

Management of ADHD in Children

Risk Factors

8.9% of US children 3 to 17 yo (2019-2020 National Survey of Children's Health)

Genetic risk - 76% in twin studies

Suspect DA and 5-HT receptor/protein gene contribution

Intrauterine exposure to alcohol, tobacco, opioid use

Premature birth, low birthweight, birth complications

Early childhood exposure to lead, organophosphate, PCB's

Association with genetic, neurologic, neurodevelopmental d/o

Boys twice as likely as girls to be diagnosed

Source: Rajaprakash. ADHD. Peds in Review. 2022.

Diagnosis

<16 yo, 6 out of 9 for hyperactive, inattentive or combination sx

>17 yo, 5 out of 9 for hyperactive, inattentive or combination sx

Present for more than 6 months

Initial signs and symptoms manifest before 12 yo

Present in 2 or more settings (home, school, work, with relatives or friends)

Reduce quality of social, academic, occupational functioning

Source: DSM-V TR. 2022.

Presentation

Hyperactivity/impulsivity in less structured settings (cafeteria, gym), high-risk behaviors

Inattention/distractibility when academic demands increase

In adolescents, hyperactivity often wanes while impulsivity and inattention persist

Hyperactivity or impulsivity

- Fidgeting or tapping hands or feet or squirming in seat
- Standing up when expected to remain seated
- Running about or climbing (mostly in children) or subjective feelings of restlessness (mostly in adolescents and adults)
- Inability to play quietly
- Often “on the go”, “driven by a motor”
- Inappropriate talkativeness
- Blurting out answers before a question has been finished
- Difficulty waiting their turn in games or activities
- Interrupting others or intruding

Inattention

- Difficulty paying attention to details and consequent careless mistakes
- Difficulty sustaining attention in tasks or activities
- Struggling to listen when spoken to
- Struggling to accomplish and to finish tasks or activities
- Difficulty organizing tasks and activities
- Avoidance of tasks that need more mental effort
- Misplacing objects needed to perform tasks or activities
- Distractibility by external stimuli
- Forgetfulness about daily activities

Assessment

Self-report (if <12 yo, may not be as helpful)

Collateral (parents and teachers)

Psych (anxiety, mood, trauma, substance)

Neurodev (intellectual disability, ASD, learning disability, language disorder)

Medical (particularly cardiac, neuro, sleep, vision/hearing, thyroid)

If medical history unremarkable, additional labs/consults not indicated

Table 3. Comorbid Conditions

COMORBIDITY	UNIQUE FEATURES	FREQUENCY IN ADHD (%) ^a
Behavioral and mental health disorders		
Oppositional defiant disorder	Argumentative or defiant behavior, annoys others, and is spiteful but can sustain attention when interested	20–30
Anxiety	Excessive worry and decreased energy lasting for >6 mo	30–40
Major depressive disorder	Low mood and decreased energy levels and psychomotor retardation for >2 wk	14–18
Conduct disorder	Deliberate rule-breaking behavior that often includes aggression toward people and animals, destruction of property; lack of guilt, remorse, or empathy	2–10
Developmental disorders		
Developmental coordination disorder	Difficulty specifically in coordinated motor tasks manifested by clumsiness and fine motor difficulties soft neurologic examination findings, including poor motor coordination, overflow movements, and low appendicular tone	45–50
Learning disabilities	Academic underachievement; behaviors are isolated to particular academic demands (eg, reading)	45–56
Autism spectrum disorder	Lack of joint attention, imaginative play, and reciprocal communication evident in the early developmental period; stereotyped repetitive behaviors and fixed interests	0.4–14
Language disorders	Evidence of misunderstanding, word-finding difficulty, pragmatic difficulties	40–90
Intellectual disability	Neuropsychological assessment reveals low IQ levels	2–4
Other conditions		
Tourette syndrome	Evidence of vocal and motor tics	1–6
Substance use	Abrupt emergence in adolescent years; symptoms due to tolerance and withdrawal from substance use	1–4

ADHD=attention-deficit/hyperactivity disorder.

