

Psychopharmacology Examination for Psychologists (PEP)
an examination for practitioners

The PEP's Primary Purpose

The College of Professional Psychology, APA Practice Organization, developed the PEP for use by state and provincial psychology licensing authorities when they set requirements to implement newly enacted laws permitting the prescribing of psychotropic medications by qualified psychologists. The PEP is designed to be used hand-in-hand with rigorous education and supervised clinical experience.

The College contracted with Professional Examination Service (PES), New York, NY, to develop the PEP using a methodology that complies with the highest standards for validity, fairness, and defensibility in licensing.* PES has provided exam development services for over 50 years to licensing, certifying, and corporate clients (including the psychology licensing exam (EPPP) currently used by all U. S. states and Canadian provinces).

Members of the 18-member expert panel who worked with PES during the developmental phase included graduates of the Department of Defense's Psychopharmacology Demonstration Project, as well as physicians, pharmacists and advanced practice nurses. Approximately 100 additional experts from various fields, including psychology, medicine, pharmacy, pharmacology, and nursing, provided review and comment throughout the developmental phase. The PEP is periodically updated to reflect changing knowledge and practice so that it remains valid and defensible for use in licensure.

The PEP assesses knowledge that is validated as critical for psychologists to possess in order to practice safely and effectively when prescribing psychotropic medications. The knowledge base is described below.

** Technical guidelines described in the Standards for Educational Psychological Testing (AERA/APA/NCME, 1985), relevant sections of the Uniform Guidelines on Employee Selection Procedures (EEOC, Civil Service Commission, U. S. Department of Labor and U. S. Department of Justice, 1978) and PES Guidelines for the Development, Use, and Evaluation of Licensure and Certification Programs (PES, 1995).*

Content Areas
Validated for Inclusion in the
Psychopharmacology Examination for Psychologists (PEP)
An Examination for Practitioners
2001

Content Area 1: Integrating clinical psychopharmacology with the practice of psychology

Refers to the implementation of clinical practices of biopsychosocial assessment, multiaxial diagnosis, and treatment, including pharmacotherapy, in the context of a complex of factors influencing functioning. These factors include biological (e.g., genetic, sex, age, disease), psychological (e.g., cognitive, emotional, dynamic, motivational, behavioral), psychosocial (e.g., gender, cultural/ethnic, interpersonal), and ecological/environmental factors.

- 0101 Knowledge of biopsychosocial variables as determinants of medication effects (e.g., family history, differential familial medication response, patient belief systems, economics, social support, current environmental circumstances)
- 0102 Knowledge of relative effects of psychopharmacological and psychological interventions as sole, additive, or interactive treatments for given disorders
- 0103 Knowledge of limitations and value of single-treatment modalities, combined interventions (i.e., medication employed alone or in conjunction with a psychological therapy), and patient perceptions (e.g., attributions of therapeutic and adverse effects, psychological meaning of medication, motivations, treatment expectations)
- 0104 Knowledge of timing and sequencing of interventions to achieve maximum treatment effectiveness, including importance of patient instruction
- 0105 Knowledge of practitionerBpatient relationship, including its impact on medication adherence, efficacy, adverse effects, and response to side effects, and implications for the relationship when physical and pharmacological interventions are utilized
- 0106 Knowledge of the development and implementation of a coherent and organized treatment plan of psychological and pharmacological intervention
- 0107 Knowledge of case and medication management techniques to enhance adherence to treatment plan (e.g., biological and psychological principles relevant to adherence, communication skills, patient education techniques, cultural competence)
- 0108 Knowledge of pharmacoeconomics/cost issues in treatment planning

Content Area 2: Neuroscience

Refers to the anatomy, physiology, and biochemistry of the nervous system and its interfaces with other major body systems.

