Original Research Article

Trends in Case Complexity and Implications for Physician Health Programs: An Analysis of Referrals to the Colorado Physician Health Program

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ABSTRACT:

Introduction: The Colorado Physician Health Program (CPHP) provides evaluation, diagnosis, treatment referral, and monitoring for physicians, physician assistants and anesthesiology assistants experiencing health or psycho-social problems. We examined trends in complexity of cases presenting to CPHP between fiscal years 2016-2017 and 2020-2021.

Methods: Case complexity was rated as mild, moderate, or high based on clinical and administrative complexity. Differences in complexity were examined by year and participant demographic, practice, and case characteristics, using chi-square and logistic regression analysis.

Results: Mild complexity cases declined from 57% to 14% and moderate cases increased from 25% to 73% ($P<.001$). Cases with high complexity (15% of cases) remained relatively stable. Complexity was higher for older participants ($P=.04$), primary presenting problem of DUI/DWAI ($P=.01$), mandatory referrals ($P<.001$), and longer participation ($P<.001$), and lower for participants with work stress/burnout ($P=.04$).

Conclusion: Potential reasons for the changes in complexity observed include increased stress in work settings, proposed changes in the regulatory environment that could threaten confidentiality, and the emergence of in-house wellness programs. Physician health programs need to prepare for increases in case complexity and the accompanying need for more referrals for care, higher levels of monitoring, and greater skill in diagnosing and addressing health and behavioral issues.

Introduction

Physician Health Programs (PHP) began emerging across the United States in the late 1970s/early 1980s. These state-level initiatives are aimed at aiding physicians, health care professionals, and trainees in addressing various health issues. The scope of evaluation and monitoring across PHPs varies, but PHPs frequently receive referrals and address needs for an array of concerns, including mental health, physical health, cognitive problems, stress, substance use, well-being, and workplace behaviors. PHPs also vary in how they operate within their state and interact with the medical licensing board(s) and other entities. PHPs coordinate, monitor, and document the evaluation, diagnosis, and treatment for health care providers, with the goal of helping them improve their health, maintain their careers, and deliver safe and effective medical care. Most PHPs allow health conditions to remain confidential to licensing or other public facing entities, enabling health care professionals to access necessary supports without fear of a negative impact on their ability to practice.

The Colorado Physician Health Program (CPHP) was established in 1986 and was one of the first state level PHPs. CPHP serves physicians (MD/DO), physician assistants (PA), anesthesiology assistants (AA), and trainees in these professions throughout Colorado. CPHP maintains an active caseload of between 400 and 500 professionals at any time, with between 200 and 300 new referrals each year.

Starting in 2016, CPHP anecdotally observed changes in the clinical severity and complexity of the health problems experienced by participants. While no published literature reports this phenomenon occurring at other PHPs, there is literature describing changes among physicians over time in conditions that can lead to involvement with PHPs. For example, Shanafelt and colleagues examined longitudinal trends in physician burnout, depression, career satisfaction, and work-life integration between 2011 and 2021.[1] They found significant differences for all these measures in 2021 compared to earlier years, which they attributed to the COVID-19 pandemic. Such findings underscore the dynamic nature of physicians' experiences and the susceptibility of their well-being to external stressors. This increase of burnout, emotional exhaustion, and mental health challenges, confirmed by other studies,[2] coincides with shifts in health care delivery, regulatory environments, and societal expectations, suggesting a complex nexus of factors influencing health care professionals' experiences and overall health. The COVID-19 pandemic likely increased the complexity of challenges experienced by those presenting for help at CPHP.

In July 2016, CPHP began using a protocol to rate the complexity of participant cases upon completion of their involvement with the program. Complexity ratings are a combination of clinical complexity (ie, the number of challenges the individual is addressing in their work, personal life, mental and physical health; the severity of conditions as manifested through the impact on various aspects of the individual's life; and how these influence the elements of care such as need for and number of evaluations, referrals, and immediate interventions) and administrative complexity (ie, administrative management that may include involvement of CPHP leadership, legal counsel, and/or the licensing board; number of reports required; etc.). As a reflection of both the challenges experienced by participants and the intensity of their case management, case complexity is likely to affect the resources needed to guide participants towards regaining optimal functioning in their professional and personal lives. Higher levels of case complexity require greater resources for PHPs to meet the needs of the populations they serve.

The objectives of this paper are to describe: 1) CPHP's complexity measure; 2) how complexity ratings are distributed among the CPHP participants by types of presenting problems and length of participation in the program; and 3) how complexity ratings have changed over five years of referrals to the program, including referrals from fiscal year 2016-2017 (July 1, 2016 to June 30, 2017) through referrals in fiscal year 2020-2021 (July 1, 2020 through June 30, 2021). We hypothesized that complexity of cases had increased over time.

Methods

Study population

CPHP began rating the complexity of cases starting with cases that were completed on July 1, 2016. This study includes physicians, physician assistants, anesthesiology assistants, and trainees in each of these fields who were referred to CPHP between July 1, 2016 and June 30, 2021, and became "participants." "Participation" was defined as having completed an evaluation with CPHP to identify problems and receive recommendations, which might include referral to outside services for additional evaluation or treatment, or no further intervention. Cases that received consultation only and did not complete a comprehensive intake assessment evaluation were not included.