^aSources: Danielson et al, (8) Mohammed-Reza et al, (36) Belanger et al, (37) and Redmond. (38)

Rating Scales for Core and Broad Features

For children, Vanderbilt

For adults, Adult ADHD Self-Report Scale (ASRS) (developed by WHO)

Treatment

For preschool age, behavioral and parent management strategies

For school age, stimulant medication and/or behavioral therapy

For adolescents, stimulant medication

AACAP Consensus Statement - medications are effective

Behavioral Management

Positive reinforcement (effective praise, token economy)

Effective commands

Antecedent management

Selective ignoring

Punishment

Caregiver Inventory

Parenting style

Cultural expectations

What is going well

What are most bothersome behaviors? What do you want child to do more?

Develop house rules

Parent Management

Focus on behaviors, not child as a whole

Focus on what you want child to do, not stop doing

Effective implementation takes times

Kids copy what they see

Preparation and consistency are key

Multimodal Treatment Study of Children with ADHD (1999)

Relative effectiveness of different treatment strategies over 14 months

579 children 7 to 9.9 yo with ADHD combined type

Compared: 1) med management, 2) intensive behavioral treatment, 3) combination, 4) standard care in community

Med management showed greatest improvement

Combination had some modest advantages over med management

Preschool ADHD Treatment Study (2006)

Effectiveness and safety of MPH IR

303 children from 3 to 5.5 yo with ADHD

Mean optimal MPH total daily dose was 14.2 mg/day

Starting dose of 3.75 mg/day (1.25 mg TID), did not decrease symptoms

Effect size of 0.4 to 0.8, although smaller than for school age children

Stimulants

MPH and AMPH are mainstays; neither shown to be more effective for core sx
65-75% initial response, although increases to 85% if both MPH and AMPH tried

For preschool age, consider MPH (low dose and small titrations)

For school age, consider long-acting preparation for school and homework

For adolescents, consider adding short-acting preparation in late afternoon

Source: AACAP Practice Parameters for Assessment and Treatment of Children and Adolescents with ADHD. 2007.

