1) A Longitudinal Medical Spanish Program at One US Medical School

2) Accuracy of Self-assessed Spanish Fluency among Medical Students

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Papers submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements of the degree of Master of Public Health in the Public Health Leadership Program.

Chapel Hill

March 14, 2008

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3/14/08	Date

A Longitudinal Medical Spanish Program at One US Medical School

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JOURNAL OF GENERAL INTERNAL MEDICINE

March 13, 2008

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We do not yet know when this supplement will be published, as some manuscripts are still undergoing review and revision. As manuscripts are accepted, they will be sent to the publisher to begin processing for publication and you will receive galley proofs directly from the publisher. However, the manuscripts will not be available online or published until all of the papers accepted for publication have been finalized.

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2.)

A Longitudinal Medical Spanish Program at One U.S. Medical School

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Key words: education, medical; Hispanic Americans; Latino; language barriers; communication.

Abstract

Introduction: Policymakers have recommended recruiting and/or training more US physicians who can provide care in Spanish. Few longitudinal medical Spanish programs have been described and evaluated.

Aim: To describe development and evaluation of the preclinical phase of a four-year program designed to graduate physicians who can provide language-concordant care in Spanish.

Setting: One public medical school in southeastern US.

Program description: The program targeted intermediate/advanced Spanish speakers. Standardized fluency assessments were used to determine eligibility and evaluate participants' progress. Curriculum included didactic coursework, simulated patients, socio-cultural seminars, clinical skills rotations at sites serving Latinos, service-learning, and international immersion.

Program evaluation: For the first two cohorts (n=45) qualitative evaluation identified program improvement opportunities and found participants believed the program helped them maintain their Spanish skills. Mean interim (two-year) speaking proficiency scores were unchanged from baseline: 9.0 versus 8.7 at baseline on 12-point scale (p=.15). Mean interim listening comprehension scores (second cohort only, n=25) increased from a baseline of 77% to 86% (p=.003). Proportions "passing" the listening comprehension test increased from 72% to 92% (p=0.06).

Discussion: We describe development of a longitudinal Spanish program within a medical school. Participation was associated with improved Spanish listening comprehension and no change in speaking proficiency.

INTRODUCTION/ AIMS

More than one in ten US residents speak Spanish at home, approximately half of whom report difficulty speaking English (1). Having limited English proficiency is associated with less access to care(2,3), lower visit comprehension(4), and lower patient satisfaction(5). Language concordance between clinician and patient appears to mitigate some of these disparities(4,6-9).

Experts have recommended expanding the Spanish-speaking provider workforce by training and/or recruiting more bilingual physicians(10,11). Medical schools in states such as North Carolina, where Spanish-speaking populations have grown dramatically (12), are struggling with whether or how they should teach medical Spanish. While some schools offer courses and/or immersion experiences, few published program descriptions are available(13,14). To our knowledge, no program uses validated standardized Spanish language proficiency assessments to facilitate teaching or evaluation.

We developed a longitudinal program designed to maintain or improve the medical Spanish communication skills of medical students entering with intermediate to advanced proficiency with the goal of graduating cohorts of physicians who are demonstrably capable of providing language-concordant clinical care in Spanish. This paper presents the context, rationale, curriculum, and interim evaluation of the preclinical phase of the program.

PROGRAM DESCRIPTION

Setting and rationale: In 2002 faculty from the Departments of Family Medicine and Medicine at the University of North Carolina (UNC) convened a working group to develop a medical Spanish program. We conducted a needs assessment, soliciting input from faculty, institutional language experts, medical students, and other sources (Appendix). Among other findings, the assessment found that medical students were strongly interested in maintaining previously-acquired Spanish proficiency skills during medical school. The needs assessment informed the program's guiding principles and rationale, which are summarized in Table 1.

Recruitment: Beginning in 2004 we included a letter in materials mailed to all entering students. The letter described the program and encouraged students rating their Spanish fluency as intermediate or higher to apply.

Language testing: An independent language testing service with over 25 years of experience administered a validated Spanish speaking proficiency test to all applicants(15). The test was administered at baseline and again in the student's second year after completing preclinical curriculum. Testing involved a recorded structured Spanish telephone interview that required subjects to respond to 12 questions randomly selected from a larger pool. Independent evaluators were native Spanish speakers who had undergone training to ensure high inter-rater reliability (>0.8) (16). Scores ranged from 1 (total beginner) to 12 (native speaker); students with scores ranging from 6 to 10 (intermediate to advanced) met program eligibility requirements. Examples of test items were: 1) *If you had a friend who smoked two packs of cigarettes a day, what advice would*

you give him? 2) *In your opinion, why do people get flu shots?* The items were designed to prompt respondents to use Spanish in both general and health-related domains. Evaluators rated the applicants' speed, general vocabulary, grammar, sentence structure complexity, and ability to express ideas in Spanish.

At matriculation (baseline) students took a listening comprehension test consisting of health-related Spanish monologues (2) and dialogues (2), each followed by five multiple choice questions. Scoring was based on the percentage of questions answered correctly. A score of 70% or higher indicated "passing" at the advanced listening comprehension level (17). These assessments were repeated in the second year.

Curriculum: Preclinical curriculum consisted of didactic, experiential, and evaluative elements (Table 2). As of this writing, the curriculum content has largely remained constant, though the structure of individual components has evolved iteratively.

