

Prescriptive authority: Psychologists' abridged training relative to other professions' training

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Abstract

Albeit psychologists were granted prescription authority in two states over a decade ago and in three states in recent years, the controversy over prescriptive authority persists within the profession and remains a concern of diverse stakeholders. The literature provides minimal research on the adequacy of psychopharmacology training programs and how commensurate psychologists' training is with other prescribers' training. Comparing psychopharmacology training for psychologists to other prescribing professionals' training reveals psychologists receive fewer didactic training hours in foundational sciences (e.g., biology, chemistry, and pathophysiology) and fewer clinical training hours directly related to prescribing and managing medications. Implications of these findings and legal and regulatory cautions are discussed along with recommendations for future research directions.

KEYWORDS

prescription privileges, prescriptive authority, psychologist, quality of care, training

1 | INTRODUCTION

In recent decades, the American Psychological Association (APA, 1996) adopted policy and procedures for pursuing prescriptive authority (RxP) for psychologists to expand their scope of practice, which could potentially increase the availability of psychoactive medication-related services. The first state legislative RxP initiatives were in Hawaii in 1984 (DeLeon, Fox, & Graham, 1991). Changes to Indiana's Psychology Code in 1993 permitted prescriptive authority for psychologists participating in specific federal programs (Levant, 2001) but not generally (IC25-33-1-2). In 1999, Guam became the first jurisdiction to pass prescription authority for psychologists. To date, five states have granted psychologists prescriptive authority (see Table 1). Despite these milestones and other initiatives, stakeholders, including psychologists, question the appropriateness and ponder the benefits, challenges, impact, and necessity of RxP (e.g., Robiner, Tumlin, & Tompkins,

2013; Stuart & Heiby, 2007). McKay (2014) noted a generation of psychologists has been exposed to a preponderance of messages about the virtues of, and relatively little about, the downsides of RxP (Baird, 2007; Fagan, Ax, Liss, Resnick, & Moody, 2007; Robiner et al., 2003, 2002; Sammons, Gorny, Zinner, & Allen, 2000; St. Pierre & Melnyk, 2004; Tompkins & Johnson, 2016; Walters, 2001). There remains division within the profession and a paucity of data regarding competencies, prescribing practices, and outcomes.

As this article was written, 171 psychologists had prescriptive authority nationwide (i.e., in New Mexico and Louisiana), accounting for equal or less than 0.18% of the estimated workforce of 95,180 FTE active psychologists (APA Center for Workforce Studies, 2018) and fewer than 0.35% of prescribing mental health professionals. Surveys gauging licensed psychologists' and psychology graduate students' interest in prescription authority have yielded mixed perspectives (e.g., Grandin & Blackmore, 2006;

Tatman, Peters, Greene, & Bongar, 1997). Graduate students appear divided in their interest and underestimate the cost and length of additional training to prescribe (Grandin & Blackmore, 2006). Tompkins and Johnson's (2016) survey of Oregon psychologists found low interest in, and little knowledge about, training required to prescribe. APA Division 55, which advocates for RxP, is the division with the second greatest proportional declines in membership (Robiner, Fossum, & Hong, 2015), losing more than a third of its membership since 2009.

The RxP controversy among psychologists has been "contentious and polarizing" (Deacon, 2014a) spanning multiple issues, including (a) whether granting prescriptive authority to psychologists would significantly remedy the shortage of psychopharmacological prescribers, especially in underserved areas (Ax et al., 2008; DeLeon et al., 1991; Moore & McGrath, 2007; Muse & McGrath, 2010a; Robiner et al., 2013; Sammons, 2010; Tompkins & Johnson, 2016); (b) ways in which prescribing might change the professional identity of psychologists and the field (Grohol, 2019; Gunn & Blount, 2009; Lavoie & Barone, 2006; McGrath & Muse, 2010; McGrath et al., 2004; Sammons, 2003); (c) ethical, legal, and regulatory quandaries psychologists might encounter (Lavoie & Barone, 2006); (d) individual, educational, and societal costs and risks associated with training to prescribe (Heiby, 2010; Lavoie & Barone, 2006; Newman, Phelps, Sammons, Dunivin, & Cullen, 2000; Robiner et al., 2002; Wagner, 2002); (e) potential negative interactions of medication and psychotherapy, and rebound effects of anxiolytic medications (McKay, 2014); and (f) medicalization of human problems implicitly overly endorsing the medical model (Hickey, 2014).

A primary challenge regarding RxP is concern over the comprehensiveness, depth, and rigor of the APA training

Public Health Significance

Psychologists' relatively abbreviated training to prescribe raises public health concerns about how potential gaps in learning and supervised experience affects the quality of care delivered. The risk of adverse effects of short cuts in training is likely greatest with more vulnerable and ill patient populations.

model. Advocates argue that while primary care physicians prescribe the majority of psychotropic medications (Ax et al., 2008; DeLeon & Wiggins, 1996; Gunn & Blount, 2009; Muse & McGrath, 2010a), psychologists receive more extensive training in the etiology, diagnosis, and treatment of mental disorders, making them more knowledgeable about mental illness than primary care doctors and advanced practice nurses (DeLeon et al., 1991; Muse & McGrath, 2010a, 2010b). They contend psychologists can fill unmet needs for prescribing and that psychologists, like other nonphysician prescribers, can be trained to safely and competently prescribe without completing medical school (DeLeon & Wiggins, 1996; Sammons, 2003).

Such assertions ignore the conspicuous difference that *all other prescribers* complete premedical, scientifically based, course prerequisites *before* entering training programs, whereas very few psychologists do (Tatman et al., 1997). Advocates acknowledge that psychology has "the least overlap" with medicine's curriculum (Fox et al., 2009). Discounting the importance of medical and scientific training is concerning given the complex issues that can arise from adverse drug effects, medication interactions, and improper physical diagnosis. Those at greatest

TABLE 1 Psychologists in jurisdictions that allow psychologist prescribing

State/territory	Year RxP legislation passed	Number of licensees	Number of prescribing psychologists	% of licensed psychologists prescribing	Population	Prescribing psychologists/100,000 population
Guam ^a	1999	16	0	0	162,742	0
New Mexico ^b	2002	745	67	9.0	2,088,070	3.21
Louisiana ^b	2004	764	104	13.6	4,684,333	2.22
Illinois ^b	2014	5,329	0	0	12,802,023	0
Iowa ^b	2016	673	0	0	3,145,711	0
Idaho ^b	2017	376	0	0	1,716,943	0
Total ^c			171 ^c		6,772,403 ^c	2.52 ^c

^aCensus data retrieved September 10, 2018, from <https://en.wikipedia.org/wiki/Guam> (estimated 2016).

^bCensus data retrieved September 10, 2018, from <https://www.census.gov/quickfacts/fact/map/la,US/PST045217?> (estimate) <https://www.census.gov/quickfacts/fact/map/la,US/PST045217?> (estimate) <https://www.census.gov/quickfacts/fact/map/la,US/PST045217?> (estimate) <https://www.census.gov/quickfacts/fact/map/la,US/PST045217?> (estimate).

^cIn Louisiana and New Mexico combined.

risk for medication mismanagement are likely the youngest, oldest, and sickest with complex conditions, numerous risk factors, and most complicated medication regimens.

Given interest in promoting training standardization in mental health professionals' core competencies, it is important to understand and enhance professionals' training (Hoge et al., 2005). This is true for prescribers (i.e., medical doctors, psychiatrists, nurse practitioners [NPs], and physician assistants [PAs]) of psychoactive medications for mental health disorders, warranting careful analysis of similarities and differences in training to prescribe.