- 0201 Knowledge of the structure and function of nervous system cells
- 0202 Knowledge of the structure and function of the central and peripheral nervous systems
- 0203 Knowledge of the major neuronal pathways and their functions, including second messenger systems
- 0204 Knowledge of the vascular supply of the brain, and the blood-brain and placental barriers
- 0205 Knowledge of cellular and molecular nervous system biology and regulatory processes
- 0206 Knowledge of major neurotransmitter and neuromodulator synthesis, storage, release, distribution throughout the brain and the rest of the body, action, reuptake, and degradation
- 0207 Knowledge of neuropeptides (e.g., enkephalin, endorphin, substance P)
- 0208 Knowledge of the endocrine system and the interface of various hormones and other neurotransmitters

Content Area 3: Nervous system pathology

Refers to disorders of the nervous system resulting in abnormal function or behavioral/mood disruption. Includes biochemical, structural (congenital or acquired), or neurophysiological abnormalities and their impact on other body systems.

- 0301 Knowledge of etiological factors and diagnoses of dementia, delirium, and other cognitive disorders
- 0302 Knowledge of etiological factors and diagnosis of chronic pain, including headache (e.g., differentiation of pain syndromes with primarily nervous, musculoskeletal, and tension-related etiology)
- 0303 Knowledge of etiological factors and diagnosis of sleep disorders as related to the nervous system and psychopathology
- 0304 Knowledge of etiological factors and diagnosis of movement disorders (e.g., including Parkinson's, Huntington's, and Tourette's syndromes)
- 0305 Knowledge of etiological factors and diagnosis of mental retardation
- 0306 Knowledge of etiological factors and diagnosis of neurodevelopmental disorders (e.g., fetal alcohol syndrome, pervasive developmental disorders, Fragile-X syndrome)
- 0307 Knowledge of etiological factors and diagnosis of central nervous system vascular disorders (e.g., cerebral vascular accidents [CVAs], transient ischemic attacks [TIAs])
- 0308 Knowledge of etiological factors and diagnosis of seizure disorders
- 0309 Knowledge of traumatic brain injury
- 0310 Knowledge of other nervous system pathology (e.g., multiple sclerosis, infectious diseases,

neoplasms)

- 0311 Knowledge of neurobehavioral/psychological disorders that have an hypothesized neuropathological basis (e.g., schizophrenia, affective disorders, anxiety, ADHD)
- 0312 Knowledge of basic neurodiagnostic markers of neurobehavioral disorders (e.g., as found on EEG and diagnostic imaging, and in neuropsychological assessment)
- 0313 Knowledge of the mechanism of extrapyramidal dysfunction (e.g., dystonic reactions and tardive dyskinesia)

Content Area 4: Physiology and pathophysiology

Refers to normal physiology and pathophysiology across the life span, and to their impact on psychological functioning and psychopharmacology.

- 0401 Knowledge of indications for referral to other health care providers for treatment or additional assessment
- 0402 Knowledge of basic cardiovascular system physiology and pathophysiology across the life span (e.g., rhythm and rate disorders such as prolonged QT interval)
- 0403 Knowledge of interrelationships between cardiovascular functioning and (a) psychopharmacology (e.g., EKG changes secondary to TCAs, blood pressure changes secondary to psychotropics, beta blockers, and depression), and (b) psychopathology (e.g., mitral valve prolapse related to panic disorder, tachycardia related to generalized anxiety disorder)
- 0404 Knowledge of basic pulmonary system physiology and pathophysiology across the life span
- 0405 Knowledge of interrelationships between pulmonary functioning and (a) psychopharmacology (e.g., theophylline and anxiety, beta blockers and asthma), and (b) psychopathology (e.g., hypoxia versus dementia)
- 0406 Knowledge of basic renal/genitourinary system physiology and pathophysiology across the life span (e.g., effect of electrolyte imbalance on mental status)
- 0407 Knowledge of interrelationships between renal/genitourinary functioning and (a) psychopharmacology (e.g., effect of psychotropic substances on urinary/sexual functioning), and (b) psychopathology (e.g., urinary tract infection and mental status changes in the elderly)
- 0408 Knowledge of basic hepatic system physiology and pathophysiology across the life span (e.g., first-pass metabolism, disorders affecting first-pass metabolism)
- 0409 Knowledge of interrelationships between hepatic functioning and (a) psychopharmacology (e.g., the interaction between psychotropics and liver enzymes, such as the cytochrome P450 system), and (b) psychopathology (e.g., metabolic encephalopathy and delirium; carcinoid tumor and anxiety)
- 0410 Knowledge of basic endocrine system physiology and pathophysiology across the life span (e.g., relationship between thyroid function tests and hypothyroidism and hyperthyroidism)
- 0411 Knowledge of interrelationships between endocrine functioning and (a) psychopharmacology (e.g., elevated prolactin and antipsychotic medications), and (b) psychopathology (e.g., hormonal disequilibrium and perimenstrual dysphoria, depression and Cushing=s disease)
- 0412 Knowledge of basic hematological system physiology and pathophysiology across the life span
- 0413 Knowledge of interrelationships between hematological functioning and (a) psychopharmacology (e.g., agranulocytosis and clozapine, thrombocytopenia and carbamazepine), and (b) psychopathology (e.g., anemia and depression)
- 0414 Knowledge of basic muscular/skeletal/dermatologic system physiology and pathophysiology across the life span (e.g., hypercalcemia and depression)
- 0415 Knowledge of interrelationships between muscular/skeletal/ dermatologic functioning and (a) psychopharmacology (e.g., alopecia and valproic acid), and (b) psychopathology