ADHD Medication Guide

ADHD Medication Guide*									
Revised: September 15, 2024									
Methylphenidate Formulations – Long Acting, Oral** (Capsules and tablets in this section are shown at actual size)									
Concerta®†	6-12 Yrs: 18-54mg; SD: 18mg 13-17 Yrs: 18-72mg; SD: 18mg ≥18 Yrs: 18-72mg; SD: 18mg or 36mg	18mg	27mg	36mg	54mg	Relaxin® (bismequivalent to corresponding Concerta dosing)	45mg	63mg	72mg
Focalin® XR† (dexamethylphenidate)	6-17 Yrs: 5-30mg; SD: 5mg 18 Yrs Adult: 10-40mg; SD: 10mg (biphasic – 50/50)	5mg	10mg	15mg	20mg	25mg	30mg	35mg	40mg
Cotempla XR-ODT® (grape flavor)	6-17 Yrs: 8.6-51.8mg; SD: 17.3mg	8.6mg	17.3mg	25.9mg	34.6mg	51.8mg			
Apentio® XR†	6 Yrs-Adult: 10-60mg; SD: 10mg (biphasic – 40/60)	10mg	15mg	20mg	30mg	40mg	50mg	60mg	
Quilivant XR® (2mg/mL, (ginger) banana flavor)	6 Yrs-Adult: 20-60mg; SD: 20mg	10mg 2mL	1 Bottle: 30mg 60mL	20mg 4mL	1 Bottle: 60mg 120mL	1 Bottle: 100mg 180mL	2 Bottles: 60mg 120mL	2 Bottles: 75mg 150mL	2 Bottles: 90mg 180mL
QuillChew XR® (cherry flavor)	6 Yrs-Adult: 20-60mg; SD: 20mg (biphasic – 30/70)	20mg	30mg	40mg	60mg				
Ritalin® LA†	6-12 Yrs: 10-60mg; SD: 20mg (biphasic – 50/50)	10mg	20mg	30mg	40mg	60mg			
Metadate® CD†	6-17 Yrs: 10-60mg; SD: 20mg (biphasic – 30/70)	10mg	20mg	30mg	40mg	60mg			
Methylphenidate Pro-Drug Formulations – Long Acting, Oral** (Medications in this section are shown at actual size)									
Azstarys®† (dexamethylphenidate + saxamethylphenidate)	6-12 Yrs: 26.1/5.2 – 52.3/10.4; SD: 39.2/7.8 mg 13 Yrs – Adult: 39.2/7.8 – 52.3/10.4; SD: 39.2/7.8 mg	26.1mg SDX / 5.2mg d-MPH	39.2mg SDX / 7.8mg d-MPH	52.3mg SDX / 10.4mg d-MPH					
Methylphenidate Formulations – Long Acting/Delayed Onset, Oral** (Medications in this section are shown at actual size)									
Jornay PM®†	6 Yrs-Adults: 20-100mg (dosed in the evening); SD: 20mg	20mg	40mg	60mg	80mg	100mg			
Methylphenidate Formulations – Short Acting, Oral** (Medications in this section are shown at actual size)									
Focalin® (dexamethylphenidate)	6-17 Yrs: Daily: 5-20mg, divided BID; SD: 2.5mg BID	2.5mg	5mg	10mg					
Ritalin®	6-12 Yrs: Daily: 10-60mg; divided BID or TID; SD: 5mg BID Adults: Daily: 10-60mg; divided BID or TID	5mg	10mg	20mg					
Methylphen Chewable† (grape flavor)	6-12 Yrs: Daily: 10-60mg; divided BID or TID; SD: 5mg BID Adults: Daily: 10-60mg; divided BID or TID	2.5mg	5mg	10mg					
Methylphen Solution (grape flavor)	6-12 Yrs: Daily: 10-60mg; divided BID or TID; SD: 5mg BID Adults: Daily: 10-60mg; divided BID or TID	5mg/5mL	10mg/5mL						
<p>*Discontinued ADHD Medications: The following FDA-approved proprietary formulations are no longer available (though, in some cases, branded or generic equivalents are still available): Adhansia XR, Adrems XR (liquid), Cylert (permetrine), DextroSparules (5mg, 15mg), Dextroline tablets, DextroSparules tablets, Lisdex/ADDS solution, Metadate CD capsules, Metadate ER tablet (10mg), Methylphen Chewable tablets, Ritalin LA capsule (60mg), Ritalin SR tablets (20mg).</p> <p>**Important Information: The age-specific dosing information listed for each medication reflects the FDA-approved prescribing information. "SD" refers to the FDA-recommended starting dose, which sometimes varies by age. Practitioners should refer to the full prescribing information for each medication. Please note: medications have been arranged on the ADHD Medication Guide for ease of display and visual comparison; dosing comparability cannot be assumed.</p> <p>*Disclaimer: The ADHD Medication Guide was created by Dr. Andrew Adelman of Northwell Health, Inc. Northwell Health is not affiliated with the owner nor is an owner of any of the medications or brands referenced in this Guide. No endorsement or affiliation exists between Northwell Health and the owner of the medications or brands. The ADHD Medication Guide is a visual aid for professionals caring for individuals with ADHD. The Guide includes only medications indicated by the FDA for the treatment of ADHD. In clinical practice, this guide may be used to assist patients in identifying medications previously tried, and may allow clinicians to identify ADHD medication options for the future. Practitioners should refer to the FDA-approved product information to learn more about each medication. Although every effort has been made to depict the true size and color of each medication depicted, we cannot guarantee there are no minor distortions. This Guide should not be used as an exclusive basis for decision-making. The user understands and accepts that if Northwell Health were to accept the risk of harm to the user from use of this Guide, it would not be able to make the Guide available because the cost to cover the risk of harm to all users would be too great. Thus, use of this ADHD Medication Guide is strictly voluntary and at the user's sole risk.</p> <p>Copyright 2006, 2016, 2017, 2019, 2020, 2021, 2022, 2023, 2024 by Northwell Health, Inc., New Hyde Park, New York. All rights reserved. Reproduction of the ADHD Medication Guide or the creation of derivative works is not permitted without the written permission of Northwell Health. The sale of this Guide is strictly forbidden. Send inquiries to Office of Legal Affairs, Northwell Health, 2000 Marcus Avenue, New Hyde Park, NY 11042. This Guide is accurate as of September 15, 2024.</p>									

Methylphenidate Formulations - Long Acting, Transdermal

Daytrana®
6-17 Yrs: 10-30mg;
SD: 10mg
(Patches are shown
at 100% actual size.
The color border
around each patch
reflects the color of
the packaging, not
the patch itself.)