2 | EDUCATION AND TRAINING OF PRESCRIBERS

2.1 | Physicians

Physicians (M.D./D.O) have the most comprehensive training for prescribing. NPs (both master's level and DNPs) and PAs prescribe based on their respective training models. Other professionals (e.g., dentists, optometrists, and podiatrists) prescribe within limited formularies. All prescribing disciplines, except psychology, require *undergraduate* coursework in biology, and organic and inorganic chemistry, and often physics prior to admission (see Table 2). Sechrest and Coan (2002) estimated medical students completed 98 hr of pharmacology, 133 hr of pathology, 130 hr of physiology, 200 hr of anatomy, 58 hr of cell biology, 83 hr of biochemistry, 93 hr of microbiology, 25 hr of genetics, 58 hr of cell biology, and 87 hr of clerkship within the medical school curriculum.

Coursework is augmented by experiential training for all medical specialties. Physicians complete three to five years in accredited residency programs under attending physicians' supervision and take specialty board examinations. Prior to residency, medical students complete approximately 700 hr of study in biological sciences and anatomy/physiology, almost 100 of which are in pharmacology.

2.1.1 | Psychiatry

Psychiatry residencies comprise four years (Rojnic Kuzman, Norstrom, Colin, Oakley, & Stoklosa, 2012). Subspecialization (e.g., child and adolescent) requires additional fellowship years. The Association of American Medical Colleges (AAMC) competency-based evaluation paradigm designates objective outcome measurements (Beresin & Mellman, 2002). Psychiatry residencies include clinical and didactic training in diverse health-care settings (i.e., inpatient, outpatient, and emergency), with multiple clinical populations and age-groups.

2.1.2 | Family medicine and primary care

Family medicine residencies require three years of supervised clinical practice and didactics. The Accreditation Council for Graduate Medical Education (ACGME) *Program Requirements for Graduate Medical Education in Family Medicine* (2018) stipulate residencies have faculty trained in and dedicated to integrating behavioral medicine into the medical curriculum. Family physicians are trained in mental health (including medication management) and supervised in integrated health-care settings. Other primary care specialties playing key roles in the de facto mental health system (Internal Medicine, Pediatrics, and Obstetrics and Gynecology) are not prescriptive in how accredited residencies address mental health training (Regier, Goldberg, & Taube, 1978; Regier et al., 1993), but strategic initiatives are ongoing to address gaps (e.g., McMillan, Land, & Leslie, 2017).

2.2 | Nurse practitioners

According to the American Academy of Nurse Practitioners (AANP, 2010), NP training resulting in doctoral (DNP) degrees follows undergraduate or master's training. In 2004, the American Association of Colleges of Nursing endorsed the Doctor of Nursing Practice (DNP) as the new standard for entry to the field by 2015. Sechrest and Coan's (2002) review of 45 NP programs noted most required bachelor's degrees in nursing (BSN). They noted BSNs require three semester hours of biology, physics, and inorganic chemistry, and one semester hour of organic chemistry. To practice, NPs must be licensed as registered nurses, graduate from a NP program, and pass a national board specialty certification examination (American College of Nurse Practitioners [ACNP], 2012).

2.3 | Physician assistants

Gifford, Haun, and Muma (2009) report most PA programs' prerequisites include two chemistry, human anatomy, and physiology courses, and one biology, microbiology, and statistics course. Organic chemistry and biochemistry prerequisites are under consideration at many PA programs. Sechrest and Coan's (2002) analysis of 45 PA programs found prerequisites: five semester hours of biology, seven of inorganic chemistry, and two of organic chemistry. In addition to didactics, PA trainees complete clinical rotations in diverse settings (e.g., outpatient clinics, hospitals, surgical departments, emergency departments, and long-term care facilities). Training standards for the Accreditation Review Committee for the Physician's Assistant, Inc. (ARC-PA), mandate students obtain practical experience in family medicine, internal

TABLE 2 Comparison of prerequisite hours of preparation across disciplines

	Degree	Foundational sciences	Pharmacology	Medical diagnosis, intervention, and assessment	Mental health diagnosis, intervention, and assessment	Professional issues
Medicine ^a	BA/BS ^b	326 (43.20) ^c	0	0	0	0
Nurse practitioner						
Master's ^d	BSN ^e	297 (6.71) ^f	48 (6.71)	51 (17.1)	132 (32.52) ^g	171 (43.21)
Doctorate ^h	BSN/MSN ⁱ	—	—	—	—	—
Physician's Assistant ^j	BA/BS ^b	243 (60.30) ^k	0	0	0	0
Prescribing Psychologist ^l	Doctorate ^m	45 (0) ⁿ	0	0	1,020 (126.22)	159 (27.25)

Note: One academic credit = 15 contact hours, and values represent mean contact hours (and standard deviations).

^aBased on allopathic medical school (excluding residency).

^bBachelor's degree in an academic area as long as prerequisite coursework is completed.

^cFour of the five programs listed prerequisite coursework required for admissions (other vetted candidates to determine whether they had completed the necessary coursework). Required coursework: two semesters of biology (all); two semesters of general chemistry and two semesters of organic chemistry (two programs); two semesters of either chemistry or organic chemistry (one program); four total semesters of chemistry (one program); two semesters of physics (three programs); and one semester of physics (one program).

^dBased on nurse practitioner master's degree programs.

^eOne MSN program required applicants to have a BSN for admission; another accepted a BSN or ASN with previous experience and additional undergraduate coursework as determined by admissions committee; two other programs accepted a BSN or bachelor's degree in another discipline in combination with an ASN.

^fAll MSN required students to have completed courses in chemistry, anatomy, physiology, and nutrition prior to beginning the nursing curriculum. Four programs also required coursework in microbiology. One program required a course in general biology, and another program required a course in biochemistry, and also completed an average of 372 hr ($SD = 66.58$) in pathophysiology. None of the other disciplinary programs included courses in pathophysiology as prerequisites. The DNP programs that admitted applicants with a BSN or a master's degree in another area combined with a BSN had different curriculum tracks for these applicants. Because this study only looked at DNP academic tracks for students who had already completed an MSN, it will be assumed that DNP students completed didactic and clinical training requirements similar to those found within the MSN programs.

^gAll programs required coursework in psychology and mental health nursing with four requiring general or introductory psychology. Another four programs also required coursework in developmental psychology or lifespan development. One program required abnormal psychology, and another program required a course on family systems.

^hBased on nurse practitioner doctoral degree programs.

ⁱThree programs required applicants to have a MSN and be licensed as a NP or a certified nurse specialist (CNS). A fourth accepted a BSN requiring completing additional coursework for DNP. The fifth program required MSN or a master's degree in another discipline in combination with a BSN (if previous work experience and coursework judged to adequately provide foundational knowledge base and rigor needed for the DNP).

^jBased on P.A. programs.

^kRequired coursework included anatomy (three programs required one course; one program required two courses), physiology (three programs required one course), general chemistry (three programs required one course; one program required two courses), biology (two programs required two courses), microbiology (three programs required one course), health-related biological science (one program required one course), organic chemistry (one program required one course; one program required two courses), medical genetics (one program required one course), and medical terminology (two programs required one course).

^lBased on Ph.D. and Psy.D. clinical/counseling degree programs plus the psychopharmacology postdoctoral programs.