(e.g., OCD and trichotillomania)

Content Area 4: Physiology and pathophysiology (continued)

- 0416 Knowledge of basic immunologic/rheumatology system physiology and pathophysiology across the life span (e.g., systemic lupus erythematosus [SLE])
- 0417 Knowledge of interrelationships between immunologic/ rheumatologic functioning and (a) psychopharmacology, and (b) psychopathology (e.g., SLE and depression, fibromyalgia and depression, AIDS-related dementia)
- 0418 Knowledge of interface of psychological, physiological, and behavioral factors and their relationship in complex behaviors and processes involving multiple body systems (e.g., psychoneuroimmunology, sexual functioning)
- 0419 Knowledge of relationship of complex behaviors involving multiple body systems with (a) psychopharmacology (e.g., sleep disruption secondary to antidepressant medication), and (b) psychopathology (e.g., sexual dysfunction and depression)

Content Area 5: Biopsychosocial and pharmacologic assessment and monitoring

Refers to a range of biopsychosocial (psychological, neurological, behavioral, physical, biomedical) and pharmacologic assessment techniques and procedures for baseline and ongoing evaluation of the individual's physical and psychological health status as well as the assessment of therapeutic efficacy, adverse effects, contraindications for usage, drug interactions, and appropriateness for medication continuation, modification, or discontinuation.

- 0501 Knowledge of psychological assessment and history taking procedures (e.g., comprehensive individual and family medical and mental health history, dietary habits, mental status, and behavioral assessments)
- 0502 Knowledge of basic physical and neurological examination procedures
- 0503 Knowledge of normal laboratory values in screening, assessment, and monitoring techniques, and the implication of disease states, sample timing, and medications on those values
- 0504 Knowledge of laboratory tests and assessment procedures indicated for general assessment (e.g., basic screening panel), appropriate for use with special populations (e.g., females, individuals experiencing first psychotic break), or before prescribing particular medications (e.g., lithium)
- 0505 Knowledge of medication-specific therapeutic drug monitoring, and indications for monitoring of clinical laboratory values (e.g., TCA levels, renal functioning in lithium use)
- 0506 Knowledge of behavioral assessment methods (e.g., rating scales, direct observation of behaviors, parent/teacher/self report) in baseline and ongoing monitoring of therapeutic effectiveness, quality of life, and adverse effects of psychopharmacological agents (e.g., tardive dyskinesia with antipsychotics, sexual dysfunction with antidepressants)
- 0507 Knowledge of techniques for differential diagnosis and indications for referral to other health care providers based on identification by abnormal biopsychosocial or pharmacological evaluation measures
- 0508 Knowledge of intellectual and neuropsychological assessment as it pertains to aiding diagnosis (e.g., depression versus dementia), indications for medication regimens, and ability to provide informed consent

Content Area 6: Differential diagnosis

Refers to the use of comprehensive diagnostic information about a patient to establish an accurate diagnosis from among possible medical and psychological diagnoses in order to select appropriate treatment modalities and determine appropriateness of referral to other health care providers.