Medical Spanish course: First-year students completed an 80-hour medical Spanish course organized around two-hour sessions conducted twice monthly by a Spanish instructor (PhD) and clinician (MD). Grammar and vocabulary lessons were based on an interactive DVD/workbook program(18). Students completed workbook assignments outside the classroom, reviewing them with the instructor via electronic mail. The clinician led clinical role-playing scenarios, which emphasized material in the students' regular Introduction to Clinical Medicine (ICM) course (i.e. Chief Complaint, Present Illness, Past

Medical History, etc.). Pertinent cultural issues were included in the cases and discussed in these sessions.

Socio-cultural seminars: Students participated in a lunch-time series led by guest faculty or community experts on cultural, psychosocial, or policy topics relevant to Latinos.

ICM clinical placements: All medical students complete five one-week clinical rotations in community-based practice sites during their two-year ICM course. When practical, our program participants were placed in sites serving Latino populations . This provided language practice while fulfilling a curricular requirement.

Service learning: Students participated in at least 20 hours of service-learning activities, such as conducting free health risk appraisals in a large, rural Latino community, interpreting at a student-run free clinic, or providing blood pressure and diabetes screening at Latino health fairs.

Immersion: Some students completed optional summer immersion experiences after their first year. Immersion activities included health-related service, research, clinical care, language coursework, and/or family homestay. Modest travel stipends were offered, along with faculty mentoring for students engaged in service or research projects. Students unable to travel abroad participated in local community service projects, permitting interaction with native Spanish speakers.

Simulated patients: During the second year, participants completed a series of seven simulated patient (SP) cases developed by bilingual clinical

faculty to correspond with the regular organ system "block" curriculum. Graduate level Spanish instructors served as SPs. Prior to each SP interview, students reviewed publicly-available illustrated Spanish language study guides on the internet(19) as well as supplementary vocabulary material relevant to the specific case scenario. After each interview, the SPs provided students with feedback on language skills and communication processes. (This part of the curriculum was not available to the first cohort of students).

PROGRAM EVALUATION

The program enrolled 48 students in the first two cohorts (n=22, 2004; n=26, 2005). Of these 48 students, three (6%) withdrew from the program: one withdrew from medical school; one stated the program did not meet expectations; and one felt his/her language skills were insufficient.

Qualitative evaluation: At the end of each year, students attended one-hour focus groups. The focus group protocol (available upon request) addressed strengths, weaknesses, and suggestions for improvement. Group size ranged from 10-18 participants. Focus groups were conducted by a faculty member not directly involved in teaching activities. Students did not identify themselves. A staff member took notes and recorded the session. Session recordings were transcribed, and the faculty member conducted a content analysis, identifying congruent and discordant views.

Focus groups captured approximately 80% of program participants. Nearly all believed the program helped them to maintain or improve their Spanish speaking and listening skills and to acquire medically-relevant vocabulary. There

was consensus that the second year case-based series was especially instructive. There was some discordance on the issue of optimal target learner groups. A few students thought the program should be geared toward beginner and intermediate speakers; however, most believed the focus on intermediate to advanced speakers should continue.

Specific suggestions for improving the program included increasing contact time with native Spanish speakers rather than with non-native language instructors, increasing the availability of community-based practices with large Spanish-speaking populations, using a more concise, clinically-focused medical Spanish textbook, and grouping program participants together within sections of the regular ICM course to facilitate language practice.

Speaking proficiency assessment (SPA): Of the 45 students in the first two cohorts who completed the preclinical curriculum, 7 (15%) did not respond to requests to complete the interim SPA before beginning their third year rotations. Among the 38 who did complete the interim SPA, mean (SD) scores were not significantly changed: 8.7 (1.3) at baseline versus 9.0 (1.6) at two years (p=.15, alpha=.05, paired t-test) .

Listening comprehension (LC) assessments: An interim LC assessment was added in the program's second year cohort (n=25). Mean (SE) LC scores increased from a baseline of 77% (3.0) to 86% (2.2) in the second year (p=0.003, alpha=.05, paired t-test). The proportion (SE) of students meeting "passing" criteria on this test increased from .72 (.09) to .92 (.05) (p=0.06, McNemar's test).

DISCUSSION

We describe a longitudinal Spanish program at a medical school in a US state with a rapidly growing Latino population. This description and interim evaluation add to a limited body of literature describing medical Spanish curricula in US medical schools. Our program is novel in its explicit rationale for targeting intermediate to advanced speakers, its size, and its number of curricular dimensions and contact hours. Attrition is lower than for previous non-credit medical Spanish courses at UNC and other institutions(14). To our knowledge, this program is unique in its use of standardized language fluency assessments, which provide a means of selecting and grouping learners. The assessments also provide a reliable means of measuring change in student language fluency over time. We suggest that employing reliable fluency measures should improve educators' ability to compare interventions and to generalize program outcomes. Ultimately, such assessments should also enhance educators' ability to predict which learners will be capable of providing competent bilingual care upon completion of training.

Our qualitative findings show that medical students view maintenance of their previously-acquired Spanish skills as an important programmatic goal. Our quantitative findings suggest that our program's participants do maintain their Spanish-speaking skills despite the competing demands they face in the

preclinical years. Although the absence of a separate control group precludes drawing definitive conclusions about the causal effects of this program on maintenance of language skills, we believe that the program has been a valuable addition to undergraduate medical education at this institution .