^mAll programs require a doctoral degree and psychology license.

ⁿNone of the doctoral programs required undergraduate prerequisites in the foundational sciences; all five doctoral programs required one course on the biological basis of behavior.

medicine, general surgery, pediatrics, obstetrics and gynecology, and behavioral and mental health (ARC-PA, 2010a, 2010b, 2016).

2.4 | Prescribing psychologists and the APA psychopharmacology training model

For psychologists to prescribe, training recommendations emphasize integrating didactics and clinical experiences to enhance psychologists' application of knowledge to clinical settings (APA, 2019a) and encourage a competency-based model to measure knowledge and skill development. APA accredits doctoral programs, internships, and postdoctoral training. Accreditation "is intended to promote consistent quality and excellence in education and training in health service psychology" (APA, 2015, p. 3). Training in other fields that prescribe also requires training programs being accredited. By contrast, APA uses a *designation* system for programs training psychologists to prescribe to afford public *recognition* of education and training programs that meet certain *minimum standards* and published criteria. The designation criteria require 400 didactic hours and supervised clinical experience of at least 100 patients and recommend programs formulate capstone competency evaluations documenting mastery of critical competencies. APA's (2019a) training model does not stipulate *any* undergraduate biological or physical sciences prerequisites. Programs training psychologists to prescribe do not meet APA criteria for accredited postdoctoral residencies.

The nature and extent of requirements vary across jurisdictions (APA, 2019b; see Table 3). Continuing education related to prescribing is not required unless territory/state law requires it. States with enabling legislation typically require passing scores on the Psychopharmacology Examination for Psychologists (PEP), a 150-item multiple-choice examination of multiple content areas: integration of psychopharmacology with psychological practice (15%); neuroscience (8%); nervous system pathology (9%); physiology and pathophysiology (9%); biopsychosocial and pharmacological assessment and monitoring (10%); differential diagnosis (13%); pharmacology (12%); clinical pharmacology (13%); research (4%); and professional, legal, ethical, and interprofessional issues (7%). Designation criteria (2019b) do not specify how many clinical hours must be completed, or what constitutes a sufficiently diverse patient caseload. There is little specification of who oversees learners' clinical experiences/placements, or the qualifications of faculty and clinical supervisors. Unlike medicine, ongoing assessments (i.e., maintenance of competence; MOC) are not required for psychologists to demonstrate continued current knowledge or competency.

Sechrest and Coan (2002)'s survey found that only three of 168 psychology doctoral programs required *any*

undergraduate biology coursework for admission. Doctoral psychology programs' accreditation requires no prerequisites in natural and biological sciences (APA, 2015) despite the clear recommendation of the Health Service Psychology Education Collaborative (HSPEC; HSPEC, 2013), an interorganizational group including the APA, the Council of Graduate Departments of Psychology, and the Council of Chairs of Training Councils, that there should be clear and uniform guidelines regarding prerequisite coursework. The Collaborative, among other competencies, recommended that applicants have knowledge in human biology prior to admission. Although the Collaborative recommends doctoral programs preparing health service psychologists should include, "knowledge in human biology suitable for someone preparing to become a health service psychologist" (HSPEC, 2013, p. 5), in actuality graduate-level medically related scientific coursework and clinical training is less than that of other health professionals (see Table 2). The absence of scientific prerequisites for enrollment in psychopharmacology training programs suggests psychologists have less medically relevant scientific foundation relative to other disciplines. This could limit readiness to grasp complex biomedical concepts germane to managing medications, and require oversimplification of the curriculum. Indeed anecdotally, graduates of the training have opined their training did not adequately prepare them to prescribe (Ransom, 2014).

3 | OVERALL COMPARISONS: PHYSICIANS, NPS, PAS, AND PSYCHOLOGISTS

As the goals and foci of training differ across disciplines, standardization of minimal training for prescribing seems important. Few studies have addressed standardization. Muse and McGrath (2010b) compared five postdoctoral clinical psychopharmacology M.S. programs to five psychiatric NP programs and five medical schools, comparing content areas they deemed relevant to prescribing: biochemistry and neuroscience; pharmacology; clinical practicum; research and statistics required to critically evaluate the effectiveness of pharmacological agents and other therapeutic interventions; behavioral assessment and diagnosis, including the use of psychometrics; psychosocial interventions, psychotherapy, and other nonpharmacological therapeutic options; and foundations in mental health and the behavioral sciences (p. 97).

They correctly noted greater didactics in biochemistry and neuroscience as well as clinical hours for physicians than psychologists. They calculated psychologists accrued more training than physicians and psychiatric NPs in some areas. Despite their noteworthy relative deficiencies, they contended prescribing psychologists are equally, if not more,

TABLE 3 Summary of prescriptive authority legislation passed in five states

State	Year	Didactic training	Practicum	Examination	License information	Governing board
New Mexico ^a (prescribing psychologist)	2002	450 hr ^b 20 continuing education (CE) hours per year	80 hr (physical assessment and pathophysiology) 400 hr (supervised evaluation and pre-scription to 100 patients)	PEP	Conditional (2 years): supervised by physician, at least 50 patients, collaborative agreement with primary provider Prescription Certificate: review of 10 patient charts (6-month re-review); attempt three times before repeat psychopharmacology training program	Psychology
Louisiana ^c (medical psychologist)	2004	Postdoctoral master's degree in clinical psychopharmacology ^d 20 CE hours per year	Broad training with no specific hours or numbers of patients specified	PEP ^e BLS	Supervised prescribing, collaborative agreement with primary provider	Psychology (2004–10) Medical (as of 2010)
Illinois ^f (prescribing psychologist)	2014	5–6 years of full-time education across the undergraduate and graduate levels ^g 10 hr CE per year	14-month (full-time, supervised) training of at least 36 credit hours including research project and completion of rotations in emergency medicine, family medicine, geriatrics, internal medicine, obstetrics and gynecology, pediatrics, psychiatrics, surgery, and one elective	PEP or PANCE	Prescribe only to clients between ages of 17 and 65; cannot prescribe to certain groups (pregnant women, intellectual disabilities, serious medical issues) Written collaborative agreement with primary care physician Limitations for prescribing Schedule II through V controlled substances	Psychology
Iowa ^h (Prescribing psychologist)	2016	5 years before application complete postdoctoral master's degree in clinical psychopharmacology approved by joint board 20 hr CE per year	5 years before application complete supervised and relevant clinical experience in assessment and pathophysiology and supervised practicum treating patients with mental disorders; sufficient practice to competently train as determined by joint rules by two boards	Examination ⁱ	Conditional (4 years): supervised by physician, collaborative agreement with primary provider with specifics to be determined by joint rules Prescription Certificate: successfully complete 2 years of supervised prescribing, ongoing collaborative relationship with primary provider	Joint Medical and Psychology Boards set joint rules

(Continues)

TABLE 3 (Continued)

State	Year	Didactic training	Practicum	Examination	License information	Governing board
Idaho ^j (Prescribing psychologist)	2017	Postdoctoral master's degree in clinical psychopharmacology CE to be determined by board	Broad training with no specific hours or numbers of patients specified	PEP	Provisional (2 years): supervised by physician with specifics to be determined by board Prescription Certificate: successfully complete 2 years of supervised prescribing (one year treating pediatric or geriatric populations if desire to prescribe for these populations); certificate by endorsement with rules to be determined by board or advisory board	Psychology

Abbreviations: PEP, Psychopharmacology Examination for Psychologists; BLS, Basic Life Support certification; PANCE, Physician Assistant National Certifying Exam.

