Using National Medical Care Survey Data to Validate Examination Content on a Performance-based Clinical Skills Assessment for Osteopathic Physicians

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Patient characteristics, chief complaints, and diagnoses can be used to specify the examination content for performance-based assessments of clinical skills. The purpose of this investigation was to explore osteopathic and allopathic medical practice patterns and to provide summary statistics that can be used to delimit potential assessment content areas for a clinical skills assessment targeted at osteopathic physicians. Analyses of the National Ambulatory Medical Care Survey indicated that the types of patients seen by osteopathic and allopathic physicians in office-based settings are somewhat different. Furthermore, the reasons that patients seek care, and accompanying diagnostic outcomes, can vary by physician type. These differences suggest that from a content perspective, a performance-based clinical skills evaluation targeted at osteopathic physicians should be characteristically different from one designed for allopathic physicians.

The specification and development of performance-based assessments is complex. For many assessments, especially those designed specifically for the purpose of licensing and board certification, a job analysis or role delineation is conducted to develop defensible test specifications. For credentialing examinations, this ensures that there is a match between the content of the examination and what practitioners actually do in their practices. However, for some examinations, especially those that are performance-based, the specific utility of a traditional job analysis is not entirely clear. If the skills needed to be tested and pursuant performance criteria are well-defined (ie, based on expert opinion, curricula while in training, textbooks, clinical practice guidelines), the focus should simply rest on modeling performance scenarios that are in line with practice patterns. Here, survey data can be used to determine the types and mix of performance scenarios that will yield a content-valid examination.

The National Board of Osteopathic Medical Examiners (NBOME) used a number of strategies in developing its Comprehensive Osteopathic Medical Licensing Examination–USA (COMLEX–USA). Its approach included consulting academicians and practicing physicians, reviewing primary source materials, and surveying professionals to determine high-frequency/high-impact patient problems presenting in the osteopathic primary care setting. The data gathered were subsequently used to designate areas of examination content. This strategy of using actual practice patterns of osteopathic primary care physicians to delimit test content is effective and ensures from a content validity perspective that reasonable inferences can be made from the test scores. Unfortunately, when this examination blueprint development was being completed, the NBOME had only a long-range plan for incorporating a clinical skills performance examination in the licensure process. Nevertheless, previous work linking examination content and osteopathic medical practice can serve as a starting point for determining the types of physician-patient encounters that can and should be modeled in an osteopathic medical clinical skills assessment.

The Educational Commission for Foreign Medical Graduates used the National Ambulatory Medical Care Surveys (NAMCSs) to provide a framework for developing cases for a standardized patient assessment. For this type of performance assessment, lay people are trained to simulate patient clinical presentations, and physicians must interview and examine them as they would real patients. Here, it is important to delineate the skills that need to be tested (eg, taking a history) and the types of scenarios that are relevant for measuring these skills. Although a job analysis could be useful for determining how each patient is actually cared for (eg, blood pressure taken, physical examination performed), the patient complaint combined with relevant background information and practice guidelines for this condition should be sufficient for determining appropriate physician actions. Therefore, once the skills to be measured are determined, it is only necessary to delimit an appropriate number and array of patient conditions to be modeled. For medical practice, this
is best accomplished by looking at the types and associated demographics of patients that are normally encountered in everyday practice.

For performance-based examinations in medical practice, it is reasonably straightforward to delineate the skills that need to be measured. The definition of examination specifications for this domain can be done by surveying experts, reviewing relevant textbooks/research articles, and consulting medical school curricula. Similar to other medical testing organizations, the NBOME's Task Force on Performance Examinations concluded that history taking, physical examination, written communication with the health care team, and doctor-patient communication would all need to be tested as part of a clinical skills assessment.

While the skill domain for this new assessment (COMLEX–USA–PE) would necessarily overlap that of any skills assessment tailored specifically for allopathic physicians, some important skills taught to osteopathic physicians are not covered within the allopathic medical curriculum or have a different emphasis. For example, physical examination skills that include palpatory diagnoses are highly stressed within the osteopathic medical curriculum. In addition, unlike allopathic medical training, clinical skills involving osteopathic principles and osteopathic manipulative treatment (OMT) are taught and subsequently used in patient management. The test specifications for COMLEX–USA–PE must reflect these and other important curricula-based and practice-based differences between allopathic and osteopathic medicine.

