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A curriculum comparison of U.S. optometry schools: Looking back over the decade

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A CURRICULUM COMPARISON OF U.S. OPTOMETRY SCHOOLS:

LOOKING BACK OVER THE DECADE

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ABSTRACT

This study provides curriculum planners with a comparative look at the 2001-2002 curricula taught at U.S. optometric schools. It divides clock hours into 17 categories and compares both the number and proportion of clock hours dedicated to a particular category. A metastudy analysis enabled comparison with two previous studies. Together they span a decade. Total clock hours have increased 5.7%. Clinical experience has increased 17.5%. Didactic hours have decreased 6.25%. Pharmacology has increased 15%. Variability between programs has decreased. Comparing metacategories shows an increasing emphasis on the Clinical Model, while the Optometric Model and the Medical Model have both decreased.

INTRODUCTION

This study is designed to compare the curricula at the seventeen schools and colleges of optometry in the United States and Puerto Rico using three techniques: 1) a comparative analysis of the curricular content of the different programs, 2) a comparative analysis of the prerequisites for each program, and 3) a survey of the academic officers at each school concerning several factors related to curriculum content.

Every school or college of optometry shares the overarching and unifying goal of preparing students to successfully treat and manage patients. Beyond this goal, and the intermediate step of preparing students to pass the National Board Exam (NBEO), no common denominator exists that mandates optometry curriculum content.

A handful of oversight bodies lend a measure of unity to optometric education without legislating curricular content or hours. In 1992 and again in 1998 the National Board of Examiners, the Accreditation Council on Optometric Education, and the Association of Schools and Colleges of Optometry formulated the Model for Entry-Level Determination (MELD). The goal was to develop a nationally accepted model that describes entry-level (not to be confused with scope-of-practice) skills and knowledge for optometrists.'

The Accreditation Council on Optometric Education (ACOE) regulates the schools and colleges by way of accreditation. The accreditation process, however, does not set curriculum standards. To be accredited a school must measure up to its self-determined goals and mission. The COE also verifies that the school or college has a sound governing structure in place (lines of communication, standards for hiring and firing, policies of admission, etc.) and that the school or college has adequate resources (facility, equipment, financial, faculty, etc.). With regard to the curriculum, the COE requires that the school or college prepare its graduates for entry-level practice with the expectation that students know how to "identify, record, and analyze pertinent history and problems presented by the patient," and be able treat and manage the patients. All schools must operate programs of at least four academic years that have a

foundation in physical, biological and behavioral sciences and have didactic, laboratory, and supervised clinical components. The school or college must also facilitate research and scholarly activity. These ACOE mandates in no way establish a core curriculum or define a minimum number of required hours.[2] The knowledge attained by optometry students upon graduation shapes the scope and future trend of our profession, just as the trajectory of the profession helps determine the educational content delivered to students. Therefore administrators and faculty, as well as our future practitioners, have an interest in knowing whether the various institutions offer relatively equivalent curricula.

National uniformity is potentially beneficial in three ways. First, maintaining national uniformity ensures that graduates may attain licensure in any state of their choosing. Second, it enables more consistent lobbying messages by state and national optometric organizations. Third, a common curriculum provides assurances about the equivalency between programs, something prospective students cannot obtain from the NBEO under the current rules.

Perhaps the greatest service a curriculum comparison provides is an understanding of the different emphases at the various schools and colleges. This can serve as a critical tool for curriculum developers at each school, both for ensuring that their school is maintaining common standards with the other programs and for enabling them to differentiate their program from other schools by offering alternative emphases.

Undoubtedly optometric educators have some sense of the curricula at other institutions, however, a broad objective view demands a more formal study. A comparison study of the curricula has not been published since 1998, when Bamberg and others published "An Evaluation of U.S. Optometry School Curricula".[3] This article followed the methodology established by Rousseau, et al.'s 1992 study entitled "U.S. Optometry Schools: A Curriculum Comparison."[4] Both these studies compared the curricula at the schools and colleges by determining clock hours in various categories called "tracks." Both concluded that great variability exists in both the didactic and clinical curricula. Rousseau et

al. expressed concern that "all schools do not equally prepare students for all aspects of optometric practice."[4]

The 1998 curriculum review saw an average increase of 200 additional hours over the previous five year period, with most of these hours being added to clinical education. The authors noted a 140 clock hour decrease in the total hours devoted to basic science, with an equivalent 142 hours added to the area of ocular disease. The authors attributed these changes to a "shift in our profession from the vision science model to a more medical model" and to shifting the basic science courses to prerequisites. They interpreted this shift to represent the "advancing role of optometrists to a primary health care provider."[3]

Our study follows their lead by using a similar methodology to examine courses listed in the 2001-2002 catalogs. Table 1 lists each school included in our study and the abbreviation by which it will henceforth be referred.

While our study does draw comparisons with the previous studies, it must be noted that the 1992[4] study compared all seventeen schools, whereas the 1998[3] study did not include Inter American University at Puerto Rico (IAUPR). Our study has included IAUPR, but excludes Pennsylvania College of Optometry (PCO) due to their unique and unfortunately incomparable modular curriculum structure.