^aNew Mexico Psychological Association (2009).

^bCourses in neuroscience, pharmacology, psychopharmacology, physiology, pathophysiology, physical and laboratory assessment, clinical pharmacotherapeutics, and cultural competence.

^cLouisiana Board of Examiners of Psychologists (2009).

^dHours not specified but must include anatomy and physiology, biochemistry, neuroscience, pharmacology, psychopharmacology, clinical medicine or pathophysiology, and health assessment. Practicum also broad but to include "range of clinical psychopathologies; medical conditions presenting as psychiatric illness; and treatment complexities, including complicating medical conditions; diagnostic questions; choice of medications; untoward side effects; compliance problems; alternative treatments; and treatment failures" (p. 9).

^eMust complete additional coursework if fail PEP three times; repeat all coursework if fail PEP fourth time.

^fIllinois Clinical Psychology Licensing Act (2014).

^gUndergraduate coursework includes one semester of medical terminology, two semesters of chemistry or biochemistry with laboratory, one semester of human physiology, one semester of anatomy and physiology, one semester of microbiology with laboratory, and one semester of general biology for science majors or cell and molecular biology; graduate coursework includes at least 60 credit hours; pharmacology, clinical psychopharmacology, clinical anatomy and integrated science, patient evaluation, advanced physical assessment, research methods, advanced pathophysiology, diagnostic methods, problem-based learning, and clinical procedural skills.

^hIowa Act Relating to Prescription Authority for Certain Psychologists (2016).

ⁱPassed national certification examination approved by both boards.

^jIdaho HB No. 2017 to Provide Prescriptive Authority for Psychologists (2017).

qualified to prescribe psychotropic medications than physicians and psychiatric NPs.

Heiby (2010) roundly criticized their approach and controversial interpretation on several grounds. She asserted the psychopharmacology master's degree "is of unknown quality" (p. 106), noted it does not meet APA accreditation standards, and critiqued their content classifications noting, "no rationale or evidence of this definition is presented in support of its content or ecological validity" (p. 107). Furthermore, essential content in physician and NP training (e.g., anatomy, genetics, pathology, and pathophysiology) and systemic effects of psychotropic drugs were excluded. Finally, Heiby (2010) criticized their conclusions for neglecting other professions' more intensive training (i.e., undergraduate physical/biological scientific prerequisites, predoctoral clerkships, apprenticeships, and postdegree supervised practice and residencies). Physicians also undergo multiple standardized (e.g., USMLE Step 1, Step 2 CK, Step 2CS, and Step 3) evaluations and nearly universally secure board certification based on additional evaluations.

The lack of data on the quality of psychopharmacology programs precludes conclusions about the comparability of training outcomes for prescribing disciplines. The review reported in the following section compared psychopharmacology training for psychologists to training for psychiatrists, family practice physicians, NPs, and PAs in terms of programs' didactic curricula, supervised practice hours, and clinical experiences.

4 | METHOD

At the time of data collection (2014), five programs were preparing psychologists to prescribe. Four APA-designated programs conferring master's degrees were assessed: (a) Daniel K. Inouye College of Pharmacy—University of Hawaii at Hilo; (b) Clinical Psychopharmacology Postdoctoral Master of Science Program at California School of Professional Psychology—Alliant International University; (c) Fairleigh Dickinson University; and (d) Southwestern Institute for the Advancement of Psychotherapy/New Mexico State University (SIAP/NMSU; November 2010). A certificate program was excluded because it did not provide sufficient information about admission requirements, curriculum, or clinical training online or in response to requests. To compare training among disciplines, five training programs for each of the following prescribing professionals were included: MD, NP (MSN and DNP), and PA. Five MSN programs were selected: Psychiatric/Mental Health Nurse Practitioner (PMHNP) and Primary Care Nurse Practitioner (PCNP) tracks were examined to explore training differences and compare with psychologists' training. Only MSN programs

offering both PMHNP and PCNP tracks were included to permit comparisons.

4.1 | Procedures

Programs were selected randomly from all accredited programs in disciplines to avoid bias based on location, program characteristics, or reputation. Programs' websites were examined for entrance criteria (i.e., admission requirements and prerequisite coursework), as well as programmatic overviews (e.g., program length, didactic instruction (in-person versus online), and total didactic hours). Clock hours or credit hours were recorded for (a) prerequisite undergraduate coursework; (b) required credit hours and coursework content; and (c) required experiential training hours. Required hours were compared within and between programs to determine variability among program types and across professions.

Six knowledge domains were established by examining general content of didactic curricula and identifying cross-cutting content: (a) scientific foundations (i.e., basic sciences, e.g., biology, chemistry, anatomy, physiology necessary for understanding structures, functions, and processes within humans); (b) pathophysiology (i.e., nature and function of disease processes within organ systems); (c) pharmacology (i.e., mechanisms of action of medications across drug classes and medical conditions); (d) interview and clinical assessment (i.e., diagnostic interviewing, performing physical examinations, and choosing and interpreting diagnostic tests); (e) professional practice (i.e., ethics, public policy, cultural diversity, patient advocacy, and multidisciplinary teamwork); and (f) assessment and treatment of psychiatric conditions (ATPC; i.e., diagnosis and treatment of psychiatric conditions, with a primary focus on psychopharmacological interventions, including integrating behavioral interventions with psychopharmacological practice and medication management). Required courses within programs' curricula were classified based on course title and description. Courses encompassing multiple areas were categorized based on the domain best capturing content. For example, a general pharmacology course that included a psychopharmacology section was categorized under pharmacology.

5 | FINDINGS

5.1 | Admission prerequisites

Entry requirements and prerequisite coursework differ across professions (see Table 2). Prescribing professionals' training requires basic science foundations *before* initiating

discipline-specific training with one exception—psychologists (see Table 2). Whereas psychology doctoral training provides training in mental health diagnoses, psychotherapeutic intervention, assessment, and research/statistics, psychologists' psychopharmacology training does not meet the APA's own Task Force experts' stipulation that prescribing psychologists have the "necessary science background" (APA, 1992, p. 66), including two courses of chemistry and biology (Smyer et al., 1993). APA's (2015) doctoral program accreditation criteria do not mandate undergraduate scientific prerequisites. Doctoral programs generally provide only one course covering "biological bases of behavior," which generally addresses minimal content critical to prescribing (e.g., organ systems).

5.2 | Didactic training models

5.2.1 | Overview and total hours

Courses were analyzed according to six domains based on Heiby (2010) revealing the total didactic hours completed by medical students greatly exceeded didactic requirements for other disciplines. This methodology yielded contrasting conclusions from Muse and McGrath (2010b), and revealed psychopharmacology programs' relative shortcomings in crucial areas, most notably in scientific foundations (i.e., receiving less than half the hours obtained by NPs and PAs) and pathophysiology.

MSN programs for PMHNPs and PCNPs consist of two years of full-time or longer part-time study. Among selected MSN programs, four required in-person didactic attendance for both tracks. Three required in-person attendance for all didactics. One combined in-person and online coursework for PMHNP and PCNP tracks, requiring in-person didactic attendance each semester. PMHNP tracks involve slightly fewer hours ($M = 500$, $SD = 110.20$) than PCNP tracks ($M = 547$, $SD = 134.98$). DNP programs generally comprise three years of full-time study or equivalent longer part-time matriculation. One program solely provided online instruction. Another combined online and in-person instruction.

