

2015

A case-based reasoning (CBR) model for the integration of insurance policy and regulations in professional physical therapist education

Rhea Cohn

George Washington University

Kenneth Harwood

George Washington University

Heather Richards

George Washington University

Karen Schlumpf

George Washington University

Follow this and additional works at: http://hsrc.himmelfarb.gwu.edu/smhs_physther_facpubs



Part of the [Health and Medical Administration Commons](#), and the [Physical Therapy Commons](#)

APA Citation

Cohn, R., Harwood, K., Richards, H., & Schlumpf, K. (2015). A case-based reasoning (CBR) model for the integration of insurance policy and regulations in professional physical therapist education. *Journal of Physical Therapy Education*, 29 (2). Retrieved from http://hsrc.himmelfarb.gwu.edu/smhs_physther_facpubs/43

This Journal Article is brought to you for free and open access by the Physical Therapy and Health Care Sciences at Health Sciences Research Commons. It has been accepted for inclusion in Physical Therapy and Health Care Sciences Faculty Publications by an authorized administrator of Health Sciences Research Commons. For more information, please contact hsrc@gwu.edu.

A Case-Based Reasoning (CBR) Model for the Integration of Insurance Policy and Regulations in Professional Physical Therapist Education

Rhea Cohn, PT, DPT, Kenneth J. Harwood, PT, PhD, CIE, Heather Richards, and Karen Schlumpf, MA

Background and Purpose. The evolving health care environment brought about by health care reform and constantly changing insurance and regulatory requirements poses a great challenge for today's physical therapists (PTs). Because professional level PT students are expected to integrate these requirements into patient management, educational programs should explore ways to enhance student learning in these areas. The purpose of this manuscript was to describe a case-based reasoning (CBR) approach to integrating insurance, regulations, and documentation content into a professional level PT education program, assess the outcome on students' clinical performance, and report faculty perceptions of the curricular changes.

Method/Model Description and Evaluation. Faculty in a professional level PT education program developed a CBR instructional method to integrate insurance,

Rhea Cohn is an assistant professor at the George Washington University Department of Physical Therapy, School of Medicine and Health Sciences, 2000 Pennsylvania Avenue NW, Suite 221, Washington, DC 20006 (rjcohn@gwu.edu). Please address all correspondence to Rhea Cohn.

Kenneth J. Harwood is an associate professor at the George Washington University, Clinical Research and Leadership, Department of Physical Therapy, School of Medicine and Health Sciences.

Heather Richards is the clinical education specialist at the George Washington University Department of Physical Therapy, School of Medicine and Health Sciences.

Karen Schlumpf is an instructor at the George Washington University, Clinical Research and Leadership

Institutional Review Board approval was attained at the George Washington University.

The authors report no conflicts of interest.

Received October 10, 2013, and accepted July 25, 2014.

regulatory, and documentation content throughout the curriculum. The goals for the curriculum change were to have third-year students begin their internships with the ability to analyze and apply appropriate insurance and regulatory policies to all patient cases, appreciate how policies affect patient management and access, and effectively document in the medical record. In addition to adding didactic material and interactive learning experiences, faculty modified existing cases used in clinical management courses. This modification resulted in students experiencing progressively more complex clinical cases layered with insurance and regulatory challenges.

Outcomes. To determine the effectiveness of the CBR method, student performance was measured using 2 domains (financial management, documentation) of the Clinical Performance Instrument (CPI) during the student terminal clinical internship for 2 cohorts of students. The first cohort included all PT students for the 2 years prior to the implementation of CBR experiences, while the second cohort included 2 years of PT students who participated in CBR learning. Significant statistical differences between cohorts were demonstrated in student self-assessment of documentation performance at midterm ($P = .011$) and financial resources performance at the midterm and final rating periods ($P = .022$ and $P = .012$, respectively). For clinical instructor (CI) ratings, there was a statistically significant difference between cohorts at the final rating for financial resources performance ($P = .044$), indicating a higher CI rating for those students that participated in the CBR instruction. Participating faculty survey results demonstrated that the CBR approach benefitted student learning, was not difficult to integrate into existing course learning experiences, and

enhanced faculty learning. However, participating faculty had concerns regarding their own comfort level with the material and whether it was replacing more clinically oriented content.

Discussion and Conclusion. The outcomes generally support the effectiveness of the CBR approach for integrating insurance policy, regulations, and documentation in a professional level PT education program. Students learn to use regulation and insurance policy information when making clinical decisions and participating faculty did not feel unduly burdened by the integration of this content into established case studies. Although the results are encouraging, further research is recommended.

Key Words: Case-based reasoning, Documentation, Insurance, Regulation, Financial management.

