CASE STUDIES

# Stahl's Essential Psychopharmacology

Volume 4

"In today's complex and burdened healthcare environment, this essential psychopharmacology for child and adolescent psychiatry gives the busiest clinicians readily available tools to navigate complex scenarios with clear, sequential, and logical guidance. The clinical pearls are written in pragmatically and with adult learning principles in mind. Thank you, Dr's Stahl and Strawn, for capitulating the wisdom of our field in such an accessible and engaging way."

**Manpreet Kaur Singh, MD, MS**
Associate Professor of Psychiatry and Behavioral Sciences
Stanford University, Stanford, CA, USA

"Dr's Strawn and Stahl have really done it! The case-based teaching format and dozens of easy-to-read graphs and illustrations, walks clinicians of all levels through the complex world of pediatric psychopharmacology. Using easy-to-follow color-coded backgrounds and icons, the cases illustrate the evolution of each patient's treatment, the interplay of science and clinical wisdom, and the common pitfalls in the practice of pediatric psychopharmacology. In this era of rapidly advancing knowledge, this book provides a foundation rooted in the latest clinical pharmacology literature; it is a must-read for anyone practicing pediatric psychopharmacology."

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Chair, Pritzker Department of Psychiatry and Behavioral Health
Ann and Robert H. Lurie Children's Hospital of Chicago, IL, USA
President-Elect, American Academy of Child & Adolescent Psychiatry

"This collection of case studies is the most comprehensive and clinically relevant that I have ever read. As a practicing Child and Adolescent Psychiatrist, I have come face to face with many of the same clinical presentations and found Dr Strawn's review of the management thoughtful and integrative.

The way the text is written provides a unique framework for how to approach these difficult interactions and gives a glimpse into how to combine science with the art of psychopharmacology when the evidence base is lacking.

I wholeheartedly believe this text is a must have for any Child and Adolescent Psychiatrist's library. I will certainly use it when teaching my residents and fellows and in my own practice as well."

**Nicole M. Ballinger, DO, MPH, FAPA**
Adult, Child and Adolescent Psychiatrist
Medical Staff President/ Director Child and Adolescent Psychiatry Partial Hospital Program/Site Director, Child and Adolescent Psychiatry Fellows and Residents for Aurora Psychiatric Hospital, Wauwatosa, WI, USA
Clinical Associate Professor, Department of Psychiatry and Behavioral Medicine, Medical College of Wisconsin and Affiliated Hospitals

# CASE STUDIES: Stahl's Essential Psychopharmacology

## Children and Adolescents

Volume 4

Jeffrey R. Strawn
*University of Cincinnati, Cincinnati, Ohio*

Stephen M. Stahl
*University of California, San Diego, California*

*With illustrations by*
Nancy Muntner

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# Introduction

Following the success of the third volume of *Case Studies* in 2021, we are very pleased to present a fourth collection of new clinical cases. This collection of cases comes from Dr. Strawn's clinics and consultations, from his research in clinical pharmacology, and from discussions with his talented collaborators, including pharmacologists, nurse practitioners, psychologists, and fellow child and adolescent psychiatrists. *Stahl's Essential Psychopharmacology* started in 1996 as a textbook (currently in its fifth edition) on how psychotropic medications work. It expanded to a companion Prescriber's Guide in 2005 (currently in its seventh edition) on how to prescribe psychotropic medications. In 2008, a website was added (**stahlonline.cambridge.org**) with both of these books available online in combination with several more, including an illustrated series of books covering specialty topics in psychopharmacology. The *Case Studies* show how to apply the concepts presented in these previous books to real patients in a clinical practice setting.

Why a case book? For practitioners, it is necessary to know the science and application of psychopharmacology – namely, both the mechanism of action of psychotropic medications and the evidence-based data on how to prescribe them – but this is not sufficient to become a master clinician. Many patients are beyond the data and are excluded from randomized controlled trials. Thus, a true clinical expert also needs to develop the art of psychopharmacology: namely, how to listen, educate, destigmatize, mix psychotherapy with medications, and use intuition to select and combine medications. The art of psychopharmacology is especially important when confronting the frequent situations where there is no evidence on which to base a clinical decision.