PA programs entailed two years (24–27 months) of full-time study. Four required in-person attendance. One offered hybrid distance learning and in-person didactics. Didactic hours exceeded masters' graduate nursing programs' hours due to their bachelors' nursing requirements.

Psychologists' psychopharmacology training required fewer didactic hours than all other disciplines (other than DNP programs for which earlier master's level training provided content exposure). Programs allowed part-time study with completion within five years. Two programs' instruction was solely online. Only one required in-person attendance for

all didactics. One combined online and in-person formats, requiring students to attend 11 in-person didactic trainings. One program's website indicated "all instruction is provided on the weekends."

5.3 | Content of didactic training

5.3.1 | Scientific foundations

Medical students get the most foundational science training (see Table 4). Nursing programs excluded scientific foundations' coursework because students already had completed undergraduate basic science courses. Psychologists in psychopharmacology programs obtained about 85 hr of scientific foundations' coursework. Combined with their one predoctoral course, they received significantly less scientific training than other prescribers. In terms of scientific foundations, physicians training entails almost six times, and NPs and PAs over twice the scientific coursework of prescribing psychologists.

5.3.2 | Pathophysiology

Medical schools provide significantly more didactic coursework in pathophysiology than the other disciplines. PA programs provided similar pathophysiology contact hours to PMHNPs' programs. Psychologists' psychopharmacology training included significantly fewer contact pathophysiology hours. Prescribing psychologists receive 17 times less pathophysiology instruction than physicians, 8–12 times less than NPs, and 4.5 times less than PAs.

5.3.3 | Pharmacology

Pharmacology coursework was fairly similar across all disciplines. It was split between undergraduate and master's programs for NPs. DNP programs excluded pharmacology training presumably which was completed at the BSN and MSN levels. Psychopharmacology coursework was included in the ATPC domain.

5.3.4 | Diagnostic interviewing and clinical assessment

Medical schools provided the most didactics on diagnostic interviewing and clinical assessment among all fields, with years of residency beyond medical school. NP training (including BSN) in diagnostic interviewing and clinical assessment was nearly identical to PA coursework. Psychologists'

TABLE 4 Comparison of professions' didactic training models across domains

Type of professional	Time	Total didactic hours	Scientific foundations ^a	Pathophysiology	Pharmacology	Diagnostic interviewing and assessment	Professional practice	Assessment and treatment of psychiatric conditions
Medical Doctor	PA ^b T	1,686 (164.55)	425 (40.23) ^c 751	986 (181.43) ^d 986	60 (0) ^e 60	144 (32.86) 144	84 (53.67) 84	72 (65.73) 72
Nurse Practitioner								
Master's (PMHNP)	PA T	500 (110.20)	0 297	330 (134.58) 702	40 (9.81) 90	47 (7.16) 98	88 (85.81) 259	247 (73.89) 379
Master's (PCNP)	PA T	547 (134.98)	0 297	79 (69.45) 451	43 (3.29) 91	50 (7.26) 101	116 (59.23) 287	14 (20.12) 146
Doctorate	PA T	266 (91.78)	0 297	32 (19.14) (483–734)	0 (90–91)	0 (98–101)	234 (84.30) (493–521)	0 132
Physician's Assistant	PA T	653 (170.99)	111 (65.68) 354	257 (89.12) 257	62 (8.22) 62	100 (31.10) 100	101 (26.83) 101	24 (19.41) 24
Prescribing Psychologist	PA T	397 (116.20)	84 (38.43) 129	57 57	60 (28.06) 60	37 (28.07) 37	20 (19.11) 179	138 (35.72) 2,158

Note: The means (with *SD* presented in parentheses) represent contact hours with 15 contact hours being equal to one academic credit.

^aA significant portion (or all in the case of NP) of didactic training in the foundational sciences occurred as prerequisite coursework completed before admission to the training program.

^bFor each type of professional, the top number represents the mean number of hours postadmission (PA), whereas the bottom number represents the total (T) mean number of hours (including those accrued before entry into training program).

^cOne medical school integrated foundational sciences curriculum with pathophysiology coursework resulting in the number of hours of foundational science being lower than the other four programs (60 versus 425). Based on course descriptions, pathophysiology appeared to be the central focus on combined didactic training so they were counted in the pathophysiology domain. The other medical training programs were relatively similar ranging from 380 to 480 so the mean of the four programs ($M = 425$) was used as an estimate for foundational sciences rather than all five programs, given that the 60 hr of the purely foundational sciences of the integrated curriculum would have artificially diminished the average ($M = 352$).

^dAll didactic training in pathophysiology occurred after admission to the training program, except for NPs where most of this coursework was completed prior to obtaining a master's or doctorate in nursing.

^eOne medical program integrated content in pharmacology with the pathophysiology coursework and, as a result, the number of hours of pharmacology was only calculated across the other four programs, rather than averaging zero hours as it is covered coincident with pathophysiology but not easily quantifiable.

psychopharmacology programs entailed a third to half the interviewing and clinical assessment contact hours relative to physicians and NPs/PAs.

Psychologists undergo training in diagnostic interviewing during doctoral training. However, that doctorate training focuses on assessment related to phenomena other than the more comprehensive and targeted health assessment necessary for prescribing. It is unclear whether, and how fully, that training prepares them with diagnostic and clinical assessment skills for managing medications, and assessing for physical health, including drug effects and interactions. Similarly, it is not clear how relatively abbreviated training might limit understanding related to physical functioning and somatic treatments that may impact clinical management of mental health and comorbid medical disorders.

5.3.5 | Issues in professional practice

DNP programs provide nearly six times the coursework addressing professional practice issues in health care than medical schools (i.e., excluding residency) and PA programs. Combining doctoral and psychopharmacology training, psychologists receive considerable instruction addressing professional practice issues. However, their doctoral coursework addressing professional practice does not focus on prescribing matters.

5.3.6 | Assessment and treatment of psychiatric conditions

Physicians and PAs received less didactic coursework on assessment and treatment of psychiatric disorders than either PMHNPs or psychologists preparing for prescribing. Nurses generally completed 132 hr of didactics for assessing and treating psychiatric conditions at the BSN level. MSN and doctoral programs for PCNPs provided less mental health training than did PMHNPs' programs. While psychologists' psychopharmacology programs provided more ATPC hours than MD (not counting residency), PA, and PCNP programs, they provided fewer than PMHNP programs. Psychologists' doctoral training includes numerous hours of training in assessing and treating (i.e., psychotherapy) psychiatric conditions, but only modest training directly related to prescribing and medications.

5.4 | Clinical experience

5.4.1 | Physicians

Clerkship requirements during the third and fourth years ranged (68–82 weeks; $M = 76.8$; $SD = 5.4$) across primary care and specialties. ACGME work hour guidelines were

established in 2003 (Kogan et al., 2006). Residents are prohibited from working ≥ 80 hr/week and have \geq one of every seven days off. Wald et al. (2007) survey of emergency medicine clerkship directors found 75% ($N = 132$) required medical students to work 32–45 hr/week (median = 40). Conservatively assuming medical students work only 40 hr/week for the mean number of weeks of clerkship ($M = 76.8$), they complete an estimated 3,072 hr of supervised practice during medical school (see Figure 1). The reality is they generally work considerably more than 40 hr/week.