Daytrana®
Methylphenidate
transdermal sys
tem
30mg / 9 hrs
~1.5" x 2.6"

Daytrana®
Methylphenidate
transdermal sys
tem
15mg / 9 hrs
~1.5" x 1.9"

Daytrana®
Methylphenidate
transdermal sys
tem
10mg / 9 hrs
~1.4" x 1.4"

Daytrana®
Methylphenidate
transdermal sys
tem
5mg / 9 hrs
~1.1" x 1.1"

Administration Key:

- Orally disintegrating tablet † Must be swallowed whole
- Can be mixed with yogurt, orange juice, or water
- Can open capsule and sprinkle medication on apple sauce
- Can open capsule and sprinkle medication into water or onto apple sauce
- Can open capsule and mix with apple sauce or yogurt
- Indicates a generic formulation is also available; generic products are not shown
- Indicates a generic (but NOT a branded) formulation is available
- View the latest version of the ADHD Medication Guide at www.ADHDMedicationGuide.com

• Updated versions of the ADHD Medication Guide can be viewed at: www.ADHDMedicationGuide.com

• Laminated copies of the ADHD Medication Guide can be ordered on-line from the ADD Warehouse

• Contact Dr. Andrew Adelman with any comments or suggestions: ADHDMedGuide@northwell.edu

ADHD Medication Guide

ADHD Medication Guide*									
Revised: September 15, 2024									
Amphetamine Formulations – Long Acting, Oral** (Medications in this section are shown at actual size)									
Dyanavel XR [®] (d- & l-amphetamine sulfate) (bubblegum flavor)	6 Yrs-Adults: 2.5–20mg; SD: 2.5 or 5mg		5mg		10mg		15mg		20mg
Dyanavel XR [®] (d- & l-amphetamine sulfate) (bubblegum flavor)	6 Yrs-Adults: 2.5–20mg; SD: 2.5 or 5mg	2.5mg 1mL	5mg 2mL	7.5mg 3mL	10mg 4mL	12.5mg 5mL	15mg 6mL	17.5mg 7mL	20mg 8mL
Mydayis [®] (mixed amphetamine salts)	13–17 Yrs: 12.5–25mg; SD: 12.5mg	12.5mg		25mg		37.5mg		50mg	
Adzenys XR-ODT [®] (d- & l-amphetamine) (orange flavor)	6–12 Yrs: 3.1–18.8mg; SD: 6.3mg 13–17 Yrs: 3.1–12.5mg; SD: 6.3mg Adults: 12.5mg		3.1mg	6.3mg	9.4mg	12.5mg	15.7mg	18.8mg	
Adderall XR [®] (mixed amphetamine salts)	6–17 Yrs: 3–30mg; SD: 10mg (biphase – 50/50)		5mg	10mg	15mg	20mg	25mg	30mg	
Dexedrine Spansule [®] (d-amphetamine sulfate)	6–17 Yrs: 10–60mg; SD: 5mg 1–2x/day		5mg	10mg	15mg				
Amphetamine Formulations – Long Acting, Transdermal									
Xelstrym [™] (l-amphetamine) (strawberry flavor)	6–17 Yrs: 4.5–18mg; SD: 4.5mg Adults: 9–18mg; SD: 9mg								
(The color border of the patches reflects the color of the packaging, not the patch itself.)									
Amphetamine Formulations – Long Acting, Oral** (Medications in this section are shown at actual size)									
Vyvanse [®] (capsules) (lisdexamfetamine)	6 Yrs-Adults: 10–70mg; SD: 30mg	10mg	20mg	30mg	40mg	50mg	60mg	70mg	
Vyvanse [®] (chewables) (lisdexamfetamine) (strawberry flavor)	6 Yrs-Adults: 10–70mg; SD: 30mg	10mg	20mg	30mg	40mg	50mg	60mg	70mg	
Amphetamine Formulations – Short Acting, Oral** (Medications in this section are shown at actual size)									
Evekeo [®] (d- & l-amphetamine sulfate)	3–5 Yrs: SD: 2.5mg 1x/day 6–17 Yrs: 5–40mg divided BID; SD: 5mg 1–2x/day		5mg		10mg		15mg	20mg	
Evekeo [®] ODT (d- & l-amphetamine sulfate)	6–17 Yrs: 5–40mg divided BID; SD: 5mg 1–2x/day	2.5mg	5mg		10mg		15mg	20mg	
Zenzedi [®] (d-amphetamine sulfate)	3–5 Yrs: SD: 2.5mg 1x/day 6–17 Yrs: 5–40mg divided BID; SD: 5mg 1–2x/day	2.5mg	5mg	7.5mg	10mg	15mg	20mg	30mg	
Adderall [®] (mixed amphetamine salts)	3–5 Yrs: SD: 2.5mg 1x/day 6–17 Yrs: 5–40mg divided BID; SD: 5mg 1–2x/day		5mg	7.5mg	10mg	12.5mg	15mg	20mg	30mg
ProCentra [®] (d-amphetamine sulfate) (bubblegum flavor)	3–5 Yrs: SD: 2.5mg 1x/day 6–17 Yrs: 5–40mg divided BID; SD: 5mg 1–2x/day		5mg/5mL						
Non-Stimulants** (Medications in this section are shown at actual size)									
Onyda [™] XR (clonidine, extended release) (orange flavor)	6–17 Yrs: 0.1–0.4mg; SD: 0.1mg (dosed at bedtime)	0.1mg/1mL	0.2mg/2mL	0.3mg/3mL	0.4mg/4mL				
Kapvay [®] (clonidine, extended release)	6–17 Yrs: 0.1–0.2mg BID; SD: 0.1mg qHS	0.1mg							
Intuniv [®] (guanfacine, extended release)	6–12 Yrs: 1–4mg; SD: 1mg 13–17 Yrs: 1–7mg; SD: 1mg Weight based dosing: SD: 8.25–4.08 mg/kg/day, may increase to 0.12 mg/kg/day *If the child is a child, then 1.2mg/kg *If the child is a child, then 1.2mg/kg *If the child is a child, then 1.2mg/kg	1mg	2mg	3mg	4mg				
Strattera [®] (atomoxetine)	6–11 Yrs: 100–400mg; SD: 100mg 12–17 Yrs: 200–400mg; SD: 200mg Adults: 200–600mg; SD: 200mg	100mg	180mg	25mg	40mg	60mg	80mg	100mg	
Qelbree [®] (viloxazine)	6–11 Yrs: 100–400mg; SD: 100mg 12–17 Yrs: 200–400mg; SD: 200mg Adults: 200–600mg; SD: 200mg	100mg	200mg	300mg	400mg				