What do you do when there is no evidence? The short answer is to combine the science with the art of psychopharmacology. Being able to combine science and art and to adapt findings from studies in adults is critical for clinicians treating children and adolescents. However, the successful psychiatric clinician working with children and adolescents must not only integrate science and art but also do so with a strong background in developmental pharmacology, attention to development, learning disorders, and family dynamics. The best way to learn this approach is probably by seeing individual patients and their families. Here we hope you will join us and peer over our shoulders to observe these complex cases from our child and adolescent psychiatric clinics and consultations. Each case is anonymized in identifying details, but incorporates real case outcomes that are not fictionalized. Sometimes more than one case is combined into a single case. Hopefully, you will recognize many of these patients as similar to those you have seen in your own practice (although they will not be exactly the same patient, as the identifying historical details are changed here to comply with disclosure standards, and many patients can look very much like many other patients you know, which is why you may find this teaching approach effective for your clinical practice).

We have presented cases from our clinical practice for many years and in courses (especially at the annual Neuroscience Education Institute Psychopharmacology Congress). Over the years, we have been fortunate to have many young child and adolescent psychiatrists and other trainees from our universities, and indeed from all over the world, sit in on our practices to observe these cases, and now we attempt to bring this information to you in the form of a fourth case book.

The cases are presented in a novel written format in order to follow consultations over time, with different categories of information designated by different background colors and explanatory icons. For those of you familiar with *The Prescriber's Guide*, this layout will be recognizable. Included in the case book, however, are many unique sections as well; for example, presenting what was on our minds at various points during the management of the case, and also questions along the way for you to ask yourself in order to develop an action plan. Additionally, these cases incorporate ideas from the recent changes in the maintenance of certification standards by the American Board of Psychiatry and Neurology, for those of you interested in recertification in psychiatry. Thus, there is a section on Performance in Practice (called here "Confessions of a psychopharmacologist"). There is a short section at the end of several cases looking back and seeing what could have been done better in retrospect. Another section of most cases is a short psychopharmacology lesson or tutorial, called the "Two-minute tutorial," with background information, tables, and figures from literature relevant to the case in hand. Medications are listed by their generic and brand names for ease of learning. Indexes are included at the back of the book for your convenience. Lists of icons and abbreviations are provided in the front of the book. Finally, this fourth collection updates the reader on the newest psychotropic medications and their uses, and adopts the language of *DSM-5*.

The case-based approach is how this book attempts to complement "evidence-based prescribing" from other books in the *Essential Psychopharmacology* series, plus the literature, with "prescribing-based evidence" derived from empiric experience. It is certainly important to know the data from randomized controlled trials, but after knowing all this information, case-based clinical experience supplements those data. The old saying that applies here is that wisdom is what you learn *after* you know it all, and the same can be said for studying cases after seeing the data.

A note of caution: we are not so naïve as to think that there are not potential pitfalls to the centuries-old tradition of case-based teaching. Thus, we think it is a good idea to point some of them out here in order to try to avoid these traps. Do not ignore the "law of small numbers" by basing broad predictions on narrow samples or even a single case.

Do not ignore the fact that if something is easy to recall, particularly when associated with a significant emotional event, we tend to think it happens more often than it does.

Do not forget the recency effect, namely, the tendency to think that something that has just been observed happens more often than it does.

According to editorialists,[1] when moving away from evidence-based medicine to case-based medicine, it is also important to avoid:

- eloquence- or elegance-based medicine
- vehemence-based medicine
- providence-based medicine
- diffidence-based medicine
- nervousness-based medicine
- confidence-based medicine.

We have been counseled by colleagues and trainees that perhaps the most important pitfall for us to try to avoid in this book is "eminence-based medicine," and to remember specifically that:

- radiance of gray hair is not proportional to an understanding of the facts
- eloquence, smoothness of the tongue, and sartorial elegance cannot change reality
- qualifications and past accomplishments do not signify privileged access to the truth
- experts almost always have conflicts of interest
- clinical acumen is not measured in frequent flier miles.

Thus, it is with all humility as practicing psychiatrists that we invite you to walk a mile in our shoes; experience the fascination, the disappointments, the thrills, and the learnings that result from observing cases in the real world.

Jeffrey R. Strawn, MD

Stephen M. Stahl, MD, PhD

[1] Isaccs, D. and Fitzgerald, D. Seven alternatives to evidence-based medicine. *British Medical Journal* 1999; 319: 1618.