In 2000 PCO radically revamped its curriculum resulting in increased clinical experience and students' accelerated entry into clinical services. Its distinctive features include an interdisciplinary modular approach aimed at providing concurrent interdisciplinary instruction, the immediate introduction of clinical concepts and skills during the first year, expedited entry into patient care, and an expanded clinical training program with a month of summer clerkship after first year and 17 months of externships. This 50% increase in extern clinic time came by way of a 15-20% reduction in traditional lecture and lab time.[5] The exclusion of PCO from our study in no way indicates a rejection of its approach, but simply an inability to incorporate it into our methodology.

Without comparison data each school's curriculum committee acts as an island, basing critical decisions on its own tradition, history, input from alumni,

and internal review. We aim to equip curriculum planners with a data set that presents the nationwide picture of optometric curricula. This study does not intend to judge the relative quality of the programs or proffer suggestions for change, but rather to highlight the trends as revealed by the clock hours devoted to different areas of study. Our data reveal the relative emphases of the different schools by presenting the distribution of each school's total hours in curriculum categories, assessing the differences in clinical experience time, and looking for trends over the last decade. We are particularly interested in the trend of variability between schools, the change in overall required course load, and the balance between clinical hours and didactic hours. We also explore the broadly held assumption that the curricula are shifting away from traditional optometry toward a medical model. Focusing on pharmacology, we look at how legislation may be influencing the hours devoted to this topic.

Additionally we have examined prerequisites to optometry school as a way of assessing the expectations schools have of their entering students and how this influences the curriculum. Finally, we conducted a survey of how curriculum planners make their decisions and what trends these decision represent.

METHODS

Comparison of Curricula

We used each school's 2001-2002 course catalogs to determine the course content and clock hours of required coursework in the optometric curriculum. Clock hours refer to the time spent in the classroom, lab, or clinic (internal and external). These clock hours were then distributed into one or more content categories (Table 2) based on the description given in the catalog. When more than one category seemed appropriate for a course, the hours were evenly divided between the appropriate categories for that course.

In some cases the course catalogs provided credit hours and not clock hours, in which case we converted them as accurately as possible from credit hours to clock hours. Where credits only were provided, we determined the clock hours based on the length of the term and the hours per week spent in lecture,

lab, or clinic. We determined term length by looking at the academic calendar and subtracting vacation days and then rounding to the nearest whole week. In several instances, where the course catalog was unclear, we telephoned an administrator at the school for information regarding term length, and/or interpretation of the catalog regarding the lab/lecture breakdown for each class.

Administrators from every school were asked to submit clock-hour-to-academic-unit conversion factors for didactic courses and clinical experience. Several conversion factors submitted by the administrators correlated with the factors we derived using the aforementioned methods. Other submitted conversion factors resulted in numbers that exceeded the number of hours actually available in the given time frame; therefore we dismissed these submitted conversion factors and determined the conversion using the methodology described above.

When calculating the clock hours, usually we found it necessary to split lecture hours from lab hours because the credit hour listing undervalues the time spent in lab. For example, although a course may be assigned only four credit hours, it actually meets for five total clock hours, with three hours in lecture and two in laboratory. We also specifically adjusted the length of the term for those hours spent in lab, because the number of weeks for lab does not necessarily equal the weeks spent in lecture. Unless the exact number of weeks for a lab was specified, we assumed that the labs ran two weeks less than the total number of weeks in the term (based on the assumption that most labs do not meet the first and last weeks of a term).

Classes listed as "seminars" or "discussions" were treated as lecture time. Unless otherwise stated, lecture times were assumed to run the full term. Term length encompasses only time in class; vacation time was subtracted from the length.

This study's methodology roughly follows that of the two previous studies that analyzed the curricula by dividing the courses into "tracks" or categories.[3,4] While many of the categories are the same, we have added five additional categories to avoid an overly large "Other" category. We established 17

categories listed with their abbreviations in Table 2. The categories and the guidelines for dividing courses were determined by test sampling eight catalogs to establish key words that would indicate appropriate categories.

Clinical Experience (CE)

Our study looks year by year at clinical experience to assess how soon in their optometric education students are exposed to patients, through direct care or observation. The credit hours for clinical experience (as listed in the catalogs) use different clock hour conversions than do the didactic courses. These conversion rates were determined either directly from the course catalog or by multiplying the length of the 4th year clinical term by 40 hours per week. We then applied this 4th year clinical conversion rate to the previous three years, unless otherwise specified. All courses with a clinical experience component were placed solely into this category regardless of supplemental lecture time. Specialty clinics were listed solely in this category rather than giving credit to another relevant category. For example, hours in a contact lens clinic were given to "Clinical Experience" and not to "Contact Lens."

Basic Biomedical (BB)

This category encompasses foundational science courses and disease courses that are not directly related to the eye. These include general anatomy and physiology, neuroanatomy, microbiology, histology, embryology, immunology, biochemistry, and systemic disease.

Ocular Disease (OD)

This category includes courses dealing primarily with diseases of the eye and adnexa.

Ocular Anatomy and Physiology (OA)

This category is used for classes teaching fundamental structure and function of the eye and visual system.

Optical Science (OS)

This category includes geometric optics, physical optics, photometry, entopic phenomena, the functional role of the pupil, and ophthalmic material (lenses, frames, prisms, and dispensary.)

Visual Science (VS)

This category deals with the basic science of how vision normally functions. Topics included are: visual optics, refractive anomalies, monocular sensory processing, binocularity, sensory fusion, ocular motility, psychophysics and testing, neurophysiology of vision, and color vision.