Another important assessment attribute to specify is content. For performance-based examinations, this entails determining the number and characteristics of the individual candidate tasks. On standardized patient assessments, these “tasks” are the modeled patient encounters. While there are numerous constraints on the types of patient complaints that can be simulated, one logical way to delimit the potential pool of patient encounters is to investigate practice patterns in the real world. For example, if it is common for patients to visit physicians for general medical examinations, it may be apropos to simulate these types of patients on the assessment. Similarly, if acute problems are more common than chronic problems, this relative weighting should be modeled within any set of simulated patient encounters. Grounding test content to the reality of medical practice will help ensure the validity of any subsequent test score inferences.

Purpose

The content specification of standardized patient assessments can be based on a number of factors, including the purpose of the assessment and the prevalence of reasons for physician visits. Summarizing practice patterns, including diagnostic outcomes, provides a framework for determining the scope of the content domain. Depending on the target population for the assessment, the uniqueness of practice patterns for a specific group should be reflected in the examination content.

The purpose of this investigation was to summarize and contrast office visits to osteopathic and allopathic physicians in the United States. Contrasting the types and characteristics of the patients, the nature and acuity of physician-patient encounters, and the relative prevalence of diagnostic outcomes provides data to guide the test development process. Differences between osteopathic and allopathic physicians can be quantified and subsequently modeled within any specifically targeted assessment.

Methods

National Ambulatory Medical Care Survey

The NAMCS is a national probability sample survey that can be used to provide data on patients’ office visits. The survey data, once weighted, can be used to produce national estimates that describe the use of ambulatory medical care services.
in the Unites States. The sampling unit for the NAMCS is the physician-patient encounter. Visits to the offices of non–federally employed physicians that are classified by the American Medical Association or the American Osteopathic Association as “office-based, patient care” were included.

All physicians listed in the master files maintained by the American Osteopathic Association and the American Medical Association as of December 31, 1997, and who met certain criteria were included in the sampling frame. A detailed description of the sampling frame, sample design, data collection, and estimation procedures may be found elsewhere.

The NAMCS does not cover all ambulatory care utilization. The National Hospital Ambulatory Care Survey (NHAMCS), which includes both outpatient and emergency department visits, is also available. Unfortunately, unlike the NAMCS, the 1999 NHAMCS does not distinguish between types of physicians visited. More important, 80% of ambulatory care delivered by non–federally employed physicians, as identified by the NAMCS and the NHAMCS, is provided in office-based practices. While hospital ambulatory patients are known to differ from office patients in their demographic characteristics and reasons for seeing a physician, most visits to osteopathic physicians take place in office-based settings. Therefore, the sole use of the NAMCS data to study patients seeking personal health services in office-based settings is justified. Furthermore, given the desire to link assessment content and patient visit characteristics, the contrast of osteopathic and allopathic medical practice patterns will be valuable in terms of constructing specific test specifications.

Analysis
The NAMCS uses a multistage probability sample design involving samples of primary sampling units (eg, counties, groups of counties), physician practices within primary sampling units, and patient visits within physician practices. As the individual patient record forms constitute a sample of office visits, the data were weighted to produce national estimates that describe the use of ambulatory medical care services in the United States.

The estimates derived in this study are subject to sampling variability. The reliabilities of the aggregate estimates were calculated using approximation methods. The National Center for Health Statistics considers an estimate to be reliable if it has a relative standard error of 30% or less (ie, the standard error is no more than 30% of the estimate). Only estimates with relative standard errors less than 30% are presented in this report. In addition, SEs are presented where appropriate. More detail on the NAMCS data collection methods, sample design, medical coding, and sampling error calculations can be found elsewhere.