Ratings of case complexity are made at the time of completion of a case ("inactivation"). The length of participation varies greatly by individual case from less than a month to over a decade. For this paper, we conducted two analyses. The first analysis examined complexity among participants referred to CPHP in the two earliest cohorts that received complexity ratings at inactivation (July 1, 2016 to June 30, 2017, and July 1, 2017 to June 30, 2018) and followed them for up to five years, at which time 90% of participants had reached inactivation. For these two cohorts combined, we examined the distribution of complexity ratings by length of participation and primary presenting problem.

For the second analysis, we examined longitudinal trends in complexity. To compare complexity ratings over time, it was necessary to create sequential cohorts that were each followed for a consistent period of time. We constructed cohorts using the fiscal year (July 1-June 30) over five sequential years starting with 2016-2017. Follow-up was limited to two years so that the 2020-2021 cohort could be followed for the same length of time as all preceding cohorts. This approach allowed us to maximize the number of cohorts included while maintaining an equivalent follow-up period. The historical experience of CPHP is that approximately

70% of cases are inactivated within two years. Thus, the longitudinal analysis we report in this paper is generalizable to the majority (approximately 70%) of the CPHP participant population, but systematically excludes those whose participation lasted more than two years.

Complexity rating

Using written criteria and examples of prototypic cases, a single rater assigned a level of mild, moderate, or high complexity after reviewing each case at the time of inactivation. The rater is a licensed clinical social worker with more than two decades of clinical experience serving this population and was not directly involved in the care of the study participants. Table 1 provides the factors considered for the complexity rating and Table 2 provides prototypic cases for each of the three levels of complexity.

Other variables

In addition to the primary variable of complexity, in our analysis we incorporated variables collected at the time of intake into CPHP. Gender and race/ethnicity were reported by the participants. The following participant variables were captured from the CPHP electronic database, which is populated like a medical record throughout the participant's involvement: professional level (MD/DO, PA or AA, student, resident); specialty; primary presenting

Table 1
Factors Considered for Complexity Rating

Participant clinical complexity factors considered
• Severity of illness requires referral to external treatment provider prior to intake
• Need for immediate clinical intervention(s) at intake, such as detoxification, hospitalization, etc.
• Evaluation period includes referral to one or more outside specialized evaluators or programs
• Extended evaluation required to collect data on completion/success of treatment or specimen testing
• Non-compliance or non-collaboration during evaluation or monitoring, resulting in intensive consultation with client, their treatment providers, the referral source, the Medical Board, or CPHP's Executive Committee of the Board of Directors
• Episode(s) during evaluation and monitoring of clinical de-stabilization and/or considerable risk of self-harm, need for welfare checks, consultation with treatment providers or hospitalization
• Number of urgent clinical needs during treatment monitoring, for example, many pager calls, changing treatment providers repeatedly, and requiring increased level of referral/treatment provider consultation
Administrative complexity factors considered
• Amount of involvement with client attorney
• Amount of involvement of CPHP's leadership
• Amount of involvement of CPHP's legal counsel
• Number of discussion(s) with Medical Board
• Amount of coordination or collaboration with out-of-state Physician Health Program or Medical Board
• Number of reports to the referral source and/or workplace consultations
Benchmarking considerations
• Mandatory workplace behavioral referrals typically start at **moderate complexity** due to workplace communication required, review of referral information, follow-ups with recommendations, and written reports involved.
• Cases that involve ruling out or active substance use disorders start at **moderate complexity** due to the requirement for significant evaluation and monitoring responsibilities, reports, and follow-up.
• Medical Board orders or stipulated clients start at **moderate complexity**, due to the Medical Board involvement, ongoing administrative and clinical work, and extra monitoring and auditing activities.
• If a case has exceeded five years of total participation with CPHP, including any prior involvement, it is rated as **high complexity**, regardless of other factors.