Binocular Vision, Perception, and Pediatrics (VT)

This category is more applied than the Visual Science category. Many of its courses include intervention strategies for visual abnormalities or dysfunctions. Key words used to identify courses in this category include: vision therapy and rehabilitation, strabismus, amblyopia, pediatrics, eye movements, perception, and learning.

Pre-clinical (PC)

This category encompasses the instruction of clinical procedures, case analysis, patient communications, emergency care, grand rounds, and the use of lasers.

Low Vision/Gerontology (LV)

These courses instruct on devices and strategies used for low vision, as well as courses distinctly geared toward care of the elderly.

Pharmacology (Rx)

This category includes instruction related to both ocular and systemic pharmaceuticals.

Contact Lens (CL)

This category includes didactic instruction of contact lens design, fitting, and care.

Scientific Thouaht (ST)

Courses associated with a thesis project or analysis of scientific literature are designated by this category. The hours associated with a thesis

project are not meant to estimate the time put into thesis work, but simply the hours spent in the course.

Practice Manaaement (PM)

Courses in this category instruct on business aspects and practice development.

Public Health and Epidemiology(PH)

Courses in this category instruct on health care policy formation and the epidemiology of eye related diseases.

Environmental/Occupational/ Sports (EO)

Courses in this category instruct on optometry's consulting role with industry and sports teams, the use of safety eye wear, and environmental adjustments that facilitate improved vision.

Psvcholoaical Issues/ Behavioral Disorders (PS)

These courses prepare students for the psychological issues and disorders that they may encounter with patients.

Other (O)

This category includes all required elective hours, as well as any course that does not fit well in another category. The following key words are associated with courses in this category: optometric orientation, history, public speaking, cultural awareness, computer use, ethics, and legal limitations.

After assigning all courses to categories, distributing the credits accordingly and making all necessary conversions to clock hours, we summed the clock hours for each school by category. For comparison purposes we found the mean, standard deviation, and median for each category. We also calculated the percent each category contributes to the school's total clock hours. We performed two rankings, one based on total hours and one based on percent. We also determined which schools fall within one standard deviation of the mean for each category.

For the purpose of comparing our data to that in the previous two studies we combined our categorical data into **4** broader metacategories: Medical Model, Optometric Model, Clinical Model, and Other. The Medical Model includes: Basic

Biomedical, Ocular Disease, Ocular Anatomy, and Pharmacology. The Optometric Model includes: Optical Science, Vision Science, Vision Therapy, Low Vision, Environmental/Occupational, and Contact Lens.. The Clinical Model contains total clinical experience. Other includes: Pre-clinical, Scientific Thinking, Practice Management, Public Health, and Other. These broader categories were also analyzed in terms of total hours and percent of the total curriculum with the mean, the median, and standard deviations calculated. We performed the same analysis on the data given in the two previous studies. Because IAUPR was not analyzed in the 1998 study, we were not able to include it in our metacategory comparison, and as mentioned previously, PCO is also not represented in this meta-study, thus the resulting data do not match the previously published numbers or the results of our study.

Curriculum Review Survev

In August 2002 we emailed a survey to the chief academic officers at each of the schools and colleges of optometry. They were asked to complete the survey within a two week period. Twelve of the seventeen schools responded. Open ended responses were used qualitatively. Closed ended responses were analyzed quantitatively by percent.

The following instructions were given: "The survey should be completed as it applies to the past 5 years at your institution. Please place an 'x' next to your response, but feel free to elaborate on your responses to any of the following questions."

We asked the academic officers to respond to these eleven questions:

1. In the past five years has your school/college undergone any significant additions, deletions, or restructuring of courses in your curriculum? Yes (Please describe)/No

2. Is your school/college planning to do a major curriculum change soon? Yes (Please describe what is being considered)/No

3. How has the overall number of credits in the curriculum changed? Increased/Decreased/Same

4. In an effort to provide students more patient contact time has your school/college reduced the amount of time spent on classroom learning? YesINo

5. How has the number of credits in visual science or optics changed? Increased/Decreased/Same

6. How has the number of credits in medical optometry changed? Increased/Decreased/Same

7. Has your curriculum changed in light of legislative changes affecting scope of practice? Yes (Please describe)/No

8. Has your curriculum changed in light of legislative actions related to pediatrics and infant care? Yes (Please describe)/No

9. Please rank in order of importance the data considered when curriculum decisions are made at your institution. (#1 is the most important.) If a category is not considered in the decision making process, please indicate with a score of zero.

Published studies
Alumni input (surveys, focus groups, testimonials, etc.)
Student input (surveys, focus groups, evaluations, etc.)
Faculty input (surveys, etc.)
Your school/college's projection of the future of the profession. (If so, please briefly describe this model of the future.)
Other

10. Does your program utilize Problem Based Learning (PBL) for any of its courses? YesINo
11. Is your program considering incorporating more PBL into the curriculum? YesINo

Prereauisite Studv

The 2002 prerequisites for each school or college of optometry were found on each school's web site. Prerequisites were provided in multiple formats, so we converted them into semesters by course title so that they could be analyzed uniformly. Additionally, we grouped several course titles related to our optometry curriculum category, Basic Biomedical. Courses that were grouped as biomedical preparatory instruction included General Chemistry, Organic Chemistry, Biochemistry, General Biology, Advanced Biology, Microbiology, Human Anatomy, Human Physiology, and each course's associated lab. Other classes analyzed were Calculus, Statistics, English, Psychology, Social and Behavioral Sciences, and Liberal Arts and Humanities. While the categories may appear overly specified, this was necessary to tease out potential differences

between different courses within the same department or course prefix that could be deemed lower level or less difficult than others.