Results
Patient Characteristics
In the United States, there were more than 750 million office-based patient care visits in 1999. Of these, more than 47.6 million (6.3% of all office visits) were to osteopathic physicians. Visits to osteopathic physicians occurred at a rate of 17.5 per 100 persons. Patients who visited osteopathic physicians (mean age, 40.8 years) were on average approximately 4 years younger than patients who visited allopathic physicians (mean age, 44.9 years). A comparison of ambulatory visits by age groups and physician professional identification is presented in Table 1. Based on Table 1, osteopathic physicians tend to see fewer elderly patients than allopathic physicians. Only 17.1% of the ambulatory visits to osteopathic physicians involved patients who were 65 years and older. In contrast, greater than 25% of visits to allopathic physicians in similar ambulatory settings were from patients 65 years and older.

Both osteopathic and allopathic physicians saw more female patients (osteopathic, 58.9%; allopathic, 58.2%) than male patients. Visits to osteopathic physicians and to allopathic physicians were equally likely not to have been referred

<table>
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<tr>
<th>Table 3</th>
<th>Diagnostic and Screening Services by Professional Identification</th>
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<tr>
<td>Examination</td>
<td>DO</td>
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<tr>
<td>Skin</td>
<td>7.5</td>
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<tr>
<td>Visual acuity</td>
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<tr>
<td>Pelvic</td>
<td>4.7</td>
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<tr>
<td>Breast</td>
<td>3.9</td>
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</table>

SE % indicates standard error of the percent.

<table>
<thead>
<tr>
<th>Table 4</th>
<th>Major Reason for Visit by Professional Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason for visit</td>
<td>DO</td>
</tr>
<tr>
<td>Acute problem</td>
<td>45.3</td>
</tr>
<tr>
<td>Chronic problem, routine</td>
<td>26.3</td>
</tr>
<tr>
<td>Chronic problem, flare-up</td>
<td>7.7</td>
</tr>
<tr>
<td>Pre- or postsurgery, injury follow-up</td>
<td>5.4</td>
</tr>
<tr>
<td>Non-illness care*</td>
<td>14.1</td>
</tr>
</tbody>
</table>

* Examples include routine prenatal examination, general medical examination, and well baby examination. SE % indicates standard error of the percent.
by another physician (81.9% vs 80.5%, respectively). The osteopathic physicians served as the patient’s primary care physician more often than the allopathic physicians (66.0% vs 46.6%, respectively). In terms of the primary expected source of payment for the visit, visits to osteopathic physicians were more likely to be self-pay (10.1%) compared with visits to allopathic physicians (5.2%). Visits to osteopathic physicians were also more likely to be covered by worker’s compensation (4.5% vs 1.9%). New patient visits for osteopathic physicians and allopathic physicians were similar (12.6% vs 12.3%, respectively).

**Physician Specialty**

The most common specialty (principal specialty as designated by the physician at the time of the survey) for osteopathic physicians was family practice. Over 64% of the visits to osteopathic physicians were to family or general practitioners. In contrast, only 19.7% of visits to allopathic physicians were to family or general practitioners. A listing of the most prevalent osteopathic medical specialty groups compared with allopathic medical specialty prevalence is presented in Table 2.

**Visit Duration**

Duration of visit refers to the amount of the patient’s time spent in face-to-face contact with the physician. The average duration of a visit to an osteopathic physician was 20.4 minutes. This was slightly longer than the average length of a visit to an allopathic physician (19.2 minutes). The median visit duration for both cohorts was 15 minutes. Likewise, the modal patient visit duration was equal (15 minutes). More than 40% (41.3%; SE, 2.1) of visits to osteopathic physicians were between 11 and 15 minutes. This compares with 31.4% (SE, 0.5) of visits to allopathic physicians.

**Injury-Related Visits**

Overall, there were an estimated 86.9 million injury-related or poisoning-related visits in 1999. However, as a percentage of the total patients seen within each cohort, osteopathic physicians were more likely than allopathic physicians to have visits related to injury or poisoning [osteopathic, 17.8% (SE, 1.6); allopathic, 11.1% (SE, 0.3)].