- 0601 Knowledge of medical disorders that present as psychological disorders (e.g., ADHD versus PKU versus autism, anxiety versus Graves= disorder)
- 0602 Knowledge of psychological disorders that present as medical disorders (e.g., factitious disorders, somatization disorders)
- 0603 Knowledge of psychological signs and symptoms (e.g., mental status changes, memory dysfunction, depression, psychosis) secondary to substances of abuse, prescribed and over-the-counter [OTC] medications, supplements, and alternative treatments (e.g., St. John=s wort, steroids)
- 0604 Knowledge of varied presentations of psychological disorders in different populations (e.g., depression versus dementia in the elderly, ADHD versus anxiety in children, mania versus paranoid schizophrenia in African Americans)
- 0605 Knowledge of the use of psychological testing, physical and laboratory assessment, and medication response to clarify diagnostic dilemmas (e.g., mania versus cocaine abuse versus hyperthyroidism versus theophylline overdose)
- 0606 Knowledge of psychopharmacological implications for mental health disorders with overlapping symptomatology (e.g., major depressive disorder with psychotic features, anxious depression)
- 0607 Knowledge of dual diagnosis and co-morbid conditions (e.g., double depression, alcoholism and schizophrenia, depression with Parkinson=s disease)
- 0608 Knowledge of iatrogenic effects of medication versus primary symptoms of disease progression (e.g., akathisia versus anxiety; depression versus negative symptoms of schizophrenia; anticholinergic reactions versus dementia; medication-induced tremor, dystonic reaction, or tardive dyskinesia versus primary movement disorders)

Content Area 7: Pharmacology

Refers to the interactions of drugs with biophysiological systems; encompasses pharmacokinetics, pharmacodynamics, pharmacogenetics, and the epidemiology of various medications such as psychotropics, adjunctive agents, and other medications used in the practice of medicine, as well as substances of abuse, OTC products, and food and dietary supplements. The influence of cultural/ethnic factors, environmental factors, and responses of special populations are considered.

- 0701 Knowledge of drug classifications for psychotropic and adjunctive medications (e.g., stimulants, sedatives, antidepressants, anticholinergics), other drugs used in the practice of medicine, OTC medications, and substances of abuse
- 0702 Knowledge of biological factors affecting pharmacokinetics and pharmacodynamics
- 0703 Knowledge of absorption (e.g., delayed-release preparations, rates of absorption after oral dosing or parenteral injection, area under the curve, timing with food intake)

Content Area 7: Pharmacology (continued)

- 0704 Knowledge of distribution (e.g., plasma protein binding, influence of lipophilicity)
- 0705 Knowledge of metabolism (e.g., drug metabolism, understanding of the substrate and inhibitors and inducers of the Afamily≡ of P450 enzymes, other enzymes outside the liver)
- 0706 Knowledge of excretion (e.g., renal filtration rate, clearance of drugs)
- 0707 Knowledge of importance of biological half-life in determining steady-state drug concentrations, dosing schedules, accumulation
- 0708 Knowledge of drug properties and characteristics (e.g., therapeutic index, therapeutic blood levels/prescription doses, potency, bioavailability, efficacy, cognitive and behavioral manifestations of toxicity, doseBresponse relationships)
- 0709 Knowledge of types of drugs and other agents interacting with receptors (e.g., direct and indirect agonists, antagonists, and inverse agonists)
- 0710 Knowledge of drug-induced cellular adaptation (e.g., cellular signaling, ion channels, second messengers, neurotransmitter release, sensitivity, supersensitivity)
- 0711 Knowledge of drug effects on genetic expression (e.g., down-regulation)
- 0712 Knowledge of specific neurotransmitters, receptors, modulators, and neuropeptides
- 0713 Knowledge of mechanisms of action of a range of therapeutic agents with particular focus on psychotropic and adjunctive medications
- 0714 Knowledge of theoretical relationships thought to exist between neurotransmitter systems and psychopathological conditions based on known mechanisms of action and clinical observations (e.g., roles of serotonin in depression, dopamine in psychosis and substance abuse)
- 0715 Knowledge of drugBdrug and drugBfood interactions for a range of medications as well as substances of abuse, and supplements and other OTC products
- 0716 Knowledge of drug-induced disease, dysfunction, and adverse reactions (e.g., hepatotoxicity, agranulocytosis, dystonias)
- 0717 Knowledge of genetic polymorphisms (e.g., ethnic and gender differences, differences in cytochrome P450 isoenzymes in drug metabolism)
- 0718 Knowledge of familial patterns of drug response and toxicity
- 0719 Knowledge of pharmacoepidemiology (e.g., epidemiology of psychotropic drug use)
- 0720 Knowledge of tolerance, dependence, and withdrawal