Table 2
Prototypic Examples of Mild, Moderate, and High Complexity*

Level of Complexity	Example cases
Mild Complexity	Self-referral of a **medical student**, who heard about voluntary confidential involvement at school orientation. The student had a history of depression and anxiety, with the last occurrence of symptoms two years ago. The student is clinically stable, with no current medications, and no other problems or concerns. The student has a primary care provider. Following evaluation, no recommendations were made.
	Self-referral of a **physician assistant** due to increased anxiety and marital issues. The client reports that they typically engage in high intensity physical activity and focus their attention on work to cope with anxiety and stress. They cannot currently use these coping strategies due to recovery from an injury that precludes both exercise and work. The client previously saw a therapist and during intake they request a therapy referral. The client is referred to a psychologist for weekly visits. The psychologist reports that the client is engaged, stable and benefiting from therapy. All agree to inactivate the case.
	Workplace suggests **physician** contact CPHP due to behavioral concerns. The client reports being burned out and CPHP discusses the need to prioritize one's own health and life balance. The client is referred to a psychologist, but they opt out of therapeutic support, stating that they currently have insight and good perspective. There are no further workplace observations of concern. The workplace did not require involvement with CPHP and did not need any documentation or follow-up concerning client's involvement with CPHP and the case was inactivated.
Moderate Complexity	A **fellow** is referred to CPHP after disclosing misdemeanor possession of marijuana charge on their licensure application. At the intake, the client discloses moderate use of marijuana and alcohol but reports having ceased use recently. The client has a positive family history of alcohol use disorder. The client provides a one-time urine drug screen with negative results for all substances. CPHP recommends a three-month abstinence challenge. The client provides on-demand urine drug screen throughout the abstinence challenge, all results are negative, and the client reports no difficulty with abstinence. CPHP recommends the client meet with a local treatment provider to address their relationship with alcohol and marijuana. The client requests multiple workplace-related reports. CPHP moves to inactivate the case, and the client is granted their medical license.
	A **physician** is referred to CPHP by a hospital health system due to complaints about the physician's performance from patients and other physicians. The complaints include disorganization, communication, and documentation issues. The client is referred to a local psychologist skilled in coaching physicians. The client was previously engaged with CPHP 15 years earlier related to a patient complaint and difficulties with organization, which included an "overdetailed" way of interacting with patients, administration, and CPHP. The client's difficulties with the workplace continue and the client hires an attorney to assist with the conflict and the client's departure from the health system where the client is employed. CPHP recommends work and hour restrictions, and the participant is better able to manage the patient load. The psychologist focuses on interpersonal relationships, system navigation, boundary setting, and communication. After following the client for four years, observing stability in the new place of employment, and with continuing coaching, CPHP inactivates the case.
	A **physician** is referred to CPHP after testing positive for marijuana during a routine pre-employment screening. At intake, the client reveals a significant history of depression and complex trauma, with a positive family history of alcohol use disorder and significant mental health problems on the maternal side. The client submits a one-time urine drug screen with positive results for alcohol. The client reports a moderate drinking pattern. CPHP recommends a three-month abstinence challenge. The client submits to specimen tests, all negative, and reports no difficulty with abstinence. CPHP recommends that the client meet with a therapist to address past trauma. Client requests numerous workplace reports and CPHP inactivates the case.
High Complexity	A **physician** is urgently referred by the Medical Board to CPHP after performing three separate wrong surgical procedures and a significant concern from the workplace that the physician is diverting and abusing drugs. The client is charged criminally. CPHP refers the client for inpatient evaluation, which recommends inpatient treatment. The client feels unable to complete inpatient treatment due to ongoing criminal charges and uncertainty regarding the long-term status of their license. The client agrees to tissue testing but compliance with testing is variable. Most of the criminal charges are dismissed and the client agrees to permanently relinquish their license. The case was inactivated.
	A **resident** is encouraged by a residency program mentor to self-refer to CPHP for support after disclosing a history of sexual abuse. Upon evaluation, a post-traumatic stress disorder and major depressive disorder are identified, and the resident is referred to a local psychiatrist and therapist. The resident was hospitalized several times for suicidal ideation and two suicide attempts over a one-year period. The client tries various medications and continues with the providers until stabilization is achieved. The resident graduates and relocates to their home out of the country. The client is provided with resources and remains engaged for a transitional period via email and telephone with the state side therapist. The case is inactivated by the team.
	A **physician** in their early sixties is referred to CPHP related to behavior, health, and documentation issues. Neuropsychological testing and brain imaging show early dementia, and the client is also diagnosed with depression and sleep apnea. With treatment and compensation techniques, these issues improve. However, the workplace refers the client to an organization that assesses work competency. Client is also referred to both a psychiatrist and neurologist for close monitoring. The Medical Board requests an extensive chart review due to allegations of alterations. Client admits to some patient chart alteration to appear more favorably to competency assessment organization who, subsequently, terminates their work with the client. The Medical Board places the client on a stipulated agreement (i.e., stipulations stating what client needs to do to be allowed to continue practicing). Meanwhile, the client's worksite monitor finds numerous problems with the client's clinical performance and documentation. Another competency evaluation is ordered, and the client undergoes cognitive testing for the fifth time. Additional practice monitoring, a Professional Boundaries course, and evaluation at an organization that completes work fitness assessment are recommended. Client is terminated from their position.

*The case descriptions in this table are amalgamations of cases and do not reflect any single participant at the Colorado Physician Health Program.

problem; referral source; and whether participation was voluntary or not. Year of referral was categorized according to the fiscal year from July 1 through June 30. See Tables 5 and 6 for further descriptions of these variables.

Analysis

Chi-square analysis was used to compare the three-level complexity rating by length of participation, primary presenting problem, and year of participation. Due to the relatively small proportion of participants assigned ratings of high complexity and to enable multiple binary logistic regression, for subsequent analyses we collapsed "high" complexity with "moderate" complexity. The collapsed complexity rating was compared across levels of all other variables using chi-square analysis. Multiple binary logistic regression was used to examine the relationship between complexity and year of referral while controlling for other variables that might confound the relationship between year and complexity. Initially all variables significantly related to complexity at $P<.25$ were included in the regression model and then variables that were not significant at $P<.10$ in the model were removed sequentially. A significance level of $P<.05$ was used to define statistical significance. We did not adjust the significance level to account for multiple testing so that we would not miss potentially important characteristics that should be controlled for and/or studied more in the future. Therefore, relationships between the control variables and complexity should be interpreted with caution and considered for hypothesis testing in future research.