**Services**

Therapeutic and preventive services (at least one) were ordered or provided for approximately one third of the patient visits in 1999. Osteopathic physicians, as compared with allopathic physicians, were slightly more likely to order or provide therapeutic services [35.6% (SE, 2.0) vs 31.9% (SE, 0.5) of visits, respectively]. In addition, osteopathic physicians were more likely to provide complementary or alternative medicine than allopathic physicians [2% of visits (SE, 0.6) vs 0.3% (SE, 0.1)]. Based on the 1999 data, medications were ordered or provided for approximately two thirds of all patient visits [osteopathic, 69.3% (SE, 1.9); allopathic, 66.0% (SE, 0.5)].

A comparison of the prevalence of some of the most frequently cited examinations at office visits, by physician professional identity, is presented in Table 3. Within their respective patient populations, all of the examinations listed in Table 3 were more likely to be done by allopathic physicians than osteopathic physicians. In terms of diagnostic and screening tests, blood pressure check was the most prevalent. Osteopathic physicians performed a blood pressure check in 55.9% (SE, 2.1) of their patient visits. In contrast, blood pressure checks were only done for 44.1% (SE, 0.5) of visits to allopathic physicians.

**Major Reason for Visits**

The major reasons for patient visits, by professional identifi-
pain, ache, soreness, discomfort). In contrast, only 2.1% (SE, 0.1) of visits to allopathic physicians were similarly classified. A comparison of RVCs, based on summary categorizations of the most important complaint, is presented in Table 5. Based on the aggregated data, allopathic physicians are more likely to see patients for treatment (eg, prescriptions, preoperative or postoperative care, medical counseling) than osteopathic physicians. In contrast, osteopathic physicians are more likely to see patients with specific symptoms (eg, shortness of breath, cough, joint pain) than allopathic physicians.

The most common RVCs, by professional identity, are presented in Table 6. Here, based on symptom module classifications, osteopathic physicians encounter higher percentages of patients with musculoskeletal and respiratory complaints than do allopathic physicians. This was not unexpected in that, based on the aggregate categorizations of patients’ principal reasons for visit (Table 5), allopathic physicians encounter higher percentages of patients who have principal complaints or reasons related to diseases or treatment.

Diagnosis
As part of the NAMCS survey, physicians are asked to provide a primary diagnosis associated with the visit. This diagnosis may be tentative, provisional, or definitive. It represents the physician’s best judgment at the time and is associated with the patient’s most important reason for the current visit. The most common primary diagnosis for visits to osteopathic physicians was for acute problems. The summaries presented in Table 4 indicate that, on a percentage basis, osteopathic physicians tend to see more acute problems.

### Table 7

<table>
<thead>
<tr>
<th>ICD-9-CM Summary Codes</th>
<th>DO</th>
<th>SE%</th>
<th>MD</th>
<th>SE%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diseases of the respiratory system</td>
<td>16.0</td>
<td>1.5</td>
<td>12.8</td>
<td>0.4</td>
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<tr>
<td>Supplementary classification of factors influencing health status</td>
<td>13.0</td>
<td>1.4</td>
<td>16.6</td>
<td>0.4</td>
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<tr>
<td>Diseases of the musculoskeletal system and connective tissue</td>
<td>12.0</td>
<td>1.4</td>
<td>7.9</td>
<td>0.3</td>
</tr>
<tr>
<td>Injury and poisoning</td>
<td>9.5</td>
<td>1.2</td>
<td>5.6</td>
<td>0.3</td>
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<tr>
<td>Diseases of the circulatory system</td>
<td>8.0</td>
<td>1.1</td>
<td>7.9</td>
<td>0.3</td>
</tr>
<tr>
<td>Diseases of the nervous system and sense organs</td>
<td>6.8</td>
<td>1.1</td>
<td>10.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Endocrine, nutritional and metabolic diseases, and immunity disorders</td>
<td>6.0</td>
<td>1.0</td>
<td>4.9</td>
<td>0.2</td>
</tr>
<tr>
<td>Diseases of the skin and subcutaneous tissue</td>
<td>5.6</td>
<td>1.0</td>
<td>5.8</td>
<td>0.3</td>
</tr>
<tr>
<td>Symptoms, signs, and ill-defined conditions</td>
<td>5.1</td>
<td>1.0</td>
<td>5.6</td>
<td>0.3</td>
</tr>
<tr>
<td>Diseases of the genitourinary system</td>
<td>4.0</td>
<td>0.8</td>
<td>5.2</td>
<td>0.2</td>
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<tr>
<td>Mental disorders</td>
<td>3.6</td>
<td>0.8</td>
<td>4.9</td>
<td>0.2</td>
</tr>
<tr>
<td>Diseases of the digestive system</td>
<td>3.5</td>
<td>0.8</td>
<td>3.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Infectious and parasitic diseases</td>
<td>2.4</td>
<td>0.7</td>
<td>2.9</td>
<td>0.2</td>
</tr>
<tr>
<td>Neoplasms</td>
<td>1.4</td>
<td>0.5</td>
<td>2.9</td>
<td>0.2</td>
</tr>
</tbody>
</table>