RESULTS

2001-2002 Analysis of Each Program's Clock Hours By Category and Relative Emphasis

Table 3 presents clock hours per category for each optometric program as well as the total hours of didactic study and the total clinical hours. The rankings based on clock hours are shown in Table 4. Table 5 presents the same data as Table 3, but shows the category clock hours as a proportion of each school's total clock hours. This provides a measure of each school's relative emphasis. The data in Table 6 correspond to the data in Table 5 by ranking the schools and colleges based on the proportion of a school's hours that are devoted to that particular category.

Change in Total Hours

The 2001-2002 data show that optometric students spend an average of 4,154 combined hours in lecture, lab, and clinic. This may be noted as the average given in Table 3. The total hours range from a high of 4,642 for UH to a low of 3,405 for UMSL. In 1991-1992 the total average hours was 3,918[4]. In 1995-1996 the total average hours was 4,089[3]. This amounts to a 5.7% increase in total average hours over the decade. The standard deviation for total average hours (representing inter-program variability) was 465 for the academic year 1991-1992[4], 497 for 1995-1996[3], and 387 for 2001-2002.

Comparison of Didactic and Clinical Hours

On average, students in 2001-2002 spent an equal amount of time in clinic as they did in their didactic studies, with 2077 hours in both categories. The 1991-1992 averages show 1,713 hours of clinic;[4] 1995-1996 data show 1,910 clinic hours.[3] This represents a 17.5% increase in clinical hours over the decade. Average total clinic hours ranged from 2,554 for NEWENCO to 1,479 for UMSL.

On average, didactic hours were 2,180 in 1991-1992[4] and 2,187 in 1995-1996,[3] amounting to a 4.7% decrease in didactic hours relative to the 2001-2002 data. NOVA had the most didactic hours with 2,484 and MCO shows the fewest didactic hours with 1,728.

Meta-study Analysis

Tables 7a-h, 8, 9 and Figures 1,2, and 3 present the results of the metastudy that combined the 17 categories into four broader metacategories (Medical Model, Optometric Model, Clinical Model and Other), enabling us to compare our data to the two previous studies and examine the shifts in curricular focus with regard to the Medical Model versus the Optometric Model. The results are also useful for comparing the trend in variability.

Table 7a-h displays the metastudy data for each school. Table 8 represents the data from Table 7a-h as rankings of each school in each model for each of the three studies. We can see that over the years the rankings have shifted significantly. For example, in 1991-1992 PUCO ranked first in the Optometric Model based on hours. In the 1995-1996 study PUCO fell to last, but by 2001-2002 its position rose back to fifth.

Comparison of Variability Over Time

Table 9 shows a summary of the mean and standard deviations for each metacategory in each study year. Comparing the standard deviations from study to study allows us to evaluate the change in variability between programs over the past decade. Figure 1 shows how this variability has changed over the years. In terms of clock hours, the Medical Model shows a lower standard deviation since 1995-1996, but a slightly higher standard deviation since 1991-1992. The Optometric Model shows an increasing standard deviation over the years. The Clinical Model shows a decreasing standard deviation over the years. In terms of percentages, the Medical Model, the Optometric Model and the Clinical Model each show reductions in variability between programs over the years.

Comparison of Model Emphasis Over Time

The percentage means given in Table 9 show how the hours have shifted over the decade. Clinic is now nearly 50% of the curriculum. This is up from 43% in 1992[4] and 46% in 1996.[3] Looking at Figure 2 one can see there has been a decline in the percent of time spent on Medical Model curriculum. The Medical Model accounted for 19.3% in 1991-1992, 18.8% in 1995-1996, and 16.9% in 2001-2002. The percent of the curricular hours devoted to the Optometric Model was 22.7% in 1991-1992, 21.5% in 1995-1996, and 21% in 2001-2002. The percent of hours falling into the remainder category, "Other," declined from 14.9% in 1991-1992 to 13.8% in 1995-1996 to 12.5% in 2001-2002.

Figure 3 shows the mean clock hours for each metacategory for each of the three studies. We can see that the medical hours have decreased by approximately 14% over the decade, the optometric hours and other hours have remained stable, and the clinical hours have made the major change, a 21% increase.

Change in Pharmacology Requirements Over Time

With regard to our specific interest in how pharmacology hours have changed, the 2001-2002 data in Table 2 show an average of 111 hours, a 15% increase in clock hours over the decade. The average 1991-1992 curriculum had 94 hours while the average 1995-1996 curriculum had 97 hours.

Survey Results

Twelve schools and colleges responded to our survey regarding curricular changes at each institution over the last five years. All respondents reported having undergone significant curricular changes; 67% stated that their institution is currently planning a major change; 42% of the schools and colleges reported having increased the overall number of credits; 25% reported that overall credits have decreased and 33% said overall credits have not changed at their institution. Half of the respondents reported a decrease in didactic hours and half

reported no change in didactic hours. None of the schools or colleges reported having increased the number of vision science credits, but 33% reported having decreased vision science credits. In comparison, 58% reported an increase in their medical-related credits and none reported having reduced these credits. Forty-one percent of the schools said they have changed their curriculum based on legislative changes affecting the scope of practice. None of the schools or colleges have changed their pediatric curriculum based on legislation, though some have changed it based on trends they see for the future of the profession. Sixty-seven percent of the schools or colleges have incorporated some Problem Based Learning (PBL) into their curriculum. Two of the four who do not currently have PBL intend to add it. Three of the eight who currently have some PBL intend to add more.