BACKGROUND AND PURPOSE:

Today's physical therapists (PTs) are confronted by a complex set of insurance and regulatory requirements. Third parties such as Medicare, Medicaid, and private health insurers pay the majority of claims for physical therapy services. These third-party payers impose restrictions on the provision of physical therapy services in the forms of financial caps, deductibles, copayments, coverage limitations, and benefit restrictions that may change on an annual basis. Restrictions such as these have affected access, frequency, and duration of services provided by a PT. In addition, with the gradual implementation of the Patient Protection and Affordable Care Act (PPACA),¹ clinicians have an unprecedented need to understand current health care and insurance policy regulations to provide patients quality care in an efficient manner.

There has been a coinciding call for educators in multiple health professional fields to

enhance learning experiences on health care policy, health systems, and cost containment strategies². Patel et al³ studied the responses of 58,294 United States medical graduates and reported that less than half of the respondents believed they had been appropriately educated in the practice of medicine, defined as medical economics, health care systems, managed care, practice management, and medical record keeping. Although there is no existing literature describing PT student perception of their preparation in practice management, it is reasonable to expect that the results would be similar and that increased attention to this area in professional level PT education is warranted. Jette et al⁴ investigated occupational therapist (OT) and PT clinical decision-making for patient discharge planning from acute care settings and noted that insurance policy and regulations are important factors considered by hospital staff during discharge planning. They suggested that academic programs should consider if students, prior to internships, are sufficiently prepared for clinical decision-making that includes consideration of financial resources and regulations.

The authors of this paper believe that practice management content (eg, documentation, insurance policy, and regulations) should be incorporated into the learning process as a component of clinical decision-making rather than as an isolated course. As the students learn to develop clinically sound plans of care, they should consider applicable insurance and regulatory policies that directly affect the care as they collaborate with the patient and other health care providers. By threading the material throughout the professional level physical therapy curriculum, students have the opportunity to contextualize this knowledge in the practice area they are studying, incorporate the information into their clinical decision-making and patient management skill set, and create a more realistic plan of care that may lead to improved outcomes.

The purpose of this manuscript is to describe a case-based reasoning (CBR) approach to enrich student learning in insurance, regulations, and documentation in a professional level PT education program and assess the outcome of the instruction on student clinical performance. In addition, participating faculty perceptions were assessed to determine the effectiveness of the curricular changes. Specifically, the authors describe a CBR approach that uses active learning methods, progressively complex case studies, and clinical reasoning to integrate insurance, regulatory, and documentation content into a professional level PT education curriculum.

Case-Based Reasoning (CBR): An Opportunity for Integration

Contemporary education theorists have shown that learning is most effective when students are involved in real-life, situational learning activities.^{5,6} Students participating in educational endeavors using problem, project, and CBR methods are more motivated to learn, use information effectively, and develop higher order thinking skills than those that are exposed to teaching methods using rote memory.⁷ CBR employs realistic, complex cases and active learning methods to assist learners to contextualize specific knowledge and experiences that may be applied to future problem-solving activities.⁸ The novice learner has little previous experiences to call upon when faced with new situations. The use of appropriately designed and progressive case studies in concert with self-reflection and guidance from a teacher-coach provides the learner with opportunities for interpreting new situations, identifying important features of the problem and solutions, and encoding strategies that can be recalled when faced with new situations. Kolodner⁷ theorized that CBR learning is successful because it solves the “indexing problem” for the learner, the ability to utilize the memory of a previous experience and apply it to a new situation. In addition, researchers suggest that successful CBR activities require cases that are at an appropriate level of complexity and include opportunities for formal reflection (written or verbal) and mentored coaching.^{7,9}

Literature supporting the use of CBR in physical therapy and other health care professional educational programs exists. Loghmani et al¹⁰ investigated student and faculty perceptions of an integrated, longitudinal case-based learning model for professional level PT education. Student survey results indicated that 76.3% of students believed the CBR approach facilitated learning, 72.3% believed it facilitated clinical decision-making, and 70.7% believed it facilitated critical thinking and problem-solving. Schwartz et al¹¹ found that a case-based learning approach for medical students resulted in higher ratings for 9 out of 10 student assessed outcome domains as compared to a traditional approach. The authors reported the greatest differences in student outcomes ratings between CBR and traditional approaches were in the promotion of student enthusiasm for learning, development of skills in independent learning, and problem solving skills domains. Thomas et al⁹ contend that the CBR approach assists students to organize information in a way that allows for easier recall when in clinical reasoning situations, allows the instructor to overtly observe student clinical reasoning,

and enhances student self-confidence. Interestingly, van Duijn and Bevins¹² compared clinical performance of PT students at the midterm point of the first full-time internship in problem-based, mixed-model, and traditional curricula and found no difference in clinical performance as measured by the Clinical Performance Instrument (CPI).¹³ The CPI is the most widely used assessment tool evaluating PT student clinical performance in the United States.¹⁴ However, there is no evidence to suggest that insurance and regulatory issues are consistently integrated into CBR activities in professional level PT education programs.