We based our decision to target intermediate to advanced speakers on input from our institutional experts who judged that, once in medical school, novice speakers probably lack time needed to acquire the degree of second language fluency needed to provide competent care without an interpreter. This view is supported by studies, including one in which novice speakers underwent an intensive medical Spanish course, showing that clinicians and trainees with limited Spanish fluency often underutilize interpreters and commit potentially important communcation errors (20-22). However, we also recognize that efforts to help novice speakers improve their Spanish skills could potentially lead to better patient care (e.g. through clinicians' improved understanding of quality of interpretation and/or improved ability to establish rapport through greetings). Hence, the optimal target learner fluencies for such programs is uncertain and may vary depending on program goals.

Despite *maintaining* their speaking skills, these first two cohorts did not *improve* their speaking fluencies. Reasons for this may be that the program lacked the intensity required to produce measurable increases in speaking proficiency and/or that we selected many learners whose speaking fluency was already too high (i.e. we may be observing ceiling effects among the more fluent participants).

This program has limitations. First, this description represents the experience at just one medical school. Second, the improvements seen in Spanish listening comprehension could be confounded by test learning since participants took the same listening test at baseline. Third, we had significant testing drop out of students from these initial cohorts. Fourth, the speaking assessment is a measure of general Spanish fluency. How well it measures language skills that are important for clinicians, such as skill in conducting a clinical encounter in Spanish, requires further study. Finally, our program currently depends partly on extramural funds to sustain it.

In order to better understand the relationship between measured Spanish fluency and clinical capabilities in Spanish, we plan to administer a clinically-oriented, standardized assessment during the students' fourth year. Other planned changes in the program include grouping student participants together into sections of the regular clinical skills (ICM) course, using native Spanish speakers instead of non-native Spanish instructors as standardized patients, and using a shorter, more clinically-focused textbook of medical Spanish(23). As subsequent cohorts matriculate we anticipate examining which proficiency groups benefit most and which program elements (e.g. international immersion) are most effective in maintaining or improving Spanish fluency during medical school.

In summary, this description of one institution's longitudinal medical Spanish program, including its explicit rationale, pre-specified target learners, multiple learning modes, and standardized fluency assessments, adds to a

limited body of literature that should help educators seeking to develop medical Spanish curricula in US medical schools.

Acknowledgements: The authors thank Dr. Beat Steiner for his encouragement and early work on this project. We also thank Drs. Marschall Runge and Cheryl McCartney for support during our efforts to obtain external funding. We thank Dr. Mike Pignone for his helpful comments. We thank the NRSA Primary Care Research fellows group for their feedback.

External financial support: Major project funding was provided by The Duke Endowment, Health Care division (all authors). Ms. Slatt and Dr. Alemán were also supported by the Bureau of Health Professions, D-56HP05213. Dr. Reuland was also supported by National Research Service Award Fellowship, T32 HP14001.

Prior presentations: Portions of this program description and interim findings were presented at the Society of General Internal Medicine meeting, Toronto, Ontario, Canada, April 26, 2007.

Conflicts of Interest: none.

Note: ALTA Language Services, Inc. administered the language tests under a contract with our program. They provided technical advice about the administration and interpretation of language tests. They played no role in the design or funding of the program or in the decision to publish the results of the evaluation.

Human subjects statement: The University of North Carolina Biomedical Institutional Review Board approved this study. Written informed consent was obtained from all students who enrolled in the program.

References

1. Shin HB BR. Language use and English-speaking ability; US Census Bureau. October 2003 .
2. Harlan LC, Bernstein AB, Kessler LG. Cervical cancer screening: who is not screened and why? American journal of public health. 1991 Jul;81(7):885-90.
3. Greek AA, Kieckhefer GM, Kim H, Joesch JM, Baydar N. Family perceptions of the usual source of care among children with asthma by race/ethnicity, language, and family income. J Asthma. 2006 Jan-Feb;43(1):61-9.
4. Wilson E, Chen AH, Grumbach K, Wang F, Fernandez A. Effects of limited English proficiency and physician language on health care comprehension. J Gen Intern Med. 2005 Sep;20(9):800-6.
5. Morales LS, Cunningham WE, Brown JA, Liu H, Hays RD. Are Latinos less satisfied with communication by health care providers? J Gen Intern Med. 1999 Jul;14(7):409-17.
6. Manson A. Language concordance as a determinant of patient compliance and emergency room use in patients with asthma. Medical care. 1988 Dec;26(12):1119-28.
7. Baker DW, Parker RM, Williams MV, Coates WC, Pitkin K. Use and effectiveness of interpreters in an emergency department. Jama. 1996 Mar 13;275(10):783-8.
8. Lee LJ, Batal HA, Maselli JH, Kutner JS. Effect of Spanish interpretation method on patient satisfaction in an urban walk-in clinic. J Gen Intern Med. 2002 Aug;17(8):641-5.
9. Perez-Stable EJ, Napoles-Springer A, Miramontes JM. The effects of ethnicity and language on medical outcomes of patients with hypertension or diabetes. Medical care. 1997 Dec;35(12):1212-9.

10. Silberman P, Bazan-Manson A, Purves H, et al. North Carolina Latino health, 2003. A report from the Latino Health Task Force. N C Med J. 2003 May-Jun;64(3):113-21.

11. Flores G, Mendoza FS. Dolor aqui? Fiebre?: a little knowledge requires caution. Arch Pediatr Adolesc Med. 2002 Jul;156(7):638-40.

12. US Census Bureau; Hispanic Population Passes 40 Million; Available at http://www.census.gov/ Accessed Nov 15, 2007.

13. Maben K, Dobbie A. Current practices in medical Spanish teaching in US medical schools. Family medicine. 2005 Oct;37(9):613-4.