When it comes to making curriculum decisions, overall the academic officers reported that they rely primarily on projections for the future of the profession and input from faculty. Student input is then considered, followed by input from alumni. Studies are of lesser importance.

A few administrators shared with us their impression of what the future of our profession holds and how optometric education must proactively prepare. These impressions included maintaining a strong emphasis on classical optometric care while expanding medical optometric procedures; introducing lasers, refractive surgery, and surgical techniques in anticipation of changes in optometric privileging; and preparing doctors who can skillfully problem solve and adapt to new technologies.

Prerequisite Study

The difference in required semester hours between programs for each course title in the basic biomedical, mathematical, and physics categories differed by one semester or less, with few exceptions. The remaining titles had wider variations, but lacked a discernable pattern. Refer to Table 10 for these findings. Comparing total required hours we see a range of 31 semesters at MCO to 17 semesters at IU. Grouping the prerequisites that are in the basic

biomedical category, we see a range of 18 semesters at UH to 10 semesters at NEWENCO and NSUCO.

The prerequisite course that has the largest variation between optometry programs is Biochemistry, with seven schools requiring it and nine that do not. The next largest differentiation is Human Physiology with five schools that require it as a prerequisite. The category of Other Social and Behavioral Sciences (other than Psychology) show the greatest variation with a high of five semesters required at Nova to none, including no Psychology courses, at IU and OSU.

DISCUSSION

The curricula at optometry schools and colleges today demonstrate commitment to a strong biomedical foundation as well as the specialties, such as low vision, contact lens, and vision therapy. The body of knowledge necessary for treating and managing patients continues to grow. The programs have met this demand by increasing the required clock hours 5.7% over the past decade.

General Observations

As schools craft their curricula to optimize available hours in the four-year program, the curricula at the various schools are becoming more similar. There appears to be a movement toward a "core curriculum," evidenced by both the similarity in total hours and the decrease in variability for each category. Another indicator of increased similarity of the total course load is decreased variance in total hours between the programs with the highest and lowest total hours, compared to the variance in the previous studies. There is a difference of 1,237 total hours between UH and UMSL, the programs with the highest and lowest total hours in the current study. This disparity is primarily the result of variation in clinical time. The high and low schools in 1992 differed by 1,492 hours (UH and IU).[4] The 1996 data showed a range that differed by 1,605 (SUNY and UMSL).[3]

Clinical Emphasis

The most significant trend revealed in this study is the commitment to increased clinic time. These results indicate that educators believe classroom education cannot match the lessons learned through direct interaction with patients. Over the past decade, average clinic hours have increased 17.5%. This has been made possible both by increasing overall hours, as discussed, and by reducing didactic hours by 6.25%. Many of the schools represented in the survey continue to look for ways to reduce didactic hours and expand clinic time. Pennsylvania College of Optometry's dramatic curriculum overhaul directly addressed this issue.

Currently most schools have struck a balance between didactic hours and clinic hours. On average, students today spend an equal amount of time in clinic and in the classroom. In order to assess whether programs that have a large clinical component sacrifice hours in their didactic curriculum or vice versa, we determined which schools or colleges fall one standard deviation above or below the mean for the categories of "Total Clinic" and "Total Didactic." We then sought to determine if any of the schools that were on the extreme high end in one category tended to be on the extreme low end in the other. The results of this analysis showed that programs do not necessarily make a trade-off between clinic and didactic time. In their curricula NOVA, SUNY, and UAB stand out for having didactic hours greater than one standard deviation above the mean, however these schools are not remarkably low for total clinical. Also, UCB and MCO stand out for having a low number of didactic hours without a correspondingly higher number of clinical hours. In the clinical curricula, IU, NEWENCO, SCCO, and UH exceed the other schools by greater than one standard deviation without having extremely low hours in their didactic curricula, whereas NSUCO and UMSL lag behind by more than one standard deviation without excelling in their didactic curriculum hours.

We wondered if the schools with the most clinic hours achieve this by placing students in clinic sooner. This does not appear to be the case with respect to starting clinic in the first year. Only three schools offer opportunities

for first year clinical experience. These are NSUCO, PUCO, and SCCO. Of these, only SCCO is in the top five for total clinical experience. However, three of the schools that were in the top five for second year clinic came out in the top five for total clinic. These schools are UH, IU, and NEWENCO. Four programs, UMSL, SCO, IAUPR and SUNY, do not offer clinic in the summer after the second year. From the surveys we know that at least one of these schools is considering adding a summer session.

Pharmacoloav Emphasis

Optometry political lobbyists, having made great legislative gains in the past decade, continue to work for a broad scope of prescriptive authority across the country. The optometry schools and colleges have responded by increasing pharmacology hours 15% over the past decade. In 1991-1992, when the mean number of pharmacology hours was 94, optometrists in 12 states had authority to use oral medications. In 1995-1996, when the mean number of pharmacology hours was 97, 32 states had orals. Currently 39 states plus DC and Guam have orals and the mean number of pharmacology hours is 111.2. According to Sherry Cooper, American Optometric Association's State Legislative Analyst, this number matches closely the pharmacology hours required in dentistry and medical schools.[6]

We examined whether the current size of the pharmacology curricula relates to legislated scope of practice in the home states and territories of the optometry programs. Of these states and territories, only four lack prescriptive authority for orals: Massachusetts, New York, Florida, and Puerto Rico. SUNY in New York and NEWENCO in Massachusetts fall below the mean in pharmacology hours. In fact, Massachusetts, which lacks authority for glaucoma treatment as well as for oral medications, has the fewest pharmacology hours in the study with 70 compared to the mean of 111.2. This might reflect that these schools are only teaching to their legislated scope. NOVA in Florida and IAUPR in Puerto Rico fall above the mean for pharmacology hours, possibly reflecting a push to achieve legislative gains in these geographic regions.