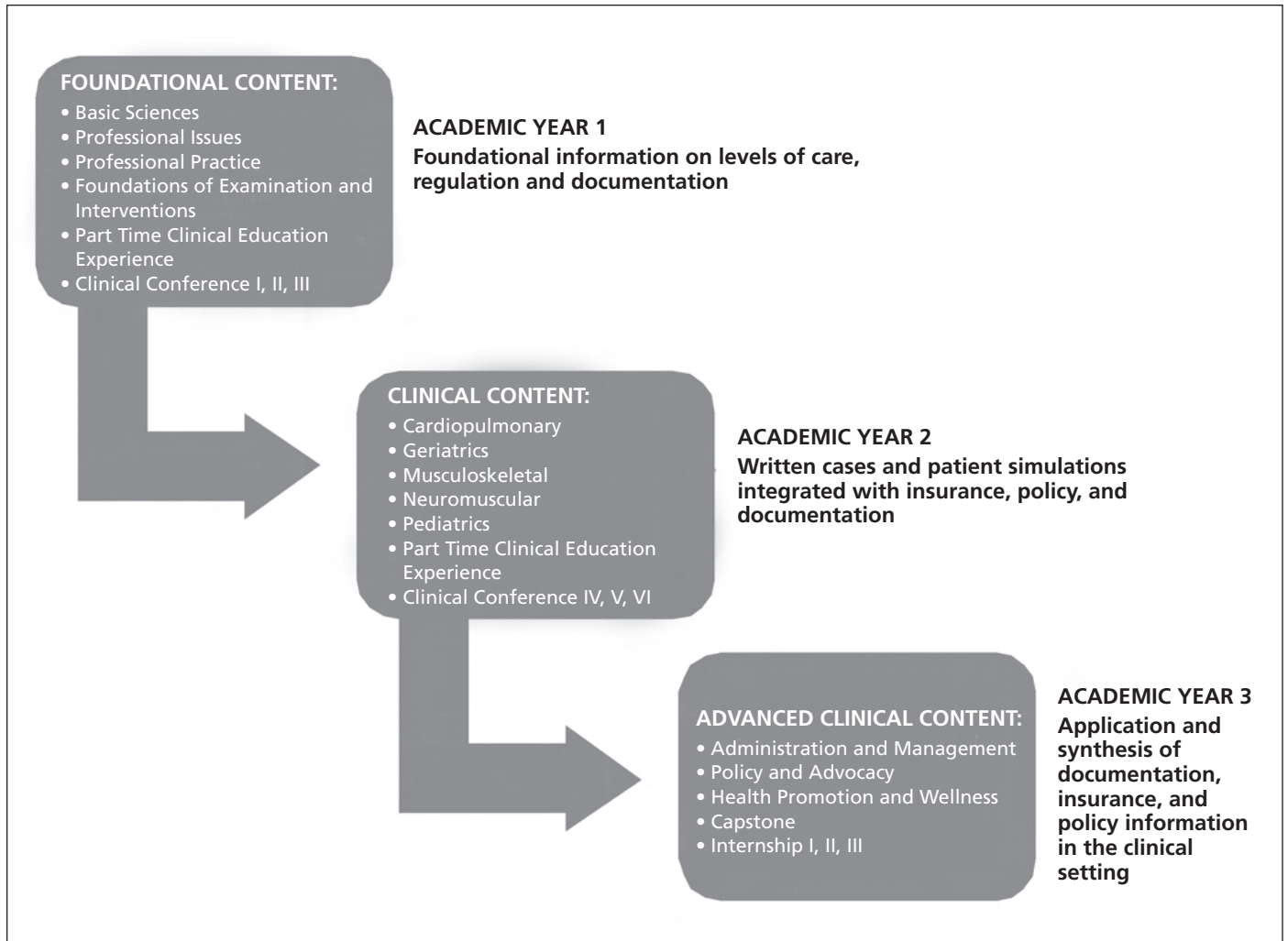
We contend that in order to develop effective and efficient plans of care, a practical understanding of insurance, state and federal policy and regulations, and the impact on health care delivery models due to health care reform must be integrated into a PT student's clinical decision-making paradigms. Jette¹⁵ articulated the need for PTs to have systems skills in order to be successful in new health care delivery models. Systems skills include the ability to collect, refine, and understand data within the context of the system in which the professional practices. Hence, a working knowledge of the system under which the PT will practice is required to be successful in our evolving health care delivery system.