Content Area 8: Clinical psychopharmacology

Refers to the application of pharmacology to the management of psychological/behavioral disorders. This includes indications, contraindications, dosing, adverse effects and toxicities of psychotropic and adjunctive medications, interactions with other medications (including other drugs used in medicine, for recreational purposes, and available for OTC purchase) as well as the management of adverse reactions, overdoses, and toxicities.

- 0801 Knowledge of indications, contraindications, and off-label uses of various psychotropic and adjunctive medications

Content Area 8: Clinical psychopharmacology (continued)

- 0802 Knowledge of rationale for psychotropic medication selection, taking into account diagnoses, target symptoms, patient and family history, premorbid personality, demographics, comorbid medical conditions, existing medication regimen and potential for interactions, and differences among medications within classes of drugs
- 0803 Knowledge of dosing, time course of therapeutic action and adverse effects; and patient factors that influence dose (e.g., weight, gender, ethnicity, age, concurrent disease)
- 0804 Knowledge of therapeutic monitoring, augmentation strategies, and dose adjustment (e.g., titration, cross-taper, discontinuation)
- 0805 Knowledge of routes of administration (e.g., oral, intramuscular, intravenous, inhalation) and differential response
- 0806 Knowledge of specific drug toxicities, management of adverse reactions, including overdose, and indications for referral for appropriate medical care (e.g., acute allergic reaction, extrapyramidal symptoms, hypertensive crisis)
- 0807 Knowledge of interactions of psychotropic and adjunctive medications with other medications (including other drugs used in medicine, for recreational purposes, and available for OTC purchase)
- 0808 Knowledge of relapse prevention, maintenance, and prophylaxis (e.g., strategies for sustaining remission of substance abuse, ensuring treatment compliance, preventing recurrence of depression)
- 0809 Knowledge of drug effects in special populations (e.g., developmentally disabled, elderly, pregnant or lactating women)
- 0810 Knowledge of pharmacological implications for comorbidity of age-related and disability-related disorders (e.g., overanxious disorder comorbid with ADHD)
- 0811 Knowledge of potential psychological and physiological manifestations of medications (including OTC drugs, supplements, and herbal substances) used for nonpsychological purposes (e.g., beta blockers, steroids)
- 0812 Knowledge of psychological and physiological manifestations of various recreational substances and treatment of intoxication or addiction, including strategies for assisted withdrawal, maintenance, and relapse prevention
- 0813 Knowledge of tolerance, cross-tolerance, dependence and withdrawal, sensitization/cross-sensitization with respect to specific medications, and the management strategies used to treat them
- 0814 Knowledge of drug-seeking behavior, and potential for abuse of prescription medications
- 0815 Knowledge of culturally appropriate educational techniques to inform patients about drug utilization, risks, benefits, potential complications, and alternatives to pharmacotherapy (e.g., procedures to enhance compliance, techniques to teach appropriate attribution and self-monitoring)

Content Area 9: Research

Refers to the methodology, standards, and conduct of research on psychoactive substances. The knowledge base facilitates research design and implementation, accurate data interpretation and communication, effective utilization of findings, the accumulation of scientific knowledge, and the improvement of the practice of clinical psychopharmacology.