Trend Toward Uniformity

Assuring national uniformity assists the legislative cause of the AOA by confirming that graduates from any school will practice with the same competency in all areas of optometry's practice scope. Although the first two studies concluded that great variability exists, our study reveals a trend toward a more common curriculum. Excluding those schools that fall beyond one standard deviation in numerous categories enabled us to establish which programs have curricula that represent a possible "core curriculum." The following three schools do not fall outside one standard deviation in more than three categories (82% of the categories in terms of hours); therefore we would consider their curricula the most similar: MCO, SCCO, and UMSL.

Our metastudy data indicate that this decrease in variability holds true when comparing the different models. Comparing the percentages for the metacategories (Table 6) we see decreased variance between schools over the past decade. This indicates that, overall, schools are evolving to greater similarity between emphases in these different models.

Medical Model vs. Optometric Model

Practitioners and educators often debate whether our profession is on a trajectory toward becoming more similar to general practice ophthalmology at the expense of our visual science roots. The trends in optometry curricula over the past ten years do not support this assertion. The proportion of curriculum hours assigned to both the Optometric Model and the Medical Model has remained fairly constant over the decade with slight declines in each. As we discussed earlier, the greatest trend is toward more clinical experience.

Stereotypes exist as to which schools operate with more weight given to the Medical Model or to the Optometric Model. These perceptions are undoubtedly based on factors such as faculty personalities rather than the amount of time devoted to certain categories. Based on which schools are more than one standard deviation from the percentage average in the models, our data

suggest that UAB and SUNY emphasize Medical Model studies and OSU, NSUCO, and UMSL emphasize Optometric Model studies.

The tendency for programs to switch their focus indicates that labels should not be taken too seriously. The percent rankings shown in Table 6 indicate that few programs show a sustained history of ranking high for a given model. Only NOVA and UAB have remained in the top five spots for the Medical Model over the course of the decade. Only OSU has consistently remained among the top five Optometric Model rankings. MCO is the only school to hold onto a high ranking spot for the clinical model for the entire decade. Frequently schools overcorrect to shift focus to the lagging model and later recorrect. These recurrent shifts in the rankings indicate that few schools adhere tightly to one model of education.

Basic Biomedical Emphasis

Significant variation still exists in the category of Basic Biomedical Sciences. We looked to the prerequisites to account for this disparity and found that extra prerequisite hours may account for UCB's low standing in this category. PUCO's low standing in this category cannot be attributed to its prerequisite burden. The schools that do not emphasize this area may expect their students to have retained their undergraduate science knowledge, whereas the other programs revisit the basic science material.

Comparison of Survey Results and Study Data

The survey responses confirm some of our comparative findings and run contrary to others. The survey only represents twelve of the schools and colleges, accounting for some of the differences between our data and the responses. Forty-two percent of administrators acknowledged that their programs have had to increase overall curriculum hours. This agrees with our findings. Half the schools acknowledged decreasing lecture time to increase patient care, while the other half stated they had not changed didactic hours in the past five years. Our data show that 83% of all the schools decreased

didactic hours since 1996. Some schools reported adding summer programs and expanding their externship programs in order to increase clinic time. The four schools that reported decreasing vision science credits also reported increasing medical courses. Fifty-eight percent reported that their medical related credits have increased. Forty-two percent reported no change in these credits. No school reported decreasing medical related credits. This contrasts with our data, which show that 93% of the programs have decreased these hours since 1996. This disparity may have resulted because "medical credits" was not defined in the survey or because administrator perception regarding medical credits does not correspond to the actual curriculum.

Study Methodology Considerations

Our study and the studies before it have endeavored to find trends in the optometric curricula by assigning hours to categories and looking at averages. This technique tends to obscure the fine details that must be considered when an individual school assesses its own curriculum. Ideally the nuances of each school's individual courses would be considered when categorizing; unfortunately omniscient familiarity with each program was not available, therefore each study, including our own, has relied upon the subjective and less refined key word methodology, which regrettably is bound to have introduced some error.

Our numbers cannot be considered as the absolute measure of the time spent in courses on each subject because when more than one category seemed appropriate we divided the hours for that course evenly between these categories. This introduces error because the categories were not necessarily evenly represented by that course. However, short of collecting and analyzing all the syllabi, we could not have accomplished the task of assigning categories in any other way. The previous studies did not divide course credits into more than one category. We believe that without doing so more error is introduced. To determine hours, unless otherwise stated, we assumed that labs ran for two weeks less than the term. We believe this assumption corrects for over-inflation of the numbers. Our study also recognized that many schools offer classes that

do not run the full length of the quarter or semester, and that the length of academic terms for the various schools does not necessarily fall neatly into the 15 week, 10 week, and 6 week model assumed by the previous studies. Each course's hours were determined by the specific length of that course. We believe that this is a significant improvement over the methodology used by the previous two studies.