5.4.2 | Psychiatry

Two medical schools' psychiatric clerkships required 6-week psychiatry rotations and two required 4-week psychiatry rotations. Assuming 40-hr work weeks and using length of psychiatric clerkships ($M = 5$ weeks), medical students conservatively obtain an estimated 200 hr of psychiatric clinical experience. They also gain mental health experience during other clerkships (i.e., family medicine and internal medicine). Our exploration yielded no data on medical students' exposure to mental health conditions outside of psychiatric rotations. Four allowed 16–28 weeks of elective clerkship (i.e., medical students can elect additional psychiatric training).

Psychiatrists complete four-year residencies focusing on clinical skills (i.e., diagnosing and treating mental health conditions). Assuming 40-hr work weeks for 48 weeks/year, psychiatry residents conservatively obtain an estimated 7,680 hr of supervised clinical practice. Total clinical hours in all areas by the end of residency are approximately 10,752 hr with more than 7,680 hr focusing on psychiatric conditions (see Figure 1). Both clerkships and residencies are widely recognized as exceeding 40 hr/week.

5.4.3 | Family medicine

In five family medicine residencies, based on 40-hr work weeks in 3-year residencies, a conservative estimate of residents' clinical experience is 6,240 supervised clinical hours. Most programs had two 6-week ($M = 4$, $SD = 1.63$) psychiatry rotations. Four to six weeks of training assuming 40-hr work weeks yields ≥ 160 –240 psychiatry hours. Residencies offered 3.75 to 6 months of elective rotations ($M = 4.93$, $SD = 1$) during which residents could pursue additional psychiatry training. One program had integrated behavioral health experiences spanning the residency rather than an actual psychiatry rotation. The clinical skills emphasized included clinical interviewing, crisis management, psychosocial assessment, psychiatric diagnosis, motivational

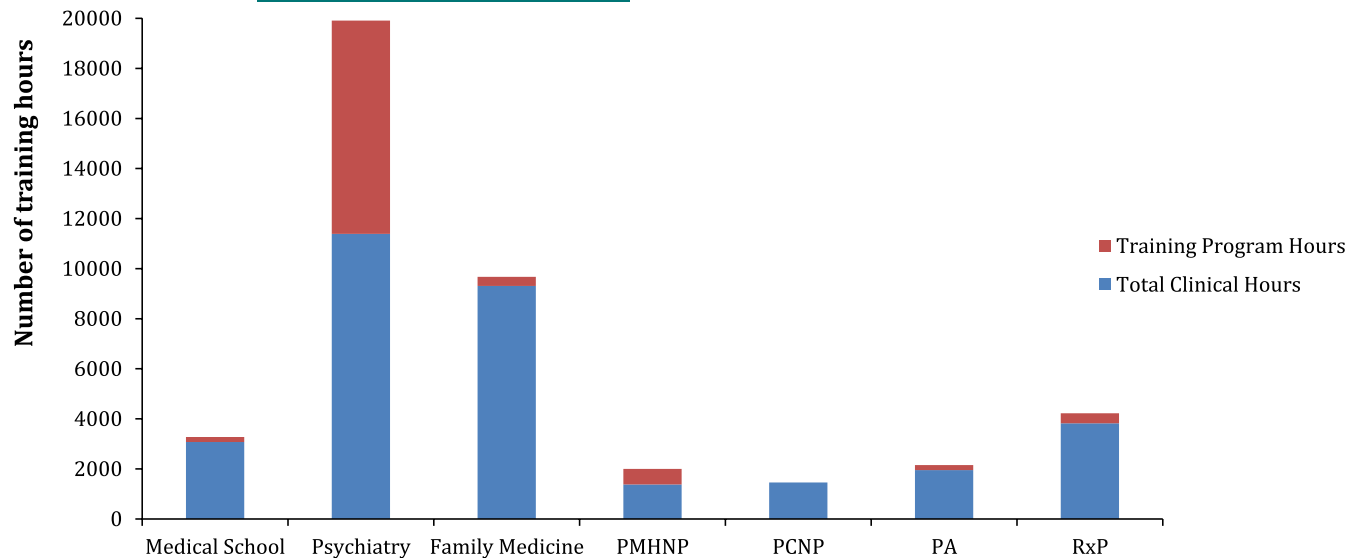


FIGURE 1 Number of Clinical and Training Program Hours in Mental Health. Graph presents the number of clinical training hours (total and specific program training in psychiatry) across disciplines' training programs. The five MSN programs that trained to act as Primary Care Nurse Practitioner (PCNP) required between 630 and 925 hr ($M = 701$, $SD = 127.89$) of clinical experience in a primary care setting. Nursing students in the PCNP track gain experience with the diagnosis and treatment of common mental health conditions within the primary care setting, but the percentage of time spent on these skills was not identified by programs, so zero reported for the PCNP programs, which is an underestimate. However, an estimate of 15–20 hr is provided in Adult-Geriatric or Family Nurse Practitioner training programs (personal communication, Sharon Smith, January 2, 2019) which are now at the doctoral level. Additional information about the mental health curriculum in nurse practitioner programs is available through the National Organization of Nurse Practitioner Faculty (<https://www.nonpf.org/page/14>)

interviewing, cognitive behavioral therapy (CBT), psychopharmacology, and managing co-occurring disorders. A conservative estimate of family physicians' training was 9,312 supervised clinical training hours across areas, assumedly providing ample medication management experiences.

5.4.4 | Nurse practitioners

Nursing training begins at the undergraduate level. Students complete clinical rotations based on diverse populations. Programs required clinical rotations providing nursing care to adults, children, mothers, and newborns. They also required mental health and public health rotations. Two programs included introductory clinical rotations on fundamentals of nursing. Two programs included final rotations wherein students integrate clinical skills pertaining to various nursing aspects. One program required rotations in gerontology and nursing leadership and management.

Bachelor's degrees in nursing programs' websites did not present clinical hours completed for each rotation. However, Li and Kenward's (2006) national survey indicated undergraduate nursing students complete extensive ($M = 758$) clinical hours. Associate-level RNs complete somewhere between 639.5 and 758 clinical hours. Four of five programs allowed admission to applicants with an ASN and a bachelor's degree in another area. Because the number of clinical hours for associate's degrees is unspecified, our analysis represents NPs with undergraduate

nursing degrees who have completed on average 758 clinical hours *before* their master's NP programs.

MSN PMHNP students complete 600–750 hr ($M = 622$, $SD = 77.59$) of supervised clinicals emphasizing diagnosing and treating mental health conditions. PCNP programs required 630 to 925 hr ($M = 701$, $SD = 127.89$) of clinical experience in primary care settings. PCNP students gain experience with mental health conditions, but the time spent on mental health is unspecified.

Master's level NPs seeking DNP degrees receive additional clinical experience. DNP programs required 400–585 clinical hours ($M = 497$, $SD = 65.54$). DNP students gain mental health experience in primary care. In sum, master's level PMHNPs and PCNPs complete an estimated 1,380–1,459 clinical hours. DNPs accrue an estimated 1,877 (PMHNPs)–1,956 (PCNPs) hours.