14. Nora LM, Daugherty SR, Mattis-Peterson A, Stevenson L, Goodman LJ. Improving cross-cultural skills of medical students through medical school-community partnerships. The Western journal of medicine. 1994 Aug;161(2):144-7.

15. ALTA Language Services Inc.; Spoken Language Evaluation (SLE)™; More at http://www.altalang.com/ . Accessed Feb 27, 2008.

16. Roosevelt C. , ALTA Language Services, Inc. (personal communication); Nov 27, 2007.

17. Roosevelt C, ALTA Language Services (personal communication); level 6 on ALTA Spoken Language Evaluation (SLE) corresponds to level 2 on Interagency Roundtable (ILR) scale. More at: http://www.utm.edu/staff/globeg/ilrhome.shtml. Accessed Feb 27, 2008.

18. Cotton CE, Tolman EE, Cardona Mack J. A su salud. Cuaderno. New Haven, CT: Yale University Press; 2005. 364 pages.

19. National Library of Medicine; MedlinePlus en español ; Available at http://medlineplus.gov/spanish/. Accessed Feb 27, 2008.

20. Prince D, Nelson M. Teaching Spanish to emergency medicine residents. Acad Emerg Med. 1995 Jan;2(1):32-6; discussion 6-7.

21. Flores G, Laws MB, Mayo SJ, et al. Errors in medical interpretation and their potential clinical consequences in pediatric encounters. Pediatrics. 2003 Jan;111(1):6-14.

22. Burbano O'Leary SC, Federico S, Hampers LC. The truth about language barriers: one residency program's experience. Pediatrics. 2003 May;111(5 Pt 1):e569-73.

23. Pilar Ortega Hernâandez MD. Spanish and the medical interview : a textbook for clinically relevant medical Spanish. Philadelphia: Saunders Elsevier; 2007. xiii, 173 pages.

24. Stewart AL, Napoles-Springer A, Perez-Stable EJ. Interpersonal processes of care in diverse populations. Milbank Q. 1999;77(3):305-39, 274.

Table 1. Principles and Rationale Used to Guide Medical Spanish Program Development

Principle	Rationale
1) The program should be longitudinal and provide multiple learning modalities.	• Maintaining second language skills requires repetition over time and across varied contexts.
2) The program should focus resources on medical students entering with intermediate or advanced level Spanish proficiency.	• Few non-speakers/ novices are likely to complete medical school with sufficient Spanish fluency to provide language-concordant care safely. • Published literature supports concerns about "false fluency" among physicians and trainees with limited fluency. • Focusing resources on maintaining or enhancing language skills for intermediate and advanced speakers is most likely to help offset the region's need for Spanish-speaking physicians.
3) The program should have official status within the medical school, and students should receive academic credit.	• Offering credit for coursework in medical Spanish would legitimize the curriculum and encourage involvement of bilingual faculty. • Offering credit is likely to decrease the attrition seen with prior non-credit courses.
4) When feasible, the program should integrate with existing medical school curriculum.	• A non-integrated program that simply adds curricular requirements would displace other learning activities and be poorly received by students and faculty.
5) The primary focus should be on language and communication skills, with cultural issues being an important but secondary focus.	• Language proficiency is measurable and required for good communication. • While cultural competence remains an important construct in medical education, it is difficult to measure partly because it is hard to separate from more widely-applicable constructs such as *respectfulness* (24).

6) Validated, reliable measurements of language proficiency should be used for assessment of students and for program evaluation.	• Use of standardized proficiency measures would facilitate formation of learner groups with similar learning needs, and would eventually permit us to understand which target learner subgroups benefit most from the program. • Use of such metrics would permit other educators to compare the effectiveness of multiple programs. • Coupling these measures with assessments in clinical settings should eventually help improve our understanding of the level of Spanish language fluency required for competent language-concordant clinical care.

Table 2. Summary of Curriculum and Evaluation Elements of a Longitudinal Medical Spanish Program at One US Medical School

Program phase	Timing	Program Element	Teaching mode or evaluative method	Time required or contact hours
Pre-clinical	Prior to medical school	Recruitment & enrollment	N/A	2
		Language proficiency assessments	SPA, LC	2
		Orientation	D	2
	1st year	Medical Spanish course*	D, RP, E, SP	80
		Socio-cultural seminars	D	4-6†
		Clinical skills course (ICM) placements	CE, CO	0-40†
		Service learning	CO	10-20†
	Summer after 1st year	Immersion or service project (optional)	IM or CO	0-160†
	2nd year	Service learning	CO	15-20†
		Simulated patient series	SP, E	8-12†
		Language proficiency assessments	SPA, LC	2
		Qualitative evaluation	FG	1
Clinical	3rd year	Clerkship placements	CE	‡
	4th year	Immersion elective (optional)	IM	‡
		Practical assessment: Spanish	SP	‡
		Language proficiency assessments	SPA, LC	‡

Abbreviations: N/A = not applicable; SPA= telephone-based, health Spanish speaking proficiency assessment; LC= health Spanish listening comprehension test; D= didactic classroom teaching and discussion; RP= clinical role-playing exercises; E= electronic media including DVD, web-based material and electronic mail; SP= simulated or standardized patients; CE= clinical experiential learning; CO= community-based experiential learning; IM= international immersion; ICM = Introduction to clinical medicine; FG=focus groups.

* Grammar topic examples include pronouns, adverbs, articles and adjectives; use of past, future, command, and subjunctive verb tenses; preterit versus imperfect; estar versus ser (two forms of the verb "to be") and tener versus hacer ("to have" versus "to do").