# List of icons

| | |
|---|---|
|  | Pre- and post test self-assessment question; question |
|  | Patient evaluation on intake |
|  | Psychiatric history |
|   | Social and personal history |
|  | Medical history |
|  | Family history |
|   | Medication history |
|  | Current medications |

| | |
|---|---|
|  | **Psychotherapy history** |
|  | **Mechanism of action moment** |
|  | **Attending physician's mental notes** |
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|  | **Case debrief** |
|  | **Take-home points** |
|  | **Performance in practice: confessions of a psychopharmacologist** |
|  | **Tips and pearls** |
|  | **Two-minute tutorial** |

| | |
|---|---|
|  | **Rating scale** |
|  | **Imaging** |
|  | **Pharmacogenetics** |
|  | **Lab testing** |
|  | **Psychological testing** |

# Abbreviations

| | |
|---|---|
| 2-AG | 2-arachidonoylglycerol |
| 5-HT | serotonin |
| AACAP | American Academy of Child and Adolescent Psychiatry |
| AAP | American Academy of Pediatrics |
| ABA | applied behavioral analysis |
| ACh | acetylcholine |
| ACMG | American College of Medical Genetics |
| ACR | albumin to creatinine ratio |
| ACTH | adrenocorticotropic hormone |
| ADH | antidiuretic hormone |
| ADHD | attention-deficit hyperactivity disorder |
| ADOS | Autism Diagnostic Observation Scale |
| AIMS | Abnormal Involuntary Movement Scale |
| AMPA | α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid |
| AN | anorexia nervosa |
| ANC | absolute neutrophil count |
| AN-P | anorexia nervosa binge purge type |
| AP | advanced placement |
| ASD | autism spectrum disorder |
| AUC | area under the curve |
| AV | atrioventricular |
| AVP | arginine vasopressin |
| BD | Block Design |
| BED | binge eating disorder |
| BMI | body mass index |
| BN | bulimia nervosa |
| BUN | blood urea nitrogen |
| BZD | benzodiazepine |
| cAMP | cyclic adenosine monophosphate |
| $CB_{1/2}$ | cannabinoid-1/-2 receptors |
| CBC | complete blood count |
| CBD | cannabidiol |
| CBT | cognitive behavior therapy |
| CBT-I | cognitive behavior therapy for insomnia |
| CBIT | Comprehensive Behavioral Intervention for Tics |
| CKD | chronic kidney disease |
| CNS | central nervous system |
| COPD | chronic obstructive pulmonary disease |
| CPT | Cognitive Processing Therapy |
| CRF | corticotropin-releasing factor |
| CRH | corticotropin-releasing hormone |
| CRHQ | Children's Sleep Habits Questionnaire |
| CSSRS | Columbia–Suicide Severity Rating Scale |
| CT | computed tomography |
| CY-BOCS | Children's Yale-Brown Obsessive-Compulsive Scale |
| DA | dopamine |

| | |
|---|---|
| dACC | dorsal anterior cingulate cortex |
| DAT | dopamine transporter |
| DD | developmental disabilities |
| DDAVP | desmopressin |
| DHA | docosahexaenoic acid |
| DLPFC | dorsolateral prefrontal cortex |
| DMDD | disruptive mood dysregulation disorder |
| DSM-5 | *Diagnostic and Statistical Manual of Mental Disorders,* 5th edn. |
| EKG | electrocardiogram |
| EEG | electroencephalogram |
| eGFR | estimated glomerular filtration rate |
| EMUO | early morning urine osmolality |
| EPS | extrapyramidal symptoms |
| FDA | U.S. Food and Drug Administration |
| FIR | fluid intake record |
| FRI | Fluid Reasoning Index |
| FSIQ | Full-scale Intelligence Quotient |
| GABA | γ-aminobutyric acid |
| GAD | generalized anxiety disorder |
| GAI | General Ability Index |
| GERD | gastroesophageal reflux disease |
| GFR | glomerular filtration rate |
| GLP-1 | glucagon-like peptide-1 |
| glu/Glu | glutamine |
| GnRH | gonadotropic releasing hormone |
| GPA | grade point average |
| $H_1$ | histamine-1 receptor |
| HA | histamine |
| HCN | hyperpolarization-activated cyclic nucleotide-gated |
| HIV | human immunodeficiency virus |
| HPA | hypothalamic–pituitary–adrenal |
| HPG | hypothalamic–pituitary–gonadal |
| HRT | Habit Reversal Therapy |
| ICSD | International Classification of Sleep Disorders |
| IEP | Individualized Education Plan |
| IPT | Interpersonal Psychotherapy |
| IPT-A | Interpersonal Psychotherapy for Adolescents |
| IUGR | in-utero growth restriction |
| IV | intravenous |
| LDT | laterodorsal tegmentum |
| MAOI | monoamine oxidase inhibitor |
| MAP | mean arterial blood pressure |
| MBT-A | Mindfulness-Based Therapy for Adolescents |
| mCPP | methylchloropiperazine |
| MDD | major depressive disorder |
| MECP2 | methyl CpG binding protein-2 |
| MGH | Massachusetts General Hospital |
| mGluR | metabotropic glutamate receptor |
| MMPI-A | Minnesota Multiphasic Personality Inventory-Adolescent version |
| MPH | methylphenidate |
| MRI | magnetic resonance imaging |
| mTOR | mammalian target of rapamycin |