IN JULY 2016, CPHP BEGAN USING A PROTOCOL TO RATE THE COMPLEXITY OF PARTICIPANT CASES UPON COMPLETION OF THEIR INVOLVEMENT WITH THE PROGRAM. COMPLEXITY RATINGS ARE A COMBINATION OF CLINICAL COMPLEXITY (IE, THE NUMBER OF CHALLENGES THE INDIVIDUAL IS EXPERIENCING) AND ADMINISTRATIVE COMPLEXITY (IE, ADMINISTRATIVE MANAGEMENT).

This study was reviewed and approved as exempt research by the Colorado Multiple Institutional Review Board.

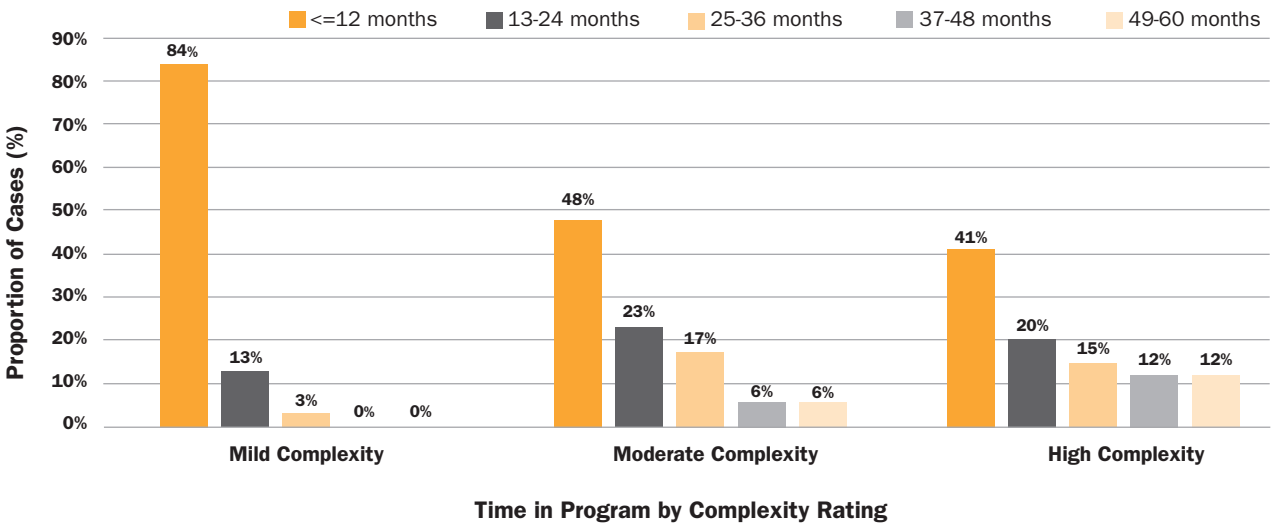
Results

Analysis 1: Distribution of complexity ratings in CPHP participant population

In fiscal years 2016-2017 and 2017-2018, 421 participants were referred to CPHP and completed evaluations. Of these, 380 (90%) completed the

Figure 1

Time in Program by Complexity Rating for Participants Referred in 2016-2017 and 2017-2018, *n*=380*



*Difference in time in program by complexity rating is significant at $p<.001$ (Pearson chi-square 82.390, df=8)

program within five years and were included in this analysis. As shown in Figure 1, length of time in the program was strongly related to complexity. Participants with mild complexity nearly always completed their participation within two years (97%), while 29% of those with moderate complexity and 39% of high complexity cases extended beyond two years of participation.

Both complexity and program participation time varied by presenting problem, as shown in Table 3.

COMPLEXITY RATINGS VARIED SIGNIFICANTLY OVER THE FIVE YEARS.... FOR THE YEARS STARTING IN 2019 AND 2020, MILD CASES DECREASED DRAMATICALLY....THE DECREASE IN MILD CASES WAS BALANCED BY AN INCREASE IN MODERATE CASES.

Participants who presented with stress, work stress/burnout, legal/documentation, and DUI/DWAI problems were more likely to finish the program within two years, and those with professional boundary, substance-related, physical/medical, psychiatric, and behavioral problems were less likely to finish within two years. The highest complexity ratings were for those with professional boundary, substance-related, and behavioral problems; these three groups were also among the least likely to finish the program within two years. While higher complexity was generally associated with longer participation, for some presenting problems this pattern did not hold. Those with physical/medical or psychiatric problems generally had lower complexity ratings but longer participation times. Physical/medical problems tend to be chronic health problems that are progressive and worsen over time, such as Parkinson's Disease or multiple sclerosis. Psychiatric symptoms are often depression or anxiety, which can often be rectified quickly with pharmacological interventions. However, CPHP strives for participants to experience sustained remission and thus longer interventions such as therapy are typically recommended. While these problems are not intensive with respect to clinical and administrative complexity, tracking may occur over a long period of time resulting in participation extending beyond 2 years. Aside from the primary presenting problem, there were no other participant characteristics significantly associated with participation longer than 2 years.