The other major difference between our methodology and that used by the previous studies was our introduction of five new categories: scientific thinking (ST), environmental/occupational (EO), psychological issues and behavioral disorders (PS), ocular anatomy and physiology (OBA), and public health (PH). We wanted to avoid a large "other" category, which acts like a black hole for useful information. The 1998 study had a mean of 154 hours for the "other" category. In contrast, our "other" category had a mean of 41.1 hours.

Letters to the editor following the 1998 study complained that public health and ethics had been relegated to the "other" category.[7] Our study recognizes public health on its own, however we too assigned ethics into "other" because in our preliminary study it did not seem to warrant its own category.

Applicability of Study

Although our survey responses indicated that curriculum planners rely the least on studies to give them information needed to make changes, this may be due to a lack of curriculum studies. It is our hope that this study might serve as a useful tool for optometric curriculum planners. Informed by these data each school should decide whether its curriculum delivers the intended emphasis.

Our findings for pharmacology may serve to substantiate lobbyists' claims that optometric education adequately prepares its students to treat patients using a wide range of pharmaceuticals, which might include oral and injectable medications. Administrators who are concerned with the battle to increase optometry's prescriptive authority will want to adjust the time devoted to pharmacology if the need exists at their school or college.

While understanding the nuances of each program's emphasis likely means little to a pre-optometry student, the information about clinic time will be an extremely useful factor for choosing an optometry program.

Our study has maintained a five year intervals for curriculum comparison. The survey responses indicate that within a five year period major revisions in the curriculum are made at nearly every institution, therefore, ideally another curriculum comparison study will be conducted within the next five years. If PCO's new curriculum garners acclaim, other schools may undertake major restructuring of their curricula, necessitating an updated curriculum review. Already other programs are looking at incorporating elements of the modular approach.

The survey responses expressed that Problem Based Learning, a method of instruction that gives the students more responsibility for gathering and learning information, is getting more attention. A study should look at how PBL has affected optometric learning.

In this study we have made reference to schools whose curriculum might most closely resemble a core curriculum. At this time a core curriculum has not been recognized. Rather than simply looking at hours, as our study has done, another study should attempt to define a core curriculum. This may be a useful step to improved national uniformity, should administrators deem that an important goal. Although schools may want to retain their uniqueness, one might argue that national uniformity lends credibility to optometry's legislative efforts.

Summary

Our study has shown a trend toward increasing clinical experience in optometric education. This is achieved by increasing overall hours and reducing classroom time. Over the past decade we have seen a trend toward less variability between optometric programs. The number of hours spent on pharmacology has increased over the past decade, either keeping pace with the changing scope of practice or driving this change. Although there is the perception that the profession is moving toward a medical model, our data

suggest that the proportion of didactic hours devoted to both models has decreased slightly over the past ten years. Average classroom time devoted to the medical model has decreased by approximately 100 hours over the past decade, while average classroom time devoted to the optometric model has remained fairly constant, decreasing by only seven hours.

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Legends

Table 1: Abbreviations for each optometry school are denoted.

Table 2: Abbreviations for each category in this study are denoted.

Table **3:** Total clock hours in each category are compiled for each school.

Table 4: Each school is ranked in each category according to total clock hours.

Table 5: Total clock hours in each category as a proportion of the total clock hours in the curriculum are compiled for each school.

Table 6: Each school is ranked in each category according to the percentage of curriculum in each category.

Table 7: Metacategory results are gathered for each school, divided by metacategory, clock hours vs. percentage of curriculum, and by the academic period that each study used to compile data.

Table 8: The metacategory data give rise to ranking the schools in each metacategory, discerning clock hours vs. percentage of curriculum, and the academic period that each study used to compile data.

Table 9: A summarized amalgamation of the schools is provided for each metacategory, discerning clock hours vs. percentage of curriculum, and the academic period that each study used to compile data. It should be noted that only schools common to all three studies are included in the metastudy data.

Table 10: Prerequisite classes are compiled for each optometry school. The coursework is presented as semesters required. The data are then filtered into a 'Total' requirement, as well as a grouping of prerequisite classes that can be considered 'Basic Biomedical' in their nature.

Figure 1: The average standard deviation of each metacategory as a proportion of each school's total curriculum is graphed relative to the academic period that each study used to compile data.

Figure 2: The mean of each school's proportion of total hours allotted to each metacategory is charted relative to the academic period that each study used to compile data.

Figure **3:** The mean of each school's total clock hours allotted to each metacategory is shown relative to the academic period that each study used to compile data.

Figures 4-25: Each school's datum for the given category is represented in a bar graph. The 'a' figure utilizes total clock hours while the 'b' figure shows the proportion of the school's curriculum devoted to the given category. In these figures the mean is expressed as a green horizontal line.

Figure 26: The total clock hours used by each school is demonstrated in a bar graph.