| | |
|---|---|
| NAC | *N*-acetylcysteine |
| NAMI | National Alliance on Mental Health |
| NSAID | nonsteroidal anti-inflammatories |
| NDRI | norepinephrine–dopamine reuptake inhibitor |
| NE | norepinephrine |
| NET | norepinephrine transporter |
| NICU | neonatal intensive care unit |
| NMDA | *N*-methyl-D-aspartate |
| NSF | National Sleep Foundation |
| OCD | obsessive compulsive disorder |
| ODD | oppositional defiant disorder |
| OGT | oxygenated glycerol triester |
| OROS | osmotic controlled-release oral delivery system |
| PAI-A | Personality Assessment Inventory for Adolescents |
| PANSS | Positive and Negative Symptoms of Schizophrenia |
| PET | positron emission tomography |
| PFC | prefrontal cortex |
| PHQ-9 | Patient Health Questionnaire-9 |
| PLM | periodic limb movement |
| PLMi | Periodic Limb Movement Index |
| PMDD | premenstrual dysphoric disorder |
| PO | oral |
| PPT | pedunculopontine tegmentum |
| PSG | polysomnography |
| PSI | Processing Speed Index |
| PTEN | phosphatase and tensin homolog |
| PTSD | posttraumatic stress disorder |
| QIDS | Quick Inventory of Depressive Symptomatology |
| QIDS-SR | Quick Inventory of Depressive Symptomatology – Self-Report |
| QTc | corrected QT interval |
| SCARED | Screen for Child Anxiety-Related Emotional Disorders |
| SCN | suprachiasmatic nucleus |
| SERT | serotonin transporter |
| SGA | second-generation antipsychotic/mixed dopamine–serotonin receptor agonist |
| SNRI | serotonin–norepinephrine reuptake inhibitor |
| SRI | serotonin reuptake inhibition |
| SSRI | selective serotonin reuptake inhibitor |
| $T_3$ | triiodothyronine |
| $T_4$ | thyroxine |
| TAT | Thematic Apperception Test |
| TCA | tricyclic antidepressant |
| TF-CBT | trauma-focused cognitive behavior therapy |
| THC | Δ9-tetrahydrocannabinol |
| TMS | transcranial magnetic stimulation |
| TORDIA | Treatment of SSRI-Resistant Depression in Adolescents study |
| TSH | thyroid-stimulating hormone |

| | |
|---|---|
| UCLA | University of California Los Angeles |
| $V_2$ | vasopressin-2 receptor |
| VCI | Verbal Comprehension Index |
| VEGF | vascular endothelial growth factor |
| VLPFC | ventrolateral prefrontal cortex |
| VMAT2 | vesicular monoamine transporter-2 |
| VP | Visual Puzzles |
| VSCC | voltage-sensitive calcium channel |
| VSI | Visual-Spatial Index |
| VTA | ventral tegmental area |
| WISC(-IV/V) | Wechsler Intelligence Scale for Children (4th/5th edition) |
| WMI | Working Memory Index |
| YMRS | Young Mania Rating Scale |