Analysis 2: Changes in complexity over time

In the five annual cohorts beginning in 2016 through 2020, 692 participants were evaluated and completed participation within two years. As shown

Table 3
Time in Program and Case Complexity by Primary Presenting Problem for Participants Referred in 2016-2017 and 2017-2018 Who Completed Participation Within Five Years (*n*=380)

	Total *n*	% Finished within 2 years*		% Rated Moderate to High Complexity**	
Primary Presenting Problem		***n***	**%**	***n***	**%**
Stress	18	18	100.0	4	22.2
Work stress/Burnout	36	32	88.9	15	41.7
Legal/Documentation	23	20	87.0	11	47.8
DUI/DWAI	30	26	86.7	17	56.7
Behavioral	85	71	83.5	54	63.5
Psychiatric	98	78	79.6	48	49.0
Physical/Medical	35	25	71.4	14	40.0
Substance-related	41	28	68.3	28	68.3
Professional boundaries	14	8	57.1	13	92.9

*Relationship between finishing within 2 years and primary presenting problem is statistically significant; Pearson chi-square 18.47, df=8, *P*=.02.

**Relationship between moderate-high complexity and primary presenting problem is statistically significant; Pearson chi-square 28.66, df=8, *P*<.001.

in Table 4 and Figure 2, complexity ratings varied significantly over the five years. The proportion of cases rated as mild complexity varied between 49% and 57% for the years starting in 2016, 2017, and 2018. For the years starting in 2019 and 2020, mild cases decreased dramatically, ranging from 14% to 27% of cases. The decrease in mild cases was balanced by an increase in moderate cases. In the years starting with 2016 and 2017, 25% and 26% of cases, respectively, were rated as moderate complexity. In 2018, moderate cases rose to 39%, and in 2019 and 2020, they rose again to 61% and 73%. High complexity cases were the smallest in number and fluctuated between 12% and 20% of cases over the five years with no clear trend over time. The variation over time was statistically significant ($P<.001$).

Table 5 provides case complexity (mild vs. moderate-high complexity) by participant characteristics (age, gender, race/ethnicity, level of practice, specialty, primary presenting problem, referral source, whether participation was voluntary or not, length of participation, and year of referral). There were no significant differences in complexity rating by gender, race/ethnicity, level of practitioner, or specialty. Complexity was lowest in the youngest age group compared to older ages ($P=.046$). For this group of participants who completed within two years, the primary presenting problems with the highest complexity ratings were DUI/DWAI,

Table 4

Complexity Ratings for Participants Referred in Fiscal Years 2016-2017 through 2020-2021 Who Completed Participation Within 2 Years

	Fiscal Year (July 1 – June 30)											
	2016-2017		2017-2018		2018-2019		2019-2020		2020-2021		Total 2016-2021	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Number of participants referred and evaluated	220	100	201	100	183	100	193	100	176	100	973	100
Number inactivated within 2 years, % of evaluated referrals	162	74	144	72	132	72	143	74	111	63	692	71
Complexity rating at inactivation*												
Mild	89	55	82	57	64	49	38	27	15	14	288	42
Moderate	40	25	38	26	52	39	87	61	81	73	298	43
High	33	20	24	17	16	12	18	13	15	13	106	15

*Denominator for complexity percentages is the total number inactivated within 2 years. Difference in complexity ratings across years is significant at $P<.001$ (Pearson chi-square 106.0, df=8)

Figure 2

Proportion of Cases Rated as Mild, Moderate, and High Complexity Over Five Cohorts (Fiscal Years 2016-2017 through 2020-2021). Includes Participants who Completed Participation Within 2 Years (*n*=692).

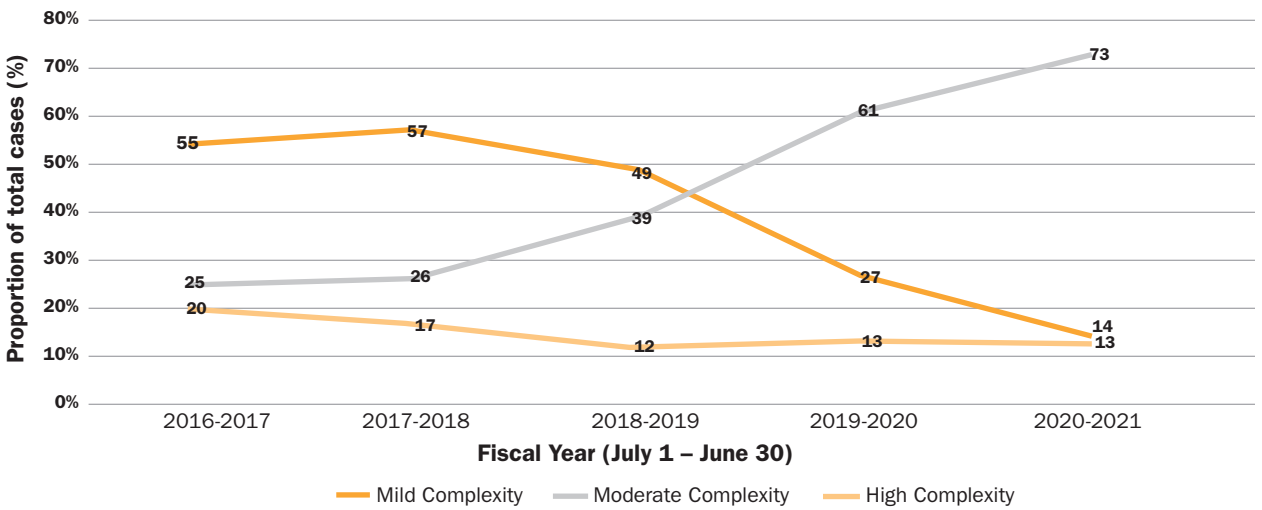


Table 5

Participant Characteristics and Bivariate Relationships with Complexity (*n*=692)