5.4.5 | Physician assistants

The American Academy of Physician Assistants (AAPA, 2013) contends PAs receive > 2,000 hr of clinical training emphasizing primary care. In four programs listing clinical rotations' length, students spent 44–54 weeks on clinical rotations ($M = 48$, $SD = 4.9$). Their clinical rotations are full-time; one program indicated students spend 40–60 hr/week on clinical rotations. Conservatively assuming 40-hr work weeks, PA students complete $\geq 1,630$ –2,220 clinical hours ($M = 1,950$,

$SD = 248.8$). Four programs required psychiatry or behavioral health rotations. The other did not specify a psychiatric/behavioral health rotation but included four weeks of exposure to specialty areas, which could include psychiatry. Three programs reported students spent 4–6 weeks on psychiatric/behavioral health rotations ($M = 5$, $SD = 1$), which assuming 40-hr work weeks, yields ≥ 160 –240 hr ($M = 200$, $SD = 40$). PA students also gain mental health experience during other rotations (e.g., primary care and emergency medicine).

5.4.6 | Prescribing psychologists

Psychology graduate students complete clinical practice as well as a one-year internship (APA, 2015). There are no national time requirements with institutions specifying practicum hour requirements. Academic advisors recommend students complete extensive ($M = 1,094$) practicum hours prior to internship, whereas internship directors think students should complete more ($M = 1,255$) hours (Ko & Rodolfa, 2005). The Association of Psychology Postdoctoral and Internship Centers (APPIC, 2014) calculated a range of practice hours ($M = 1,340$ –3,016).

Doctoral psychology internships comprise one year of supervised clinical practice. Conservatively assuming 40-hr work weeks, interns complete 2,000 hr of training. Combining practicum and internship hours, doctoral psychology trainees are estimated to complete $\geq 3,420$ hr of clinical training. Most jurisdictions require one year of postdoctoral, supervised practice for licensure. Some states have eliminated postdoctoral licensing requirements (Stambor, 2006). Doctoral psychologists complete clinical training in diagnosis and nonpsychopharmacological treatment, but not in managing medications.

APA-designated psychopharmacology training programs typically require 400 hr of didactic experience and treatment of at least 100 patients (APA, 2019a). Graduation from APA-designated program is not necessary for licensure in New Mexico or Louisiana. One psychopharmacology program required treating 100 patients and 250 clinical hours. Another required treating 100 patients and one year of clinical experience without specifying required hours. Three programs adhere to APA's requirement of treating 100 patients. One program also required 80 clinical assessment hours, meeting New Mexico's requirement.

6 | DISCUSSION

Prescribing psychologists complete most of their clinical training *prior to* entering psychopharmacology programs. They receive more mental health didactics than family medicine physicians, NPs, and PAs (Lavoie & Barone, 2006; Muse & McGrath, 2010a; Sammons et al., 2000). Their areas of relatively greater knowledge include mental health conditions,

study and prediction of human behavior, and psychotherapy/behavior change. These relative strengths, however, do not suggest they would be as competent prescribing as psychiatrists or nonpsychiatrist prescribers, who are more experienced prescribing generally as well as in prescribing psychoactive agents within the holistic framework of patients' total medication regimens and overall health. Whereas doctoral psychology training provides extensive ATPC experience, it does not address basic scientific/biological knowledge nor skills specifically related to addressing physical health conditions and managing medication. Psychologists' psychopharmacology programs typically entail 400 didactic hours to foster skills specifically for assessing need for and managing psychotropic medications. By comparison, physicians, NPs, and PAs accrue considerably more supervised clinical training hours than prescribing psychologists relevant to prescribing. Whereas empirical evidence identifying minimum time thresholds for establishing prescribing competence (including minimizing risk to patients) is lacking, training for all other prescribers involves more intensive basic education and clinical training addressing prescribing than prescribing psychologists obtain. APA's psychopharmacology training model and existing psychopharmacology training programs promote less-extensive medical training relative to programs for other prescribers and have limited and loose criteria for clinical experiences directly involving prescribing (e.g., Nasrallah, 2017).

The American Psychological Association's training model comprises less than half the training (Heiby, DeLeon, & Anderson, 2004) of the DoD's Psychopharmacology Demonstration Project (PDP), which RxP proponents cite as evidence for training psychologists to prescribe (Sammons, 2013) despite the striking differences between the more intensive PDP and current training. The American College of Neuropsychopharmacology's (1998) final report on the PDP judged graduates' medical knowledge on level of 3rd- or 4th-year medical students (i.e., individuals needing closely supervision rather than independently practicing). PDP graduates generally recommended two-year full-time programs including inpatient psychiatric training, as they experienced at Walter Reed Army Medical Center. Current training for RxP does not stipulate such intensity nor contact with specific populations, clinical severity, setting, or care parameters. Potential consequences of prescribing psychologists' relatively circumscribed training may include increased risks to patients, litigation, malpractice costs, and adverse publicity for the profession.

7 | PROPONENTS' RATIONALE FOR PRESCRIBING PSYCHOLOGISTS

Proponents contend that prescribing psychologists can increase patient access to psychiatric services in light of

shortages of psychiatrists (Balon, Coverdale, & Roberts, 2011; Bray et al., 2014; Thomas & Holzer, 2006; Wilk, West, Narrow, Rae, & Regier, 2005). However, the psychiatrist shortage does not logically lead to the conclusion that psychologists should fill gaps by prescribing based on relatively abbreviated training. In fact, research raises questions whether prescribing psychologists increase rural access (see Tompkins & Johnson, 2016). Most prescribing psychologists practice in mental health settings where they may lack access to medical resources (Tulkin, 2012). Claims (e.g., Shearer, Harmon, Seavey, & Tiu, 2012) that psychologists can effectively and safely increase patient access are not based on rigorous investigation. Linda and McGrath's (2017) report of favorable responses among physicians to prescribing psychologists is limited in scope, biased toward finding favorable outcomes (e.g., due to sampling procedure), and based on attitudes rather than competency or patient outcomes. The greatest benefit reported by physicians was availability of care, reduced use of physician time and insurance-related issues. Such benefits do not address more critical patient outcomes and are not unique to prescribing. For example, integrating (cf. coordinated care, co-located care; see Heath, Wise Romero, & Reynolds, 2013) psychologists in health-care settings, without psychologist prescribing, can yield meaningful benefits: (a) counteracting underutilization of mental health services (Huang, Fong, Duong, & Quach, 2016); (b) implementing evidence-based practices across disciplines; and (c) integrating funding, resource sharing, and billing.

Recent changes to the MCAT and competencies and principles outlined in *Scientific Foundations for Future Physicians* resulting from the AAMC partnership with the Howard Hughes Medical Institute (HHMI) suggest synergy between premedical and medical education that integrates broad-based science competencies and greater knowledge in behavioral and social health, communication, and cultural competence (AAMC/HHMI, 2009). Robiner et al. (2013) address the importance of psychologists' roles as members of interdisciplinary teams, noting that changes in care delivery highlight the need for psychologists to collaborate effectively rather than prescribe. Integrating mental health services in primary and specialty care settings may improve access and leverage psychologists' impact given that there are more physicians, NPs, and PAs who prescribe than mental health prescribers. Providing psychological services in primary care reduces barriers to accessing care (e.g., transportation, time, referral inefficiencies, and stigma). Approximately 10% of primary care patients meet criteria for major depressive disorders (Craven & Bland, 2013) and 20% meet criteria for anxiety disorders (Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007). This epidemiology suggests health professional trainees gain considerable experience assessing and treating mental health concerns during primary care rotations. Adding

mental health specialists to interdisciplinary teams promotes effectively and holistically addressing patient needs.