METHOD/MODEL DESCRIPTION AND EVALUATION

This manuscript describes how a professional level PT education program integrated insurance, documentation, and regulation content within the curriculum through CBR methodology. The desired outcome of the curriculum change was that the third-year students would begin their full-time internships with an improved ability to apply regulatory and insurance policies to patient cases and appreciate how the policies affect patient management and access to services. Additionally, the student would apply appropriate documentation skills in order to effectively communicate patient plans of care to third parties. Using the CBR methodology, students experienced progressively more complex clinical cases layered with insurance and regulatory challenges and had an opportunity to discuss and reflect on their successes and failures facilitated by a faculty coach. The expectation was that these experiences would become the foundational knowledge the students would utilize and build upon during their clinical internships and early professional job experiences.

Figure 1 provides a graphic of the overall organization of the Doctor of Physical Therapy (DPT) program, highlighting where

Figure 1. Schematic of the Integration of Insurance Policy and Documentation Into the Doctor of Physical Therapy Curriculum



insurance, regulation, and documentation experiences were integrated into the curriculum. Before students can be expected to integrate information about insurance and regulations into the Patient Care Management Model (PCMM), it is necessary to introduce the basics of insurance and the industry’s levels of care (eg, acute, post-acute, home health, outpatient). In academic year 1, students were introduced to the various levels of care around which payment policies are based, documentation skills, and information about state licensure and regulations. In addition, students were introduced to the various stakeholders in the regulatory environment such as government entities and payers. Student learning was enriched by a combination of didactic and active learning techniques.

In academic year 2, the students learned the purpose and underlying concepts of insurance, basic terminology of benefits and coverage, and the impact of inclusionary and exclusionary language. Table 1 includes representative examples of terminology covered

Table 1. Basic Insurance Terminology

<ul style="list-style-type: none"> • Benefit • Coverage • Medical necessity • Qualified personnel • Skilled care • Copayment • Deductible • Maintenance care • Investigational and experimental
--

in year 2. In addition, Table 2 provides examples of actual coverage and benefit language in existing payer policies that were incorporated into the introduction of these concepts. The policies in Table 3 were used to illustrate the variability in medical policies used by third-party payers. Existing case studies in the clinical management courses designed to address contemporary PT practice expectations across the lifespan and practice settings were modified to include various aspects of regulation and insurance. For example, the District of Columbia’s Medicaid policy pertaining to coverage for home modifications, *Environmental Accessibility Adaptation Services*, was utilized in a pediatrics class for the following case: “Patient is a 5-year-old child with L1–L2 Spina Bifida Aperta. The therapist is evaluating the patient’s home environment to determine what modifications will improve accessibility and if insurance coverage is available.” Finally, a semester-long advanced clinical conference course in the last semester prior to the first full-time clinical internships,

Table 2. Benefit and Coverage Examples

Coverage and benefit inclusion language examples	<ul style="list-style-type: none"> • The combined physical therapy and occupational therapy benefit is 20 visits in a calendar year. • The specialist copay (eg, physical therapy) is \$40.
Coverage and benefit exclusion language examples	<ul style="list-style-type: none"> • Iontophoresis is not a covered benefit. • There is coverage for physical therapy only when provided by a qualified provider. • Maintenance care is not a covered benefit.

Table 3. Examples of Commercial Payer Coverage Policies Pertinent to Services Provided by Physical Therapists

Payer	Coverage Policy
Aetna	Physical Therapy Services (0325): http://www.aetna.com/cpb/medical/data/300_399/0325.html Iontophoresis (0229): http://www.aetna.com/cpb/medical/data/200_299/0229.html Pulmonary Rehabilitation (0032): http://www.aetna.com/cpb/medical/data/1_99/0032.html
Cigna	Physical Therapy (0096): http://www.cigna.com/assets/docs/health-care-professionals/coverage_positions/mm_0096coveragepositioncriteria_physical_therapy.pdf Plantar Fasciitis Treatment (0097): https://cignaforhpc.cigna.com/public/content/pdf/coveragePolicies/medical/mm_0097_coveragepositioncriteria_plantar_fasciitis_treatments.pdf
DC Medicaid	Environmental Accessibility Adaptation Services. http://www.dcregs.dc.gov/Search/FullTextSearch.aspx?SearchType=DCMR&KeyValue=Environmental%20Accessibility%20Adaptation%20Services

which is designed to challenge student clinical reasoning, provided an opportunity for integrating insurance and regulatory policies into the PCMM using 3 complex cases.

In addition to coverage issues, the critical concept of cost-shifting, the process by which payers and employers shift some of their expenses onto the consumer through the use of deductibles and copayments, was introduced early in the curriculum and repeatedly discussed as important when developing the frequency and duration of treatment in a plan of care. Knowledge of a patient-specific dollar obligation is essential when establishing a patient’s plan of care, particularly those in outpatient settings. Claxton et al¹⁶ demonstrated that cost-shifting from payers to consumers is increasing in employee sponsored health insurance, resulting in higher consumer responsibility for health care costs. It is predicted that this cost shifting limits an individual’s use of health care services. While a student may design an appropriate plan of care based on clinical findings, the patient may not be able to participate because of their out-of-pocket financial obligation. As a result, students need to consider: (1) joint decision-making with the patient regarding number and frequency of visits, (2) an appropriate plan of care based on the patient’s

expected attendance in therapy, and (3) home instruction and patient education designed to enhance the overall effectiveness of therapy.