	Study Population		% Moderate – High Complexity (vs. Mild) within row		*P* value
	n	%	*n*	%	
All	**692**	**100%**	**404**	**58.4**	**NA**
Gender					
Female	279	40.3	152	54.5	.09
Male	413	59.7	252	61.0	
Age					
< 30	111	16.0	51	45.9	.05
30-39	200	28.9	118	59.0	
40-49	145	21.0	93	64.1	
50-59	138	19.9	83	60.1	
60+	98	14.2	59	60.2	
Race/Ethnicity					
White non-Hispanic	555	80.2	318	57.3	.22
Hispanic	35	5.1	21	60.0	
Black	11	1.6	10	90.9	
Asian	62	9.0	36	58.1	
Other	29	4.2	19	65.5	
Level					
MD/DO	436	63.0	262	60.1	.55
PA or AA	53	7.7	28	52.8	
Student	72	10.4	38	52.8	
Resident	131	18.9	76	58.0	
Specialty					
Anesthesiology	57	9.2	37	64.9	.40
Emergency Medicine	59	9.5	35	59.3	
Surgery	57	9.2	34	59.6	
Family Medicine	99	16.0	59	59.6	
Internal Medicine	124	20.0	66	53.2	
Obstetrics & Gynecology	33	5.3	22	66.7	
Orthopedic Surgery	25	4.0	19	76.0	
Pediatrics	36	5.8	22	61.1	
Psychiatry & Neurology	41	6.6	27	65.9	
Other	88	14.2	45	51.1	
Not applicable	73				
Primary Presenting Problem					
Behavioral	173	25.0	107	61.8	.004
DUI/DWAI	51	7.4	35	68.6	
Legal/documentation	44	6.4	27	61.4	
Physical/Medical	58	8.4	28	48.3	
Professional boundaries	28	4.0	23	82.1	
Psychiatric	174	25.1	97	55.7	
Substance related	47	6.8	31	66.0	
Stress	32	4.6	11	34.4	
Work stress/burnout	85	12.3	45	52.9	
Referral Source					
Self	223	32.2	113	50.7	<.001
Workplace	165	23.8	100	60.6	
Medical Board related*	62	9.0	38	61.3	
Medical Board mandated	77	11.1	61	79.2	
Training program	122	17.6	71	58.2	
Other	43	6.2	21	48.8	
Voluntary participation**					
Voluntary	371	53.6	192	51.8	<.001
Mandatory	321	46.4	212	66.0	
Length of participation					
0-4 months	107	15.5	22	20.6	<.001
5-8 months	234	33.8	123	52.6	
9-12 months	156	22.5	96	61.5	
13-16 months	80	11.6	61	76.3	
17-20 months	64	9.2	55	85.9	
21-24 months	51	7.4	47	92.2	
Referral year (July 1 - June 30)					
2016-2017	162	23.4	73	45.1	<.001
2017-2018	141	20.4	61	43.3	
2018-2019	136	19.7	70	51.5	
2019-2020	141	20.4	103	73.0	
2020-2021	112	16.2	97	86.6	

*Medical Board related cases are those that have not yet been mandated for evaluation and are engaging proactively or are applicants for a medical license whose application has been tabled for a potential underlying medical or psychiatric reason.

**Participation may be mandated by a medical board, workplace, or training program.

professional boundaries, and substance-related (*P*=.004), which is similar to the findings in Table 3 for those who were followed for five years. Among referral sources, the highest level of complexity was among those with Medical Board mandated referrals and lowest was among self-referrals (*P*<.001). Similarly, those whose participation was mandated by a Medical Board, workplace, or training program had higher complexity compared to those with voluntary participation (*P*<.001). Consistent with the findings reported in Figure 1, longer participation was associated with higher complexity (*P*<.001).

The final results of the logistic regression model are shown in Table 6. This analysis verifies the relationship between year of referral and complexity after controlling for other participant characteristics. Higher complexity was significantly associated with being referred to CPHP in the years 2019-2020 and 2020-2021 compared to referrals in 2016-2017. There was no significant difference in complexity between the years 2016-2017, 2017-2018, and 2018-2019. In addition to year of referral, older participants (over age 60) had significantly higher complexity ratings compared to the reference category of age 30-39; participants with a primary presenting problem of DUI/DWAI had higher complexity and participants with work stress/burnout had lower complexity compared to the

Table 6
Results of Logistic Regression Examining Factors Related to Complexity (*n*=692)