† Substantial variation in contact hours among participants in initial cohorts occurred. These numbers represent estimates. Variation has decreased over time. More recent cohorts are receiving more contact hours than the first two cohorts described in this paper.

‡ These program elements are not described in this paper, and data are not yet available for this phase of the program.

Appendix. Results of Needs Assessment for Medical Spanish Curriculum at One US Medical School

Information source	Problem or Need Identified
(1) Medical school faculty, including advanced or native Spanish speakers, who taught previous medical Spanish courses	• Lack of official recognition of medical Spanish as legitimate field of study (e.g. for-credit coursework) • Lack of clear delineation of goals for learners at different Spanish proficiency levels • Limited faculty resources for teaching
(2) Romance Languages Department faculty who taught medical Spanish in the School of Medicine	• High attrition for previous non-credit courses • Competing priorities for students • Need for sustained, longitudinal effort to maintain or improve language skills • Lack of involvement of clinicians in curriculum
(3) Published articles describing medical Spanish programs in other medical schools	• Limited contact hours • Limited scope of teaching modalities • Lack of measures of language proficiency • Lack of evaluation • Few programs described
(4) Written and verbal student feedback from previous non-credit medical Spanish courses	• Documented high attrition rates (60-80%) • Desire for more clinical content in curriculum • Desire for involvement of clinicians in teaching • Language skills sometimes poorly matched with other learners within the same course
(5) One-hour structured group interview conducted with 9 medical students from a medical student organization interested in community service to the Hispanic community	• Desire to maintain previously acquired language skills during medical school • Desire to work with clinicians who speak Spanish and care for Hispanic patients • Desire for clinical language immersion and community service experiences
(6) Spanish fluency self-assessment data from incoming medical student survey* from 2003 entering class	• Few native Spanish speakers matriculating (<1%), but sizeable numbers (26%, n=161) of self-assessed intermediate to advanced speakers

*All incoming medical students answered 2 questions: "Do you speak Spanish? *yes/no*," and "If yes, please rate your proficiency: *novice*, *intermediate*, *advanced* or *native speaker*."

Accuracy of Self-assessed Spanish Fluency among Medical Students

Accuracy of Self-assessed Spanish Fluency among Medical Students

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Target Journal
Medical Care
(Brief Report)

Abstract

Background: The accuracy of Spanish language fluency self-assessment among US physicians and medical students is unknown. We aimed to determine both the accuracy of self-assessed Spanish fluency and the prevalence of fluency over-estimation among medical students.

Methods: Four consecutive classes of matriculating students at one medical school assessed their own Spanish fluencies on a written questionnaire. Students self-assessing as "intermediate" or higher took a voluntary standardized, oral language fluency test scored from 1 (no ability) to 12 (native speaker). Students were grouped into three fluency levels based on test scores: novice (1-5); intermediate (6-8); and advanced/native (9-12). We determined the positive predictive value (ppv) of self-assessment for predicting the same or greater fluency level on the language test.

Results: Fluency tests were completed by 102 students. Median (range) test scores for self-assessed "intermediate" (n=51) and "advanced" speakers (n=49) were 8 (3-10) and 10 (7-12), respectively ($p < .0001$). Two "native" speakers scored 11 and 12. Among self-assessed "intermediate" speakers, 67% (34/51) tested at the intermediate level and 25% (13/51) tested above that level, yielding a ppv for having at least intermediate fluency of 92% (95% CI= 81.1% to 97.8%). Among self-assessed "advanced" speakers, 84% (41/49) tested at the advanced/native level (ppv = 84%; 95% CI=70.3% to 92.7%), and the remaining 16% tested at the intermediate level.

Conclusions: Among medical students whose self-assessed Spanish fluency is "intermediate" or higher, self-assessment is highly predictive of scores on a standardized Spanish speaking test, although12% scored below their self-assessed level. These preliminary results suggest that self-assessment may be an efficient way to measure Spanish language capacity within the future physician workforce.

Introduction

More than one in ten US residents speak Spanish at home, approximately half of whom report difficulty speaking English[1]. Language barriers contribute to disparities in care that have been documented for patients who are monolingual Spanish speakers[2,3]. Having limited English proficiency is associated with less access to care[4,5], decreased use of preventive services[6], lower visit comprehension[7], and lower patient satisfaction[8,9]. Overcoming the challenges posed by language barriers in health care may require multiple interventions, including recruiting and training more physicians who are Spanish speakers and integrating professional interpreter services into routine care.

One promising approach, that has already been adopted by some health plans, is to match limited English proficient patients with clinicians who speak their language. This approach is supported by evidence that physician-patient language concordance is associated with improved outcomes[7,10-14].

Implementing this strategy on a large scale will require that health systems measure the Spanish language capacity of their clinicians. However, other than a single survey done in one state[15], the Spanish language capacity of the current or future physician workforce remains largely unknown. For example, the American Medical Association Physician Master File does not include any information on physician language abilities and the Association of American Medical Colleges (AAMC) collects data only on the "dominant" (i.e. native) languages of US medical school matriculants[16]. Hence, neither the numbers nor

the degree of fluency of US physicians and medical students who speak Spanish (or other common languages) is known.

An important obstacle to obtaining accurate data on the language capacity in the workforce is uncertainty regarding the optimal strategy for assessing language fluency. One simple way to determine the proficiencies of physicians or trainees is to ask them to assess their own fluency. However, whether clinicians have an accurate understanding of their own language proficiencies is unknown. Studies have demonstrated that physicians and trainees often use their own limited language skills instead of professional interpreters during encounters with Spanish speaking patients resulting in potentially important "false fluency" errors and lesser patient satisfaction[11,17,18 19]. While clinicians' reasons for underutilizing interpreters may be multiple, overestimation of language skills may contribute to this practice.