CBR Integration Method

CBR integration occurred in 4 clinical management courses and 1 integrative clinical conference course during year 2. Faculty in the 4 clinical management courses identified existing patient cases that could be used to expand the insurance, regulation, and documentation threading initiative (Figure 1). One case was selected for modification in each of the following courses: “Management of Musculoskeletal Dysfunction,” “Geriatrics,” “Pediatrics,” and “Management of Cardiopulmonary Dysfunction.” Introduction to payment or regulatory considerations related to the selected 4 cases laid the groundwork for higher order application of these principals in the “Clinical Conference V” course that followed.

A series of questions helped to guide the faculty in integrating the insurance policy, regulations, and documentation guidelines into each case. The questions for discussion led by the faculty expert in this area included:

- How could the salient features of the selected payment policy be applied to the case?

- Did the case require slight modification to facilitate the incorporation of the payment issues?
- What would be expected of the professor and the students relative to the revised case?
- How would student learning be evaluated?
- Could the payment policy issues be incorporated into documentation assignments associated with the case?

Table 4 identifies content areas and terminology that were added to the modified cases helping to strengthen the goals of the learning experience.

“Clinical Conference V” is the fifth in a series of case-based seminars designed to serve as integrative units throughout the curriculum. The seminar applied clinical decision-making models to 3 cases that represent different physical therapy practice patterns and practice areas. Faculty mentors simulated the cases for small groups of students and all student groups experienced each of the 3 cases. For the CBR integration, each case was assigned an applicable insurance policy (see Table 5).

Student roles varied within the group for each case. Two students acted as lead thera-

Table 4. Additional Insurance and Regulation Topics Included in Cases for CBR

Topic	Purpose
Benefit availability	The available benefit provides boundaries of care and raises the potential for the patient's financial liability.
Qualified providers	The coverage policy defines who is considered a qualified provider for purposes of payment.
Modality coverage	Inclusion and exclusion criteria impact boundaries of coverage policies.
Preauthorization	Monitoring of utilization of services.
Examination	Reporting prior level of function (PLOF) provides contextual information for functional limitations and established goals.
Documentation	Demonstrating support for medical necessity of services and claims.
Durable medical equipment (DME)	Consideration of equipment, orthotics, and prosthetics within the context of the separate benefit for DME.
Patient progress towards goals	Use of measurements for functional limitation and outcomes.
Physician quality reporting system (PQRS)	Introduction to quality measurement reporting under Medicare Part B.

Table 5. Examples of Cases and Applicable Insurance Coverage Policy Used in Clinical Conference V

Case Description	Payer
<ul style="list-style-type: none"> Metastatic lung cancer, s/p hip Open Reduction Internal Fixation (ORIF) S/P myocutaneous sacral flap, T10 paraplegic Anterior cruciate ligament (ACL) reconstruction, juvenile rheumatoid arthritis (JRA) 	<ul style="list-style-type: none"> Virginia Medicaid (Home Health Benefit) Medicare (Inpatient Rehabilitation Facility Benefit) Carefirst Blue Cross Blue Shield (Outpatient Benefit)

pists and were responsible for planning and directing the patient encounter. The other group members either observed or assisted with various role-playing assignments, such as being a family member, case manager, or aide. At each class session, lead therapists assessed and treated the simulated patients and documented patient management. For the CBR integration, the lead therapists were also required to manage and document the care, taking into consideration the assigned insurance coverage policy. All students in the group were responsible for reviewing and discussing each other's draft documentation posted in the mock medical record housed in Blackboard™. Either prior to or following each session, the CBR integration group met with the faculty member with content expertise in insurance and regulation, known as the insurance consultant. This tutorial focused on issues related to establishing the plan of care, timing and progression of treatment plan, choice and implementation of interventions, and documentation that supported the medical necessity of services based on the payer's policies. In addition, the tutorial provided opportunities for reflection and discussion and helped ensure that students who were not the

lead therapists focused their attention on the cases treated by other students. Peer feedback on planning and execution of the treatment was facilitated and encouraged. The final documentation submitted by the lead therapists was assessed by the insurance consultant.

In year 3, the "Administration and Management" course was designed for students to apply a deeper and broader understanding of payment and regulatory issues to patient and clinic management. The course design offered the students a summative experience for integration of this content and highlighted health care reform and a holistic view of the PT in the evolving health care landscape.