If the profession wishes to present psychologist prescribers as high quality, comparable to other professions' prescribers, the APA designation criteria should more closely resemble training of other (including nonphysician) prescribers in other disciplines to confirm near equivalence of training (i.e., of didactics and experience) and readiness for prescribing. The training model should be upgraded to require *accreditation* (c.f. designation) criteria and processes, and alignment of the content and rigor of the PEP with other prescribers' board and clerkship (e.g., shelf) examinations. Otherwise, skepticism related to psychology's shortcut training for prescribing and about psychologist prescribers' expertise will continue.

Moreover, to meet APA's Ad Hoc Task Force's (Smyer et al., 1993) experts' recommendations for scientific prerequisites, psychopharmacology training programs would need to require and include significantly more training in the foundational sciences, pathophysiology, diagnostic interviewing and assessment, and issues related to professional practice. Adequate targeted medical training is needed, as psychotropic medication can adversely impact diverse organ systems (see Ransom, 2014).

No regulatory system for monitoring prescribing psychologists' outcomes has been established. The challenges with tracking legal and regulatory complaints and absence of any funding or organized effort to do so (i.e., within the DoD or jurisdictions granting prescriptive authority) preclude establishing a comprehensive system or database for monitoring psychologists' prescribing practices and clinical outcomes. It is inappropriate to consider the absence of quality data, especially when none is being systematically and scientifically collected, as evidence that there are no problems. Legal strategies, such as nondisclosure agreements, and regulatory limitations (e.g., limited medication expertise on psychology boards; no oversight mechanisms in the FDA or other federal or state agencies or pharmaceutical companies to assess the competence of prescribers), are factors that could preclude identifying and publicizing problems associated with psychologist prescribing.

Nevertheless, health regulatory board actions and litigation are potentially associated with prescribing based on truncated training. The field would benefit from research comparing the prevalence of health regulatory actions and litigation based on prescribing versus nonprescribing psychologists and other prescribers. The Louisiana State Board of Medical Examiners has sanctioned four prescribing psychologists, two for inappropriate practices. In addition, three lawsuits have been filed in Louisiana against prescribing psychologists. Whereas these indicators are difficult to interpret, their very existence necessitates that RxP proponents

no longer claim there have been no problems associated with psychologists prescribing.

For psychologists to pursue prescriptive authority, ethics training specific to the prescribing role is also crucial. Spurling et al.'s (2010) meta-analysis of physician prescribing found that increased exposure to pharmaceutical information led to *greater frequency* of prescribing and *decreased quality* of prescribing (as measured by appropriateness of medications prescribed and adherence to recommended guidelines). Mintzes et al. (2013) note physicians can misjudge the quality of information provided by pharmaceutical representatives when minimizing or not disclosing adverse effects. This seems to have been a contributing factor to the opioid epidemic. Limited scientific background and medical training theoretically render prescribing psychologists even more susceptible to misleading marketing by pharmaceutical companies. Moreover, data from the Part D Prescriber Public Use File (PUF) from the Centers for Medicare and Medicaid Service (CMS) suggest some prescribing psychologists have prescribed beyond the legislative bounds of their licenses.

Over a decade ago, Stuart and Heiby (2007) lamented the lack of data evaluating the risks and benefits of prescribing psychologists' performance, arguing that psychology was in an "awkward position of being a scientifically based profession ... seeking to expand its scope based on a small pilot program (e.g., the PDP) that reaches well beyond the parameters of the available data" (p. 26). The RxP movement seems to resist two precepts of evidence-based practice (Lilienfeld, Ritschel, Lynn, Cautin, & Latzman, 2013): (a) naïve realism (i.e., relying on one's own limited observations to judge safety and efficacy) and (b) the *ad ignorantiam* fallacy, that is, the "error of concluding that because a claim has not been proven wrong, it must be correct or at least possess substantial merit" (p. 892).

Evidence supporting prescribing psychologists' competence, quality, and safety is still limited in scope. LeVine and Wiggins (2010) and Linda and McGrath (2017) provide limited guidance about competence or safety given their extremely small sample sizes, low response rates, sampling bias, and reliance on self-report of prescribing and other practice behaviors. Deacon's (2014b) survey of the Association for Behavioral and Cognitive Therapies (ABCT), found 89% believed RxP advocates should produce empirical evidence in support of proposed models *prior* to promoting further legislation and 67% favored collaboration over prescriptive authority to address access issues. APA's continued dogged expansion and investment in RxP, despite a lack of data seems especially concerning in light of evidence of the public's increased reliance on pharmacological intervention (Marcus & Olfson, 2010), despite patients' strong preference for psychotherapy over psychotropic medication (McHugh, Whitton, Peckham, Welge, & Otto, 2013).

Further investigation into the didactic and clinical training for prescribing is essential to ensure that if psychologists prescribe, psychopharmacology programs prepare them to be safe, competent prescribers. Unless more equivalent training is required commensurate with other prescribers' training, and its integrity is assured (i.e., through rigorous evaluation and appropriate accreditation), doubt is warranted. Psychologists' doctoral training and internship training are governed by stringent accreditation mechanisms. Ironically, despite risks of psychoactive medications (various adverse reactions including death), psychologists' training to prescribe is not. Increasing the training rigor is essential to assure that prescribing psychologists' training meets standards for all health professionals.

7.1 | Limitations and future directions

Our analysis is based on a limited sample of training programs. Future studies could replicate the findings by sampling more programs to increase the reliability of results. Clinical training hours for physicians, PAs, and others were estimated based on a 40-hr work week, which likely significantly underestimated the total number of clinical hours completed, and thereby may underestimate differences with prescribing psychologists' training. We recognize the need for larger, objective, systematic studies of the knowledge and prescribing practices of psychologists who have prescriptive authority, especially patients' health outcomes. Such studies could better gauge the quality of psychologists' prescribing as well as the frequency of recognized and unrecognized adverse events. Additional research comparing psychologists' prescribing practices to those of other prescribing professionals could highlight areas of strength and weakness in psychopharmacology training programs and in other prescribing professionals' training programs, providing a basis for further identification of standards for prescribing that minimize safety risks.

Because NP training shifted toward requiring doctoral degrees (DNP) by 2015 (American Academy of Nurse Practitioners & AANP, 2013) in response to concerns that additional training was necessary to train competent nurse practitioners, DNPs should be included in future research comparisons instead of grandparented master's level NPs.

Future research exploring all prescribers' clinical training for treating psychiatric conditions would elucidate the extent of mental health training. Identified weaknesses in mental health knowledge and skills for nonpsychologist health providers could yield training recommendations to ensure primary care patients needing mental health services receive proper care. Finally, further research on how to better serve underserved areas and populations is needed (e.g., telehealth and integrated practice) to improve access to mental health

services for populations underserved by psychologists and other health professionals.

An unknown about prescribing psychologists is how much of what they have not learned during their relatively abbreviated training may adversely affect the care they render. More could be known about the quality of care for mental health patients if there were formal, objective, systematic, larger-scale assessments of their services and the outcomes of their services.

The profession of psychology has a responsibility to support methodologically rigorous, unbiased research that comprehensively (a) identifies problems associated with psychologist prescribing (e.g., create registries and other processes for tracking problems); (b) compares patient outcomes with those of professionals with more extensive training; (c) is transparent about funding and the scope and distribution of the prescribing psychologist workforce; and (d) evaluates how much impact psychologist prescribing is having on the health care of diverse populations and regions (e.g., rural) to determine whether the agenda is achieving its stated intents and whether it is cost-effective. Acknowledging to psychologists and the public that there have been regulatory and legal problems involving psychologists who prescribe is one step toward greater understanding of the risks that attend the authority to prescribe.

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