In this study, we examined the accuracy of self-assessment of Spanish fluency among medical students who report having at least "intermediate" Spanish fluency by comparing their self-assessed fluency levels with their performance on a validated Spanish fluency test. We were particularly interested in determining if students overestimated their language skills.

Methods

Spanish fluency self-assessment: We collected Spanish fluency self-assessments from all medical students matriculating at the University of North Carolina School of Medicine in years 2004 through 2007. Incoming students were asked two questions as part of a survey used for clinical site placement: *Do*

you speak Spanish? (yes, no), and *If yes, how would you rate your fluency? (novice, intermediate, advanced*, or *native speaker)*.

Language testing: Along with the materials mentioned above, a letter was included inviting students to apply to a medical Spanish education program intended for individuals with intermediate or advanced fluency. Students who applied took a standardized Spanish speaking fluency test administered by an outside language testing service with more than 25 years of language testing experience[20]. The test involved a recorded, structured, telephone interview during which subjects responded in Spanish to 12 questions that were randomly selected from a larger pool of 120 items. Examples of actual test items were: 1) *If you had a friend who smoked two packs of cigarettes a day, what advice would you give him?* 2) *In your opinion, why do people get flu shots?* The items were designed to prompt respondents to use their language skills in both general and health-related domains.

Evaluators who were native Spanish speakers rated the applicant's speaking speed, general vocabulary, grammar, sentence structure complexity, and ability to express ideas in Spanish. Evaluators did not assess technical medical vocabulary or knowledge. All evaluators had undergone training to ensure high inter-rater reliability (>0.8) of their assessments[21].

The test result was scaled from 1 (total beginner) to 12 (native speaker). This scale has been mapped to other widely-used, validated language fluency tests including the Interagency Language Roundtable (ILR) scale [22]. The

following are descriptions of conversational capacities of speakers at levels 7 (intermediate) and 9 (advanced):

A person at a level 7 cannot easily participate in general conversations. He/She can participate in conversations that are routine or on topics that are well known to the person. He/She will have trouble with a native speaker's normal pace. He/She will use simple tenses with a few errors, but will avoid advanced tenses. A candidate at this level in a general conversation will cause misunderstandings between himself/herself and the listener based on lack of ability to convey clearly his/her message

A person at a level 9 can successfully handle in-depth conversations in the target language, on a broad range of subjects and at a normal rate of speech. He/She has difficulty understanding some slang or idioms or some advanced grammatical structures, but can figure out what is said by the context of the discussion. When speaking, a person at a level 9 can express himself/herself over a broad range of topics at a normal speed. He/She may have a noticeable accent and will make grammatical errors, for example with advanced tenses, but the errors will not cause misunderstanding to a native speaker.

Statistical analysis: We grouped subjects into two self-assessment categories, "intermediate" and "advanced". For this analysis, we excluded self-assessed "native" speakers because of small cell size (2). We tested whether the medians of the test fluency test scores differed significantly by self-assessment group using the Wilcoxon rank sum test. Analyses were performed using *Stata/IC* 10.0 (College Station, TX).

We defined three fluency test result categories based the language examination score: novice (score 1-5); intermediate (score 6-8); and advanced/native (score 9-12) using previously established guidelines provided by the language testing service[20]. We estimated the positive predictive value (PPV) of self-assessment for predicting test result category by determining the proportion of subjects in each self-assessment category whose test result category was at the same level or higher than their self-assessment category .

Results

Self-assessed fluencies were available for 637 (99%) of 644 matriculating students over the four-year period. Of these 45% reported speaking "no" Spanish, 22% rated their fluency as "novice", 21% as "intermediate", 10% as "advanced", and 0.8% as "native".

Fluency test scores were available for 102 students who had self-assessed proficiencies of "intermediate" (n=51), "advanced" (n=49) , "native" (n=22) (Figure 1). These subjects represented 50% of matriculating students with self-assessed fluencies of "intermediate" or greater. Scores for self-assessed "intermediates" ranged from 3 (novice) to 10 (high advanced) with a median 8 and mean (SD) of 7.6 (1.4). Scores for self-assessed "advanced" speakers were higher: median = 10 ($p<0.001$), range 7 (intermediate) to 12 (native level), mean (SD) = 9.5 (1.0). The two self reported native speakers scored 11 and 12.

Of the self-assessed "intermediate" speakers, 67% (34/51) tested at the intermediate level and 25% (13/51) tested above that level, yielding a positive predictive value (ppv) for having at least intermediate fluency of 92% [95% CI= 81.1% to 97.8%] (Table 1). Of students who self-assessed as "advanced" speakers, 84% (41/49) tested at the advanced/native level [ppv = 84%, 95% CI=70.3% to 92.7%] and the remaining 16% tested at the intermediate level.

Discussion

We found that medical students who are Spanish speakers are able to assess their own Spanish fluencies reasonably accurately. Since self-assessment is considerably less time-consuming and costly than formal language fluency testing, these results suggest that self-assessment could be useful as an efficient means of determining the Spanish language capacity in the current and future physician workforce. We are unaware of other published studies describing the accuracy of language fluency self-assessment in US physicians or trainees.