Evaluation Methods

Two methods of evaluation were used to determine the effectiveness and utility of the CBR approach to integrating insurance policy, regulation, and documentation into the curriculum. Student performance in applying knowledge of insurance policy, regulation, and documentation to clinical practice was measured through 2 domains of the Clinical Performance Instrument (CPI).¹³ Participating faculty perceptions of the curricular change were measured through an

anonymous, web-based survey. The study was reviewed by George Washington University Institutional Review Board and granted exempt status.

Student Performance

Subjects. A convenience sample of students was selected. The first cohort consisted of all PT students within the DPT program for the 2 years prior to the implementation of CBR experiences (cohort 1). A traditional method of instruction was used during this period that included lectures and assignments that were independent of other courses. The second cohort consisted of 2 years of PT students who participated in CBR learning as described in previous sections (cohort 2). Subjects were included in each cohort only if they had completed midterm and final CPI scores for their final internship.

Data collection. Because the faculty was most interested in determining if the curricular changes influenced student clinical performance, 2 domains of the CPI most associated with the curricular content were selected as outcome measures. Roach et al¹⁴ demonstrated high levels of internal consistency and good construct validity of the CPI

Table 6. Physical Therapist Clinical Performance Instrument (PT CPI) Domains and Criteria Description (Version 2006)

Domain	Criteria Description
Documentation	Produced high quality documentation in a timely manner to support the delivery of physical therapist services.
Financial resources	Participates in the financial management (budgeting, billing and reimbursement, time, space, equipment, marketing, public relations, etc) of physical therapy services consistent with regulatory, legal, and facility guidelines.

Table 7. Student Sample Demographics

Cohort	Number	Sex	Age Mean	Age Standard Deviation (SD)	Clinical Internships			
					Acute Care	Outpatient	Post-Acute Care	Pediatrics
1	54	89% Female	27.5	3.01	34.6%	20.2%	31.7%	7%
2	62	84% Female	26.8	2.14	47.6%	12.9%	28.2%	11.3%

(version 2006) as a measure for PT student clinical performance. The 2 CPI performance domains selected, documentation and financial resources, are described in Table 6. Mid-term and final student self-assessment and CI rating scores for the 2 CPI domains were extracted from the PT CPI Web portal, de-identified by a research assistant not associated with the data analysis, and imported into Excel. Statistical analyses were conducted with IBM SPSS¹⁷ (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY) and SAS (Version 9.3, SAS Institute, Cary, NC).¹⁸

Data Analysis. Descriptive statistics were used to describe each cohort. In order to determine if the types of clinical internship settings varied between groups, clinical internship settings were categorized into 4 areas: acute care, outpatient, post-acute care, and pediatrics. Chi-square (X^2) analysis was used to determine if the relative frequencies of clinical internship settings were different between cohorts.

To analyze CPI ratings, raw CPI data extracted from the PT CPI Web portal[™] were transformed. Items were coded “1” if the student scored “at or above entry level” (CPI score ≥ 17) or “0” if they scored “below entry level” (CPI score < 17). We compared the proportion of students who were “at or above entry level” in both cohorts. Student and CI assessments of “at or above entry level” for each scoring period (midterm or final) in 2 CPI domains of interest (documentation and financial resources) were captured using 2 x 2 contingency tables. Since frequencies were small in some cells, Fisher exact tests were

used to determine the differences between cohorts.^{19(p65)}

Faculty Survey

Following the first year of implementation, lead faculty of the clinical management courses were asked to use Survey Monkey^{™20} to complete a short, anonymous questionnaire assessing the ease, utility, benefits, and challenges associated with the CBR integration.

OUTCOMES

Student Performance

Table 7 summarizes the sample demographics. Data from all students in each of the 4 classes were included in the data analysis. Since insurance and regulatory policy varies by setting, we were interested to see if there was a difference in clinical internship settings between cohorts. The chi-square analysis indicates no significant difference between the 2 cohorts for the proportion of students placed in each of the 4 clinical placement settings during their final clinical internship ($X^2 = 2.3, P = 0.51$).

Table 8 presents the results of the Fisher exact test analysis of student self-assessment and CI CPI ratings considered “at or above entry level” for the 2 domains at midterm and final ranking periods. Significant differences between cohorts were demonstrated in student self-assessment of documentation performance at midterm ($P = .011$) and financial resources performance at the midterm and final rating periods ($P = .022$ and $P = .012$, respectively). These results indicate greater

student self-assessment in these performance areas by those students that participated in the CBR learning experiences. For CI ratings, financial resources performance was significantly different between cohorts at the final rating period ($P = .044$), indicating a higher CI rating at the end of the internship for those students that participated in the CBR instruction.