AACAP ADHD Parents' Medication Guide



Attention-Deficit/ Hyperactivity Disorder (ADHD): **Parents' Medication Guide**

AMERICAN ACADEMY OF
CHILD & ADOLESCENT
PSYCHIATRY
WWW.AACAP.ORG



FAQs: Medication Use in Children and Adolescents with ADHD

I have been told that my child may have ADHD. What are the next steps?

Parents of children who might have ADHD should discuss their concerns with their child's primary care practitioner, primary teacher, developmental pediatrician, and/or mental health specialist, such as a child and adolescent psychiatrist or psychologist, and seek guidance in obtaining a comprehensive evaluation.

Who can treat children and adolescents with ADHD?

Children and adolescents with ADHD can benefit from careful medication management by a child and adolescent psychiatrist, pediatrician, child neurologist, or advanced practice nurse with experience in treating ADHD. Children and families may benefit from psychotherapy for behavioral, emotional, and academic issues, which can be conducted by a licensed mental health practitioner.

What do I do if my child doesn't think anything is wrong?

Many children and adolescents with ADHD do not think they have a problem that requires treatment. Adolescents may have some insight into their problems but may not believe that they need medication. Some children or adolescents blame others for their problems. For those who deny that they have a problem, a frank, non-accusatory discussion about the difficulties your child is experiencing may help. You may also turn to online sources of information such as the CHADD or AACAP websites (see *Resources* section on page 17).

What if my child refuses to take medication?

Some children and adolescents can't explain why they refuse to take medication. You can explore what they think might happen if they take medicine. Some kids fear that medication may change their brains, while others think that taking medicine means that there is something wrong with them, and still others may resent taking something that may control or change them. For those who are taking medication, ask them about any side effects (including a belief that they are not as social or as much fun to be with) and work with the child's prescriber to minimize side effects.

I am afraid of using medications for my child.