Our study compared self –assessment of Spanish fluency with performance on a standardized oral test containing both general and health-related content. However, many questions remain to be answered regarding the relationship between a clinician's general fluency level and his/her ability to provide language-concordant clinical care in Spanish. Such questions may need to specify the general clinical setting and type of scenario. For example, how well can a clinician with intermediate fluency (e.g. level 7 on this scale) perform on communication tasks required in the setting of a common, low complexity, outpatient clinical scenarios? How does this compare with clinical communication using a trained interpreter (in terms of clarity, completeness, patient satisfaction, efficiency?) How would such a clinician perform when faced with more complex or higher risk scenarios? How fluent must a clinician be in another language to provide communication that is comparable to what he/she can provide in English? and finally, how does the quality of clinical

communication provided by physicians who are non-native Spanish speakers compare with that of native Spanish speakers? This last question recognizes that language and cultural proficiency are different, though related, skill sets[14].

Though self-assessed fluency generally predicted measured fluency in our study, we did find that 12% of students overestimated their Spanish fluencies. This implies that inaccurate self-awareness of Spanish fluency may contribute to the problem of interpreter under use[11,17-19]. However, our finding that fluency self-assessment is largely accurate also suggests that other factors besides fluency overestimation (e.g. lack of interpreter availability, lack of training, inertia, and/or time pressures) are likely to contribute to interpreter under use.

Our study has limitations: First, our subjects were medical students at one institution. These findings should be confirmed more widely among trainees and practicing physicians. Second, we tested students who expressed interest in a medical Spanish program. Self-assessment accuracy may be different among those who did not apply to the program. Third, we did not determine the accuracy of self-assessment among students who reported speaking *no* or *novice*-level Spanish. However, since there is wide agreement that physicians and trainees with little or no Spanish fluency should always use trained interpreters when providing care to Spanish-speaking patients, knowing whether self-assessment is accurate in these groups is less important.

Ultimately, the usefulness of self-assessment as a measure of language fluency will depend on specific purposes for which self -assessment data are used. For example, from a patient safety perspective the 12% fluency overestimation rate found in this study may be unacceptable if self-assessment is used for the purpose of determining an *individual* clinician's language fluency. In contrast, this same accuracy level found in our study may mean that self-assessment can be useful for estimating numbers of Spanish-speaking providers at a teaching institution, health care network, state, regional, or national workforce. The usefulness of self-assessment for these purposes may be even greater since these estimates could be adjusted when the degree of inaccuracy is known.

Further research is needed to understand the influence of financial or non-financial incentives on the accuracy of fluency self-assessment. Our subjects had no financial incentives to overestimate or underestimate their Spanish fluency. Self-assessment may be less reliable in circumstances where there are financial incentives to overestimate one's fluency (e.g. where differential pay is offered to multilingual providers) or to underestimate it (e.g. where identifying oneself as fluent in Spanish is perceived as potentially leading to a less desirable patient mix, for financial or other reasons).

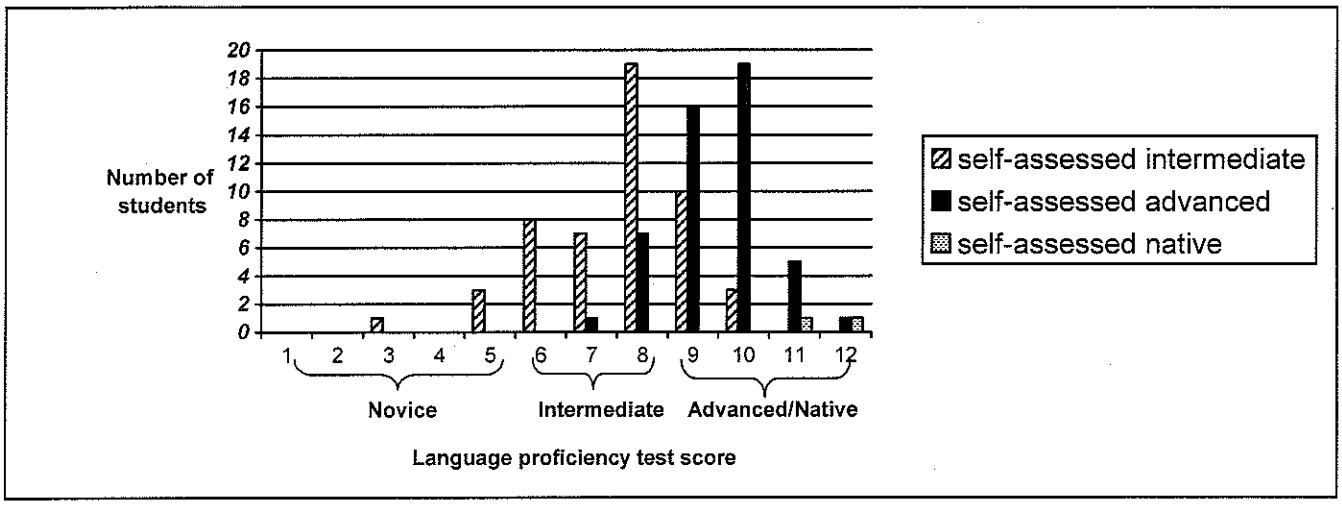
In summary, US physicians are caring for populations that are increasingly more diverse, both culturally and linguistically. This study suggests that self-assessment may hold promise as an efficient means by which health

systems could determine the Spanish language capacity in their current or future physician workforce.

Table 1: Relationship between Spanish language fluency self-assessment and measured fluency level.