Faculty Survey

Three of the 4 faculty members who adapted their courses to include insurance, regulation, and documentation information completed the survey. Survey respondents perceived no difficulty in adding content to their existing course, saw benefits to adding the information into their cases, would consider including insurance and regulatory issues in other case studies, and learned from the experience. One individual felt uncomfortable with their level of knowledge in incorporating the information into the cases, making answering student questions difficult. Two of the 3 respondents suggested that students needed more background information in insurance and regulation when addressing the case studies within the management courses.

DISCUSSION

The outcomes generally support the effectiveness of the CBR approach for integrating insurance policy, regulations, and documentation in a professional level PT education program. Students learn to use regulation and insurance policy information when making clinical decisions, and participating faculty did not feel unduly burdened by the integra-

Table 8. Cohort Comparisons by Rater, Domain, and Time for Students Rated “At or Above Professional Level”

	Total Number At or Above Professional Level	Cohort 1 2009–2010 N (%)	Cohort 2 2011–2012 N (%)	P value ^a
Total Number in Cohort		54	62	
Rater: Student Self-Assessment				
Midterm Documentation	31	8 (25.8)	23 (74.2)	.011
Final Documentation	111	50 (45.0)	61 (55.0)	.182
Midterm Financial Resources	19	4 (21.0)	15 (79.0)	.022
Final Financial Resources	107	46 (43.0)	61 (57.0)	.012
Rater: Clinical Instructor				
Midterm Documentation	41	15 (36.4)	26 (63.4)	.124
Final Documentation	114	52 (45.6)	62 (54.4)	.214
Midterm Financial Resources	39	15 (38.5)	24 (61.5)	.242
Final Financial Resources	112	50 (44.6)	62 (55.4)	.044

^aBolded values indicate statistical significance ($P \leq .05$)

tion of the this content into established case studies.

There was a significant difference in student CPI self-assessment scores between the cohorts for the items related to documentation (midterm) and financial resources (midterm and final). The difference may provide evidence for the effectiveness of the described model in increasing participant self-confidence in clinical decision-making that included insurance and regulatory policy perspectives. Early in the curriculum, students were required to consider the importance of policy and regulations that were embedded in the context of more clinically related patient management processes such as examination, evaluation, and intervention. As students progressed from guided CBR at the academic institution to actual patient cases during their clinical internships, they were well accustomed and therefore perhaps more confident in clinical decision-making processes that accounted for insurance and regulatory policy.

Similarly, the cohort’s higher self-assessment CPI scores in the documentation domain may reflect enhanced student understanding of the link between documentation and insurance and regulatory policy. Practicing therapists understand this connection and, we believe, are typically the primary instructors delineating this connection to interning PT students. However, through the CBR approach, students explicitly discuss this connection with faculty mentors early in

the curriculum and apply the information to simulated documentation experiences. Differences in CPI midterm scores may reflect the increased confidence of cohort 2 as a result of these guided experiences and applied practices. However, by the time students approach the end of their final internship, they can draw from multiple experiences as well as specific facility practice, and the early advantage of the CBR model is no longer evident in a comparison of the cohort final self-assessment scores.

The CI’s final ranking of student performance in the financial resources domain was significantly higher for the cohort with CBR training, suggesting the model effectively contributed to the preparation of students for professional level practice in this complex area. The difference in scoring between cohorts was not evident at midterm. Perhaps, given the relatively complex and multidimensional skills encompassed by the financial resources domain, students require a greater length of time to achieve professional level competence. Additionally, program faculty members have noted that CIs frequently do not assess and rank student performance in this area of practice until later in the internship. This area, however, would benefit from additional study.

There were limitations in the study. The study used a sample of convenience that was not randomized. Therefore, one is not able to generalize the results of the study. In addition, the sample included a cohort from only

1 educational program. It is hoped that similar studies will be undertaken that include cohorts from different professional level education programs. The study was retrospective, thus limiting our ability to assess the possible contribution of other contributing factors on the outcomes measured. Finally, the study used the CPI as a readily available outcome measurement that may not be sensitive enough to discern discrete differences. Continued work on this area may consider using a more specific measurement tool for regulation, payment policy, and documentation. It is hoped that further study of the effectiveness of the CBR approach for the integration of insurance policy regulations and documentation using more direct measures of applicable knowledge and skills will be undertaken.

Faculty perception of the overall curricular change was generally positive. Faculty survey respondents reported that the CBR approach was beneficial to student learning, not difficult to integrate into their course, and faculty learning was enhanced. We believe that the overall positive responses were partly due to assigning a dedicated faculty member with expertise in insurance and regulations as the coordinator and active participant of the curriculum. The dedicated faculty member worked with participating faculty to identify appropriate policies to include in existing cases, reviewed salient points of the policies with faculty and students, and acted as the mentor during student discussions and assignments.