Many parents would rather not use medication to treat their child's ADHD or any other mental health problem. It is important to note the problems associated with leaving ADHD untreated into adulthood: more academic, work-related and social problems, as well as higher risks for injuries, concussions, depression, suicidality, criminality, nicotine and substance use disorders compared to those treated for their ADHD. It is important to recognize that along with educational planning and accommodations, medications for children and adolescents with ADHD are well-studied, effective, and safe. There are no unexpected long-term side effects of stimulants that one does not see in the short term. For example, a lowered appetite seen soon after beginning stimulants may continue longer term. With careful coordination with your child's provider, most side effects can be managed with little to no long-term problems related to the medication.

What if my child with ADHD also has motor tics?

About one-third of children with ADHD will have spasm-like movements in the face, mouth, or upper body. Changes in tics may occur naturally, or may be related to medication for ADHD (sometimes causes increases or decreases in tics). Close monitoring of your child for a couple of weeks after a change in dose or introduction of a new medication is advised.

Are there differences between generic and brand name medications?

Brand name medications are the types of medications that are approved by the FDA and have been tested in research. These medications are made in a very consistent way and are generally preferred by patients because they work well and do not have serious side effects. Also available at pharmacies are generic medications, which are similar to brand name medications in several important ways. For example, they enter the bloodstream almost as much as the brand medication (at least 80% as much), and are effective, well tolerated, and less expensive. But, some generic medications are not as good as the brand name medication that they are copying. This has to do with differences in the way that the medication is released from the form it comes in (for example, a tablet or a capsule form) and how much the tablets are affected by different conditions such as humidity and light, as well as differences in side effects. Unfortunately, many pharmacies frequently switch among generic products so that you may be receiving a different generic preparation with each prescription. Some may be better than others.

Methylphenidate

Short Acting

Ritalin IR - Tablets taken typically 2-3 times per day, duration of 3-4 hours

Long Acting

Concerta - Capsules taken once per day, duration of 12 hours

22% IR, 78% delayed

Metadate CD - Capsules taken once per day, duration of 8 hours

30% IR, 70% delayed

Dexmethylphenidate

Pharmacologically active enantiomer of racemic methylphenidate

Short Acting

Focalin IR - Tablets taken 2-3 times per day, duration of 4-5 hours

Long Acting

Focalin XR - Capsules taken once per day, duration of 10-12 hours

50% IR, 50% delayed

Amphetamine

Adderall

Tablets taken 1-2 times per day, duration of 6 hours

Adderall XR

Capsules taken once per day, duration of 12 hours

50% IR, 50% delayed

Vyvanse

Prodrug of dextroamphetamine

Capsules taken once per day, duration of 12-14 hours

Managing Side Effects

Appetite suppression

Insomnia

Mood change

Headache

Abdominal pain

Tics

Growth effects

Non-Stimulants

Atomoxetine (Strattera)

Noradrenergic reuptake inhibitor

First FDA-approved non-stimulant; not as effective as stimulants

Consider for ADHD with substance use, comorbid tics

Less appetite cessation, more nausea and sedation

Black box warning for suicidal ideations

Guanfacine

IR (Tenex), ER (Intuniv)

Alpha 2a agonist

FDA-approved for monotherapy and adjunctive to stimulant

Less sedating than clonidine

Clonidine

IR (Catapres), ER (Kapvay)

Alpha 2 agonist

FDA-approved for monotherapy and adjunctive to stimulant

Taper to avoid rebound hypertension

Substance Abuse

Consider longer-acting

Monitoring for safety (misuse, diversion) and responsible prescribing practices

School Interventions

Individuals with Disabilities Education Act (IDEA)

Section 504 of Rehabilitation Act

Classroom Accommodations

ADHD Letter

Thank you!

References

Rajaprakash. ADHD. Peds in Review. 2022.

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AACAP Practice Parameters for Assessment and Treatment of Children and Adolescents with ADHD. 2007.

ADHD Medication Guide (<http://www.adhdmedicationguide.com/>)

AACAP Parents' ADHD Medication Guide

(https://www.aacap.org/App_Themes/AACAP/docs/resource_centers/resources/med_guides/ADHD_Medication_Guide-web.pdf)

Massachusetts General Hospital Psychiatry Academy (<https://mghcme.org/app/uploads/2022/03/New-Stim-TX-Ped-ADHD-2022-Spencer.pdf>)