		Subjects Testing Below Self-assessed Level		Subjects Testing At Self-assessed Level		Subjects Testing Above Self-assessed Level	
Self-Assessment Category	**N**	**No.**	**percent [95% CI]**	**No.**	**percent [95% CI]**	**No.**	**percent [95% CI]**
"Intermediate"	51	4	8 [2, 19]	34	67 [52, 79]	13	25 [14, 40]
"Advanced"	49	8	16 [7, 30]	41	84 [70, 93]	n/a	n/a
All	100	12	12 [6, 20]	75	75 [65, 83]	13	13 [7, 21]

Fig 1: Frequencies of Spanish fluency test scores by self-assessment level



Acknowledgments: We thank Gina Horne and Patricia Neff for their help with data collection for this project. We thank Rosalie Dominik, DrPH, for her biostatistical advice.

Human subjects statement: These data were collected as part of a medical Spanish educational enhancement project at the University of North Carolina (UNC) School of Medicine. The project was approved by the UNC Biomedical Institutional Review Board.

External financial support: Funding for language testing was provided by The Duke Endowment, Health Care division. Ms. Slatt and Dr. Aleman were also supported by the Bureau of Health Professions, D-56HP05213. Dr. Reuland was also supported by National Research Service Award Fellowship, T32 HP14001.

Conflicts of Interest: none.

Note: ALTA Language Services, Inc. administered the language tests under a contract with our educational program. They provided technical advice about the administration and interpretation of language tests. They played no role in the funding or design of the program or the decision to publish the results.

1. Shin HB BR. Language use and English-speaking ability:. US Census Bureau. October 2003(2000).
2. Nelson A. Unequal treatment: confronting racial and ethnic disparities in health care. Journal of the National Medical Association. 2002 Aug;94(8):666-8.
3. Fiscella K, Franks P, Doescher MP, Saver BG. Disparities in health care by race, ethnicity, and language among the insured: findings from a national sample. Medical care. 2002 Jan;40(1):52-9.
4. Harlan LC, Bernstein AB, Kessler LG. Cervical cancer screening: who is not screened and why? American journal of public health. 1991 Jul;81(7):885-90.
5. Greek AA, Kieckhefer GM, Kim H, Joesch JM, Baydar N. Family perceptions of the usual source of care among children with asthma by race/ethnicity, language, and family income. J Asthma. 2006 Jan-Feb;43(1):61-9.
6. Woloshin S, Schwartz LM, Katz SJ, Welch HG. Is language a barrier to the use of preventive services? J Gen Intern Med. 1997 Aug;12(8):472-7.
7. Wilson E, Chen AH, Grumbach K, Wang F, Fernandez A. Effects of limited English proficiency and physician language on health care comprehension. J Gen Intern Med. 2005 Sep;20(9):800-6.
8. Carrasquillo O, Orav EJ, Brennan TA, Burstin HR. Impact of language barriers on patient satisfaction in an emergency department. J Gen Intern Med. 1999 Feb;14(2):82-7.
9. Morales LS, Cunningham WE, Brown JA, Liu H, Hays RD. Are Latinos less satisfied with communication by health care providers? J Gen Intern Med. 1999 Jul;14(7):409-17.
10. Manson A. Language concordance as a determinant of patient compliance and emergency room use in patients with asthma. Medical care. 1988 Dec;26(12):1119-28.
11. Baker DW, Parker RM, Williams MV, Coates WC, Pitkin K. Use and effectiveness of interpreters in an emergency department. Jama. 1996 Mar 13;275(10):783-8.
12. Lee LJ, Batal HA, Maselli JH, Kutner JS. Effect of Spanish interpretation method on patient satisfaction in an urban walk-in clinic. J Gen Intern Med. 2002 Aug;17(8):641-5.
13. Perez-Stable EJ, Napoles-Springer A, Miramontes JM. The effects of ethnicity and language on medical outcomes of patients with hypertension or diabetes. Medical care. 1997 Dec;35(12):1212-9.
14. Fernandez A, Schillinger D, Grumbach K, et al. Physician language ability and cultural competence. An exploratory study of communication with Spanish-speaking patients. J Gen Intern Med. 2004 Feb;19(2):167-74.
15. Yoon J, Grumbach K, Bindman AB. Access to Spanish-speaking physicians in California: supply, insurance, or both. The Journal of the American Board of Family Practice / American Board of Family Practice. 2004 May-Jun;17(3):165-72.
16. Association of American Medical Colleges, Data Warehouse: Applicant Matriculant File, as of November 26, 2007.
17. Flores G, Mendoza FS. Dolor aqui? Fiebre?: a little knowledge requires caution. Arch Pediatr Adolesc Med. 2002 Jul;156(7):638-40.
18. Burbano O'Leary SC, Federico S, Hampers LC. The truth about language barriers: one residency program's experience. Pediatrics. 2003 May;111(5 Pt 1):e569-73.
19. Flores G, Laws MB, Mayo SJ, et al. Errors in medical interpretation and their potential clinical consequences in pediatric encounters. Pediatrics. 2003 Jan;111(1):6-14.

20. ALTA Language Services Inc.; Spoken Language Evaluation (SLE)™; More at http://www.altalang.com/ Accessed 2008 Feb 28.
21. Roosevelt C. President of ALTA Language Services, Inc. personal communication; Nov 27, 2007.
22. Roosevelt C, President: ALTA Language Services (personal communication); level 6 on ALTA Spoken Language Evaluation (SLE) corresponds to level 2 on Interagency Roundtable (ILR)scale. More at: http://www.utm.edu/staff/globeg/ilrhome.shtml.