By assigning a specific individual to act as the coordinator, we believe that problems associated with faculty buy-in, as described by Loghmani et al,¹⁰ were prevented.

However, the faculty identified challenges that will need to be addressed as the program evolves. Participating faculty believed that they required more information to increase their understanding of new insurance policies and regulations. Additional faculty training and increased experience with the cases may address these challenges. In addition, some faculty believed that including insurance and regulation policy within their course may have taken away time previously dedicated to clinical content instruction. This important issue requires further investigation. Neglecting to teach clinical management with an insurance and regulatory perspective may affect patient outcomes and regulatory or payer compliance. Thus, we believe effort should be expended on exploring effective methods to integrate clinical management with insurance and regulatory policy within PT educational programs.

CONCLUSION

Today's PTs are challenged by the quickly evolving health care environment due to health care reform and the ever-changing complexities of insurance and regulatory requirements. Professional level PT students are expected to quickly integrate these requirements as they enter the field. Therefore, it is incumbent upon educational programs to explore ways to enhance student learning in these areas. The purpose of this paper was to demonstrate how 1 professional level DPT program developed a CBR approach to integrate insurance, reimbursement, and documentation content within the curriculum. The results show that the participating faculty believed that the CBR approach was a valuable experience as it enhanced student learning and clinical decision-making ability.

Student performance was measured during their last full-time clinical internship using 2 domains of the CPI. The cohort who experienced a CBR approach to integrating insurance and regulations policy demonstrated statically significant difference in some measures of student self-assessment and CI ratings of performance when compared to a cohort who were exposed to a traditional method of instruction. Although the results are encouraging, further research using more discrete measures of learning is recommended.

REFERENCES

1. Patient Protection and Affordable Care Act, 42 USC § 18001 et seq (2010).
2. Chuang E. Expanding medical student and resident knowledge of health economics, policy, and management. *Acad Med.* 2011;86(11):e1.
3. Patel MS, Davis MM, Lypson ML. Advancing medical education by teaching health policy. *N Engl J Med.* 2011;364(8):695–697.
4. Jette DU, Grover L, Keck CP. A qualitative study of clinical decision-making in recommending discharge placement from the acute care setting. *Phys Ther.* 2003;83(3):224–236.
5. Brown AL. Motivation to learn and understand: on taking charge of one's own learning. *Cogn Instr.* 1988;5:311–322.
6. Cognition and Technology Group at Vanderbilt. Anchored instruction and situated cognition revisited. *Educational Technology.* 1993;33(3):52–70.
7. Kolodner JL. Educational implications of analogy: a view from case-based reasoning. *Am Psychol.* 1997;52(1):57–66.
8. Eshach H, Bitterman H. From case-based reasoning to problem-based learning. *Acad Med.* 2003;78(5):491–496.
9. Thomas MD, O'Connor FW, Albert ML, Boutain D, Brandt PA. Case-based teach-

ing and learning experiences. *Issues Ment Health Nurs.* 2001;22(5):517–531.

10. Loghmani MT, Bayliss AJ, Strunk V, Altenburger P. An integrative, longitudinal case-based learning model as a curriculum strategy to enhance teaching and learning. *J Phys Ther Educ.* 2011;25(2):42–50.
11. Schwartz PL, Egan AG, Heath CJ. Students' perceptions of course outcomes and learning styles in case-based courses in a traditional medical school. *Acad Med.* 1994;69(6):507.
12. van Duijn AJ, Bevins SI. Clinical performances of physical therapist students in problem-based, mixed-model, and traditional curricula. *J Phys Ther Educ.* 2005;19(2):15–21.
13. American Physical Therapy Association. Physical therapist clinical performance instrument. Version 2006. Alexandria, VA: American Physical Therapy Association; 2006.
14. Roach KE, Frost JS, Francis NJ, Giles S, Nordrum JT, Delitto A. Validation of the revised physical therapist clinical performance instrument (PT CPI): Version 2006. *Phys Ther.* 2012;92(3):416–428.
15. Jette AM. 43rd Mary McMillan lecture. Face into the storm. *Phys Ther.* 2012;92(9):1221–1229.
16. Claxton G, Rae M, Panchal N, et al. Health benefits in 2013: moderate premium increases in employer-sponsored plans. *Health Aff (Millwood).* 2013;32(9):1667–1676.
17. SPSS Inc. SPSS [computer program]. Version 21.0. Armonk, NY: IBM; 2013.
18. SAS Institute. SAS [computer program]. Version 9.3. Cary, NC: SAS Institute; 2010.
19. Zar J. *Biostatistical Analysis*. 2nd ed. Englewood Cliffs, NJ: Prentice-Hall Inc; 1984.
20. SurveyMonkey Audience [computer program]. Palo Alto, CA: www.surveymonkey.com; 2012.