacotherapy for ADHD

- Stimulants & Non-Stimulants
- Stimulants: Amphetamines (AMP) and Methylphenidate (MPH)
  - Equally efficacious when dosed comparably with a response rate of 65-75%
  - Overall stimulant response rate increases to as much as 85% if both classes are tried
  - Side effects are mild, short lived and amenable to dose or timing adjustments
- Non-stimulants : Norepinephrine reuptake Inhibitor & alpha 2 agonists
- New options in both categories

Pliszka S, AACAP Work Group on Quality Issues. Practice parameter for the assessment and treatment of children and adolescents with ADHD. J Am Acad Child Adolesc Psychiatry 2007;46(7):894-921

Pharmacotherapy for ADHD

Side Effects		
Drug Class	Common	Serious But Rare
Stimulants	Decreased Appetite	Cardiovascular events (pre-existing conditions)
	Insomnia	Psychosis
	Mood changes (wearing off)	Excessive Rumination
	Headaches/Abdominal pain/ Nausea	Movement disorders
Non-Stimulants	Somnolence/Insomnia	Liver failure (Strattera)
	Irritability/Mood Swings	Risk of S.I. (Strattera)
	Decreased Appetite	Hypotension
	Nausea/Vomiting	Cardiac conduction abn (Intuniv)
	Headache	Seizures
	Dry mouth	Chest pain
	Constipation/Abdominal Pain	

Amphetamines on the Market

Brand Name	Generic Name (D:L ratio)	Duration	Dosage Form	FDA Approved
Dexedrine	Dextroamphetamine sulfate (1:0)	6-9 hrs	Capsule	1976
Adderall	Mixed amphetamine salts (3:1)	4-6 hrs	Tablet	1996
Adderall XR	Mixed amphetamine salts (3:1)	8-12 hrs	Capsule	2001
Vyvanse	Lisdexamphetamine dimesylate (0:1)	10-12 hrs	Capsule	2007
ProCentra	Dextroamphetamine sulfate (1:0)	4-8 hrs	Liquid	2010
Evekeo	Amphetamine sulfate (1:1)	4-6 hrs	Tablet	2012
Zenzedi	Dextroamphetamine sulfate (1:0)	4-6 hrs	Tablet	2013
Dyanavel XR	Mixed amphetamine salts (3:1)	8-12 hrs	Liquid	2015
Adzenys XR	Mixed amphetamine salts (3:1)	9-12 hrs	ODT	2016

New(er) Amphetamines on the Market

Brand Name	Generic Name (D:L Ratio)	Duration	Dosage Form	FDA Approved
Mydaysis*	Mixed amphetamine salts (3:1)	16 hrs	Capsule	2017
Vyvanse	Lisdexamphetamine dimesylate (0:1)	8-12 hrs	Chewable tablet	2017
Adzenys ER	Mixed amphetamine salts (3:1)	9-12 hrs	Liquid	2018
Evekeo ODT	Amphetamine sulfate (1:1)	4-6 hrs	ODT	2019

*Mydaysis is only approved for >13 yrs of age; Vyvanse for 6+ yrs

Methylphenidates on the Market

Brand Name	Generic Name	Duration	Dosage Form	FDA Approved
Metadate ER	Methylphenidate hydrocholoride	8-12 hrs (?)	Tablet	1998
Concerta	Methylphenidate hydrocholoride	10-12 hrs	OROS Capsule	2000
Focalin	Dexmethylphenidate hydrocholoride	3-5 hrs	Tablet	2001
Metadate CD	Methylphenidate hydrocholoride	8-10 hrs	Diffucaps Capsule	2001
Ritalin LA	Methylphenidate hydrocholoride	8-10 hrs	SODAS Capsule	2002
Methylin*	Methylphenidate hydrocholoride	8 hrs (?)	Tablet	2002
Focalin XR	Dexmethylphenidate hydrocholoride	10-12 hrs	SODAS Capsule	2005
Daytrana	Methylphenidate	10-12 hrs	Transdermal Patch	2006
Quillivant XR	Methylphenidate hydrocholoride	8-12 hrs (?)	Liquid	2012
Aptensio	Methylphenidate hydrocholoride	7-8 hrs	Capsule	2015
QuilliChew ER	Methylphenidate hydrocholoride	8-12 hrs	Chewable tablet	2016

*Methylin Chewable & Methylin Oral Solution (3-5 hrs; 2013)

New(er) Methylphenidates on the Market

Brand Name	Generic Name	Duration	Dosage Form	FDA Approved
Cotempla ODT	Methylphenidate	8-12 hrs	ODT	2017
Jornay PM	Methylphenidate hydrochloride	12+ hrs	Capsule	2018
Adhansia XR	Methylphenidate hydrochloride	16 hrs	Capsule	2019
Azstarys	Serdexmethylphenidate & dexmethylphenidate	10+ hrs	Capsule	2021

Jornay PM – taken night before and takes up to 12 hours to become effective; recommended taking between 6:30-9:30 pm

Aztarys – serdexmethylphenidate is pro-drug for dexmethylphenidate; only active after absorption by lower GI tract

Non-Stimulants on the Market

Brand Name	Generic Name	Duration	Dosage Form	FDA Approved
Tenex	Guanfacine hydrochloride	1-4 hrs	Tablet	Off label
Catapres	Clonidine	6-12 hrs	Tablet	Off label
Strattera	Atomoxetine hydrochloride (NE reuptake inhibitor)	24 hrs	Capsule	2002
Intuniv	Guanfacine hydrochloride	12-24 hrs	Capsule	2009
Kapvay	Clonidine hydrochloride	12-24 hrs	Capsule	2010
Qelbree	Viloxazine (NE reuptake inhibitor)	24 hrs	Capsule (can be opened)	2021

- Guanfacine & Clonidine are α-2 agonists and not FDA approved for ADHD as short acting forms
- Strattera, Intuniv and Kapvay have to be swallowed whole
- Qelbree can be opened and sprinkled on food

Thank You….. Questions?