SE% indicates standard error of the percent.
original contribution

cians was essential hypertension (ICD-9-CM, 401), representing 5.8% (SE, 1.0) of all visits to osteopathic physicians. In contrast, only 4.1% (SE, 0.2) of visits to allopathic physicians involved diagnoses of essential hypertension. Acute upper respiratory infections (excluding pharyngitis) were listed as the primary diagnosis for 5.1% (SE, 0.9) of visits to osteopathic physicians. This compares to 3.7% (SE, 0.2) of visits to allopathic physicians. The third most common diagnosis by osteopathic physicians was sprains and strains of other and unspecified parts of back (ICD-9-CM, 847), representing 2.9% (SE, 0.7) of office-based ambulatory visits to osteopathic physicians. Only 0.6% (SE, 0.1) of visits to allopathic physicians resulted in similar diagnoses. A summary of primary diagnosis categories, by professional identification, is presented in Table 7.

Discussion
The analysis of NAMCS data revealed several differences in practice patterns between osteopathic and allopathic physicians. First, osteopathic physicians tend to see younger patients. This is important both from practice analysis and test development viewpoints. Currently, COMLEX–USA–PE is being piloted as a 12-station assessment. Ideally, to model actual practice patterns, the osteopathic clinical skills assessment, as compared with an assessment of allopathic physicians, should include fewer cases involving elderly standardized patients. In addition, as 17% of the visits to osteopathic physicians are from individuals 15 years old and younger, the inclusion of some pediatric cases is essential. Unfortunately, using children as standardized patients, especially for a high-stakes licensing examination, is problematic. Nevertheless, it is still possible to develop cases that involve parent interviews or use youthful-looking teens. Overall, it is important to select patient encounters, when possible, to model actual practice.

Depending on logistic considerations, other practice characteristics may also influence the test development process. Practicing osteopathic physicians tend to see more female patients than male patients. For a performance-based assessment such as COMLEX–USA–PE, it may be important to have this reflected in any set of patient encounters. A similar argument holds for the relative percentages of new versus repeat patient visits and use of diagnostic and screening services.

The time physicians spend with patients also has some bearing on test design. Based on the 1999 ambulatory care survey, the modal and median visit durations were both 15 minutes. While the duration of patient visits will vary as a function of a number of factors (eg, new patient visit, reason for visit, acuity), it is important—especially for simulated patient examinations—that candidates are afforded sufficient time to interview the patient and perform the necessary physical examination maneuvers. If the performance requirements of the physician cannot be reasonably accomplished in the allotted time frame, the assessment becomes speeded, possibly compromising the validity of test scores. Fortunately, timing issues can be controlled by selecting and developing patient cases involving tasks that, based on the purpose of the assessment, can be accomplished within the desired time frame. It is also reasonable to study candidate timing issues in pilot and operational implementations of the assessment. If residents or candidates are having difficulty finishing particular cases, the performance requirements can be modified accordingly.

The reason for the patient visit is one of the most important factors in developing a standardized patient assessment. Using RVCs as a starting point for case development ensures that, within the constraints of patient simulation, the assessment models practice patterns within the profession. Based on major reason for visit, we found that osteopathic physicians tend to encounter more acute problems than do allopathic physicians (45.9% vs 35.4%, respectively). In addition, osteopathic physicians were more likely to encounter injury-related visits. If these types of differences are acknowledged in the test specifications, one would expect, at least from a content perspective, that an assessment targeted at osteopathic physicians would be different from one designed to measure the clinical skills of allopathic physicians.