	Odds Ratio (Confidence interval)	*P* value
Age		
< 30	.566 (.314, 1.020)	.06
30-39 (reference)	–	
40-49	1.635 (.950, 2.815)	.08
50-59	1.165 (.670, 2.024)	.59
60+	1.953 (1.025, 3.720)	.04
Primary presenting problem		
Psychiatric (reference)	–	
Behavioral	.890 (.501, 1.582)	.69
DUI/DWAI	2.830 (1.257, 6.370)	.01
Legal/documentation	.804 (.348, 1.860)	.61
Physical/medical	.468 (.215, 1.019)	.06
Professional boundaries	2.389 (.731, 7.804)	.15
Substance related	1.573 (.693, 3.571)	.28
Stress	.491 (.183, 1.316)	.16
Work stress/burnout	.486 (.247, .957)	.04
Mandatory participation		
Voluntary (reference)	–	
Mandatory	1.872 (1.230, 2.848)	.003
Length of participation		
0-4 months	.199 (.107, .370)	<.001
5-8 months (reference)	–	
9-12 months	1.886 (1.180, 3.016)	.008
13-16 months	2.755 (1.452, 5.230)	.002
17-20 months	5.772 (2.572, 12.950)	<.001
21-24 months	14.544 (4.806, 44.007)	<.001
Year of referral (July 1 - June 30)		
2016-2017 (reference)	–	–
2017-2018	.834 (.488, 1.428)	.51
2018-2019	.776 (.448, 1.344)	.37
2019-2020	3.532 (2.007, 6.218)	<.001
2020-2021	10.262 (5.040, 20.891)	<.001
Constant	**.480**	**.01**

reference category of psychiatric presenting problem; mandatory participants had higher complexity compared to voluntary participants; and as length of participation increased, complexity increased. Referral source was significant in the bivariate analysis but dropped out of the multiple regression, most likely due to its strong relationship with mandatory versus voluntary referral status. Gender and race/ethnicity were tested in the multiple regression, found to be not significant, and were dropped from the model.

Discussion

In this study of participants with the Colorado Physician Health Program, we found that case complexity increased significantly over time, especially between fiscal years 2019-2020 and 2020-2021. This increase began prior to the COVID-19 pandemic, and the finding was not changed after controlling for age, primary presenting problem, length of participation, and whether participation was voluntary or mandatory. Additionally, complexity was significantly associated with all of these covariates. The relationships found with covariates should be interpreted with caution as our primary purpose in this analysis was testing the relationship between year and complexity while controlling for potential confounders. However, the relationships we identified between complexity and covariates may be important in guiding future research.

Complex cases can involve a myriad of factors, including comorbidities, dual diagnoses, clinical acuity, access to care, as well as social, interpersonal, behavioral, systemic, and cultural dimensions.[3,4,5] While CPHP does not provide treatment, the clinical evaluation and monitoring of its participants requires a perspective that takes these factors into account to improve resource allocation (ie, staffing), clinical decision-making, risk management, and client-centric holistic approaches. As problem complexity increases, so does the need for clinical attention, attunement, and action in both clinical and administrative aspects for all involved parties.[6]

The nature of the primary presenting problem often influences the quantity and intensity of these functions, including the level of care and time needed for established and sustained recovery. Cases involving psychiatric, substance, and boundary-related problems are often more complex due to the potential patient risks involved when these problems are unaddressed or treated inadequately. For example, participants evaluated and monitored for a diagnosis of a substance use disorder often require a minimum of four to five years of monitoring due to established evidence regarding recovery rates of physicians.[7,8] In this respect, it is important to note the distinction between DUI/DWAI and substance use as primary presenting problems. A typical DUI/DWAI case involves an evaluation following the receipt of a driving citation and in the majority of cases does not lead to a diagnosis of a substance disorder. DUI/DWAI cases are typically resolved in less time and are rated as less complex compared to substance use problems.

The reason for the increase in complexity over time is not known, but we suggest several potential explanations. First, many evolving conditions in health care work settings have increased the stress experienced by health care providers. These include increasing time pressures, use of electronic health records (EHRs),[9] changing administrative structures resulting in less autonomy over one's career (including the decline of physician-owned practices and increase in health care system owned practices),[10] and misalignment between workplace and personal values.[11] Amidst this backdrop of the changing health care environment, the COVID-19 pandemic added additional stress on the health care system and health care providers. It also created home and family stress due to stay-at-home orders, children being schooled remotely, etc. Within the increasingly stressful health care environment, health care providers may have perceived less time or access to services to address their health and behavioral problems at the time they were emerging. Providers may have delayed addressing mild problems, which may have progressed to become more complex.

WITHIN THE INCREASINGLY STRESSFUL HEALTHCARE ENVIRONMENT, HEALTH CARE PROVIDERS MAY HAVE PERCEIVED LESS TIME OR ACCESS TO SERVICES TO ADDRESS THEIR HEALTH AND BEHAVIORAL PROBLEMS AT THE TIME THEY WERE EMERGING. PROVIDERS MAY HAVE DELAYED ADDRESSING MILD PROBLEMS, WHICH MAY HAVE PROGRESSED TO BECOME MORE COMPLEX.

These multi-dimensional factors could be responsible for the decline in mild complexity cases and dramatic increase in moderate complexity cases that we observed.