- 0901 Knowledge of psychopharmacological retrieval systems and data bases
- 0902 Knowledge of research designs and analytic techniques used in psychopharmacological research (e.g., double-blind, drug washout, control groups, dose-response relationships, intent-to-treat analyses, endpoint analyses, within-subject and group designs, cross-over, use of rescue medications, and concurrent administration of other drugs [including OTC and nonpsychotropic medications])
- 0903 Knowledge of the FDA drug development process (i.e., Phase I: Human Pharmacology; Phase II: Therapeutic Exploratory; Phase III: Therapeutic Confirmatory; Phase IV: Therapeutic Use)
- 0904 Knowledge of measurement issues in psychopharmacological research (e.g., sample heterogeneity; sample size; random assignment of participants to treatment conditions; drug levels; outcome measures; standard monitoring procedures for side effects, adverse effects, and drug levels; interpretation issues; and interobserver reliability)
- 0905 Knowledge of community and participatory research strategies to enhance the relevance of studies on ethnic/cultural and other underserved populations (e.g., use of community advisory boards, community involvement in research planning)
- 0906 Knowledge of regulatory issues in psychopharmacological research (e.g., FDA regulations, informed consent, research ethics, Institutional Review Board [IRB], safety, abuse liability, follow-up, compassionate care)
- 0907 Knowledge of how to critically review clinical research data and use the information for making treatment decisions
- 0908 Knowledge of current status of research regarding specific medications

Content Area 10: Professional, legal, ethical, and interprofessional issues

Refers to knowledge of ethics, standards of care, laws, and regulations relevant to the practice of psychology involving psychopharmacology.

- 1001 Knowledge of ethical codes and standards as they pertain to pharmacological practice and research (e.g., the APA Ethical Principles of Psychologists and Code of Conduct, APA Standards for Providers of Psychological Services, AERA/APA/NCME Standards for Educational and Psychological Testing, ASPPB Code of Conduct, Joint Commission on the Accreditation of Healthcare Organizations [JCAHO] Standards)

Content Area 10: Professional, legal, ethical, and interprofessional issues (continued)

- 1002 Knowledge of practice guidelines and standards of care for prescribing psychotropic medications (e.g., documentation requirements, nomenclature for writing prescriptions, written and verbal orders, elements of informed consent, patient education, institutional formulary restrictions, chemical restraints, Agency for Health Care Policy and Research [AHCPR] guidelines, National Institute of Mental Health [NIMH] consensus panel protocols, health care organization rules)
 - 1003 Knowledge of federal and state laws and statutes for prescribing psychotropic medications (e.g., FDA regulations, Medicare, controlled substance laws, specifics of psychologists= licensing laws, patient=s rights)
 - 1004 Knowledge of issues involved in collaboration/consultation with other health care providers who are also prescribers and/or psychotherapists (e.g., Aownership≅ of patients, when to refer or seek consultation, differences in theoretical orientation, triangulation, appropriate levels of disclosure)
 - 1005 Knowledge of provision of psychotropic medications within specific environments (e.g., structured and unstructured environments, classroom and home, correctional institutions, military, substance abuse facilities)
 - 1006 Knowledge of patient=s rights (e.g., informed consent, right to refuse treatment, right to treatment within the least restrictive environment, duty to warn, and privileged communication)
 - 1007 Knowledge of issues regarding relationships with pharmaceutical companies (e.g., acceptance of gifts, revealing sources of funding and affiliations)
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Note: The complex of factors influencing human functioning noted in Content Area 1, i.e., biological (e.g., genetic, sex, age, disease), psychological (e.g., cognitive, emotional, dynamic, motivational, behavioral), psychosocial (e.g., gender, cultural/ethnicity, interpersonal), and ecological/environmental factors should be considered as they apply across all knowledge areas.