A more detailed comparison of common patient visit classifications, by physician type, also revealed differences. Compared with allopathic physicians, osteopathic physicians see proportionately more patients with musculoskeletal complaints. This was not surprising, given that a significant proportion of musculoskeletal care is provided by primary care physicians and alternate care providers. Also, given the osteopathic medical focus reflecting the interrelationship of bodily structure and function, one would expect that some patients would seek alternative or complementary care modalities. As a percentage of the total number of encounters, osteopathic physicians also see more patients with respiratory complaints than do allopathic physicians. Based on the osteopathic physician’s primary diagnosis, diseases of the respiratory system were most prevalent (16% of all patient visits). All of these findings suggest that musculoskeletal and respiratory cases should be a focus of any osteopathic clinical skills assessment.

For standardized patient assessments, the case development process can also benefit from a more detailed analysis of reasons for visit and accompanying diagnoses. Depending on the purpose of the assessment and the target test population, it may be appropriate to develop general—as opposed to focused—standardized patient cases. For COMLEX–USA–PE, where the assessment is targeted at graduating medical students, the modeled encounters should for the most part reflect common clinical problems or reasons for visit. However, from a measurement perspective, it is important that even if the case is modeled on a common reason for visit it should not lead to one specific diagnostic outcome. In taking the patient’s history or performing physical examination maneuvers, the candidate should be required to explore a reasonable array of possible diagnoses. This will allow for a more thorough assessment of clinical skills. To aid in this task, it is useful to tabulate and analyze diagnostic outcomes as a function of common
reasons for patient visits. Summary data can be used by case authors to develop realistic cases that cover a wider range of diagnostic outcomes.

In developing COMLEX–USA, the NBOME surveyed professionals to determine high-frequency/high-impact patient problems. While the NAMCS data can be used to determine high-frequency reasons for patient visits, there are some relatively nonprevalent patient conditions that could be modeled within a performance assessment. These lower-morbidity cases (e.g., sexual dysfunction) may still serve as excellent vehicles for measuring clinical skills. Therefore, the use of prevalence data as the sole criterion for determining the types of cases to be modeled in a clinical skills performance is ill-advised. Instead, a combination of utilization data (reasons for visit, diagnostic outcomes) and professional opinion should be used to delimit the universe of simulated patient encounters.

Although there were marked differences between osteopathic and allopathic physicians in terms of the characteristics of the patient populations, it is also important to study therapeutic services provided by these two groups. This will help identify the unique practices associated with the osteopathic medical profession and could provide some guidance for the development of assessment content. On a percentage basis, osteopathic physicians ordered or provided therapeutic services more frequently than allopathic physicians. Unfortunately, while specific therapeutic/preventive services were coded within the NAMCS (ICD-9-CM procedures), the sample sizes were insufficient to make any additional meaningful comparisons between osteopathic physicians and allopathic physicians.

Based on the sample responses of osteopathic physicians, the specific use of OMT was not common and the associated tabulations were not reportable based on NAMCS publication guidelines. As OMT is a defining feature of osteopathic medicine, it may be useful to replicate recent surveys of osteopathic physicians that focused on the prevalence of OMT use as a function of patient complaints. In addition, although OMT use is not that prevalent, even for high-frequency patient problems, its inclusion in an assessment of osteopathic clinical skills is important given the desire to stress osteopathic principles. Including the evaluation of OMT in the assessment may also have the desirable consequence of modifying the curricular focus in osteopathic medical schools.

Conclusion
Summary data on patient characteristics and chief complaints and diagnoses can be used to specify the test content for an assessment that uses standardized patients. Our analyses indicate that the types of patients seen by osteopathic physicians and allopathic physicians in office-based settings are slightly different. In addition, the reasons that patients seek care, and accompanying diagnostic outcomes, are dissimilar in some respects. For licensing examinations, it is important that assessment content and professional practice are linked. The NAMCS provides summary data that can be used to fulfill this goal. The summary statistics suggest that a performance-based clinical skills evaluation targeted at osteopathic physicians should, from a content perspective, be different from one specifically designed for allopathic physicians.

References