Second, beginning in the time period of this study and continuing to the present, PHPs have faced challenges in multiple states that include proposed reductions in funding, limitations to confidentiality, and eliminating PHPs altogether.[12-14] National organizations such as the Federation of State Medical Boards, American Medical Association, and the Dr. Lorna Breen Heroes' Foundation have advocated to maintain or expand protections for physician health.[15-17] Given the paramount importance of confidentiality to health care providers and trainees seeking help, any real or proposed changes to a PHP's function may have discouraged some physicians, particularly those with mild complexity, from seeking assistance for their problems.[18,19] Even with the national efforts to encourage help seeking among physicians, PAs, and trainees, there still exists both stigma and perceived professional consequences for seeking care for health conditions.[20-22]

Third, many health care systems have initiated in-house wellness programs and/or hired Chief Wellness Officers in recent years. These in-house wellness programs may successfully address mild issues, and this may explain the reduction in mild complexity cases presenting to CPHP. However, the dramatic increase in moderate cases seen over this period suggests that in-house efforts are not preventing the emergence of moderate to high complexity cases. With this expansion of resources available, education and partnership between PHPs and other wellness programs is of vital importance to address cases at all levels of complexity.

Most likely, mild complexity cases still exist, and these problems are either: 1) being treated elsewhere; 2) not being treated; or 3) rapidly progressing to moderate and high complexity. This suggests the need for outreach to health care providers for the recognition and treatment of problems before they progress in complexity. Allowing problems to go unaddressed can result in unnecessary distress to providers, families, and co-workers, and could potentially threaten patient safety.

Additionally, as cases present more complex problems, PHPs need to be prepared to provide high quality care and support. With higher complexity comes the need for more referrals for care, higher levels of monitoring, and greater skill in diagnosing and addressing health and behavioral issues. Administrative complexity increases due to shifting levels of care, additions to recommendations that require administrative processes for assessing availability of providers and facilities, sending referral information, coordinating treatment conferences, ongoing updates, discharge planning, and arranging aftercare. Additional updates to workplaces, attorneys, and the generation of reports to involved parties add to the administrative burden of clinically complex cases.

If the trend we have observed in Colorado is emblematic of other regions, PHPs can expect increased workloads to meet participant needs and provide the necessary support to maintain physician health as well as quality and safety in health care. To accommodate this, there is a need to strengthen PHPs nationwide and ensure stable and adequate funding.

Limitations

This study has certain limitations. First, while comprehensive in characterizing the experiences of health care providers in the state of Colorado, this study is limited to Colorado. The experiences of health care providers in other states may be different. Also, the availability and care approaches of physician health programs in other states are likely to be different. However, many of the pressures experienced in Colorado, including the changing health care environment and pressures on health care providers, are national or international trends. This study examined the experiences of health care providers who presented to the CPHP. It does not characterize the experiences of providers who seek care in private systems or whose problems go unaddressed.

Our rating of complexity reflects the support needed for each participant's clinical care and the administrative necessities of managing legal and other aspects of the case. Our focus was on the burden of case management at CPHP, and we are unable to separate the complexity of clinical management from administrative management with our current measure. While our measure does not directly measure clinical complexity, clinical complexity manifests itself as management complexity. That is, as the number and severity of clinical problems increase, often the complexity of clinical case management increases. Our measure of complexity was developed and implemented for

clinical and administrative purposes and has not undergone formal reliability testing. Also, our data are limited to what was systematically recorded in CPHP record systems and reflects the perspectives of CPHP staff who recorded clinical factors and management of cases, and rated case complexity. We did not contact participants to ascertain their perspectives on these issues. These limitations should be addressed in future research.

In our statistical analysis, we were limited in our ability to characterize the experiences of all CPHP participants. To compare cohorts of participations over time, it was necessary to limit most analyses to those who completed their participation in two years. While this includes over 70% of participants, those who participated for longer than two years are known to experience more complex problems. Thus, we may have underestimated the increase in complexity that occurred over the five-year period we studied. Still, our study clearly demonstrates a dramatic trend in increased complexity of cases over time, even with this limitation. A related limitation is that CPHP only began systematically rating the complexity of cases in mid-2016. We are not able to speak to case complexity prior to that time.

IF THE TREND WE HAVE OBSERVED IN COLORADO IS EMBLEMATIC OF OTHER REGIONS, PHPS CAN EXPECT INCREASED WORKLOADS TO MEET PARTICIPANT NEEDS AND PROVIDE THE NECESSARY SUPPORT TO MAINTAIN PHYSICIAN HEALTH AS WELL AS QUALITY AND SAFETY IN HEALTH CARE. TO ACCOMMODATE THIS, THERE IS A NEED TO STRENGTHEN PHPS NATIONWIDE AND ENSURE STABLE AND ADEQUATE FUNDING.

Conclusion

This study documents a substantial increase in case complexity among physicians and other health care providers who became participants in the Colorado Physician Health Program over five years, between July 1, 2016 and June 30, 2021. Reasons for this increase in complexity are unknown, but we suggest it may be due to several factors including changes in the health care work and regulatory environments, the emergence of in-house wellness programs for health care providers, and the COVID-19 pandemic. This upward trend in complexity of clinical and administrative management will require enhanced readiness and increasingly skilled services within PHPs. Medical boards also need to be prepared for increased case complexity and be willing to support their state PHPs in addressing these trends.

Future research is needed to better understand the complexity of cases managed by physician health programs. This includes replicating these findings from Colorado in other states/regions; separating components of CPHP's complexity measure to better understand trends in both clinical and administrative complexity of cases; studies to understand the factors driving changes in complexity including further evaluation of the provider characteristics that we found to be related to complexity; and continued longitudinal collection and evaluation of complexity information to monitor trends.

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