APPENDIX

Table 1

Abbreviation	Name
IAUPR	Inter American University of Puerto Rico
ICO	Illinois College of Optometry
IU	Indiana University
MCO	Michigan College of Optometry
NEWENCO	New England College of Optometry
NOVA	Nova Southeastern College of Optometry
NSUCO	Northeastern State University College of Optometry
OSU	The Ohio State University
PUCO	Pacific University College of Optometry
SCCO	Southern California College of Optometry
SCO	Southern College of Optometry
SUNY	State College of New York School
UAB	University of Alabama
UCB	University of California at Berkeley
UH	University of Houston
UMSL	University of Missouri- St. Louis

Table 2

Clinical Experience	CE
Basic Biomedical	BB
Ocular Disease	OD
Ocular Anatomy and Physiology	OA
Optical Science	OS
Visual Science	VS
Binocular Vision, Perception, and Pediatrics	VT
Pre-clinical	PC
Low Vision/ Gerontology	LV
Pharmacology	Rx
Contact Lens	CL
Scientific Thought	ST
Practice Management	PM
Public Health and Epidemiology	PH
Environmental/Occupational/Sports	EO
Psychological Issues and Behavioral Disorders	PS
Other	O

Table 3

Total Clock Hours For Each Category

School	BB	OD	OA	OS	VS	VT	PC	LV	Rx	CL	ST	PM	PH	EO	PS	O	CE1	CE2	CE3	CE4	Total	Total Clinic	Total Didactic
IAUPR	312	90	142	239	217	101	340	0	135	157	38	38	38	0	0	45	0	0	630	1600	4120	2230	1890
ICO	380	170	120	225	275	205	225	40	120	110	250	20	30	0	10	20	0	0	576	1584	4360	2160	2200
IU	331	193	98	363	185	96	338	64	143	119	46	30	45	0	0	38	0	104	384	1920	4494	2408	2086
MCO	214	178	103	165	243	168	226	56	98	118	0	33	42	33	19	33	0	84	448	1680	3940	2212	1728
NEWENCO	429	225	75	168	207	190	230	15	70	120	20	40	30	29	35	40	0	90	280	2184	4475	2554	1921
NOVA	450	189	72	342	198	252	405	90	126	144	0	72	90	18	0	36	0	32	80	1968	4564	2080	2484
NSUCO	253	214	99	310	236	210	258	60	105	157	75	90	60	15	0	15	15	63	528	992	3753	1598	2155
OSU	274	130	137	286	304	167	304	108	90	148	0	45	30	46	0	25	0	0	240	1560	3894	1800	2094
PUCO	122	170	159	213	318	258	396	30	137	127	30	60	45	30	15	60	37	37	204	1628	4075	1906	2170
SCCO	265	170	100	220	300	210	358	70	120	150	43	38	55	15	0	25	20	40	540	1824	4562	2424	2138
SCO	278	171	112	194	181	138	295	51	143	92	60	80	20	23	20	23	0	94	460	1440	3875	1994	1881
SUNY	440	220	107	215	201	221	434	40	88	130	26	58	43	0	6	73	0	30	210	1750	4294	1990	2304
UAB	566	183	155	140	230	170	440	60	95	120	0	75	40	20	0	5	0	296	720	1160	4475	2176	2299
UCB	115	154	73	251	95	172	481	45	115	94	90	10	10	8	0	64	0	0	554	1214	3543	1768	1775
UH	225	195	126	349	161	368	211	45	105	129	0	90	45	28	0	105	0	180	780	1500	4642	2460	2182
UMSL	262	142	86	224	273	142	282	71	90	101	0	75	60	30	38	51	0	0	412	1067	3405	1479	1926
Mean	307	175	110	244	226	192	326	53	111	126	42	53	43	18	9	41	5	66	440	1567	4154	2077	2077
St. Dev	121	34	28	68	59	66	86	26	22	21	62	25	18	14	13	25	11	79	198	334	387	313	207
Median	276	175	105	225	224	181	321	54	110	124	28	52	43	19	0	37	0	39	454	1592	4207	2120	2116

Table 4

Rankings By Clock Hours

BB	OD	OA	OS	VS	VT	PC	LV	Rx	CL	ST	PM	PH	EO	PS	O	CE1	CE2	CE3	CE4	Total	Total Clinic	Total Didactic
UAB	NEWENCO	PUCO	IU	PUCO	UH	UCB	OSU	SCO*	IAUPR*	ICO	NSUCO*	NOVA	OSU	UMSL	UH	PUCO	UAB	UH	NEWENCO	UH	NEWENCO	NOVA
NOVA	SUNY	UAB	UH	OSU	PUCO	UAB	NOVA	IU*	NSUCO*	UCB	UH*	NSUCO*	MCO	NEWENCO	SUNY	SCCO	UH	UAB	NOVA	NOVA	UH	SUNY
SUNY	NSUCO	IAUPR	NOVA	SCCO	NOVA	SUNY	UMSL	PUCO	SCCO	NSUCO	SCO	UMSL*	PUCO*	SCO	UCB	NSUCO	IU	IAUPR	IU	SCCO	SCCO	UAB
NEWENCO	UH	OSU	NSUCO	ICO	SUNY	NOVA	SCCO	IAUPR	OSU	SCO	UAB*	SCCO	UMSL*	MCO	PUCO	IAUPR*	SCO	ICO	SCCO	IU	IU	ICO
ICO	IU	UH	OSU	UMSL	SCCO*	PUCO	IU	NOVA	NOVA	IU	UMSL*	IU*	NEWENCO	PUCO	UMSL	ICO*	NEWENCO	UCB	SUNY	NEWENCO*	IAUPR	UH
IU	NOVA	ICO	UCB	MCO	NSUCO*	SCCO	NSUCO*	ICO*	SUNY	SCCO	NOVA	PUCO*	UH	ICO	IAUPR	IU*	MCO	SCCO	MCO	UAB*	MCO	PUCO
IAUPR	UAB	SCO	IAUPR	NSUCO	ICO	IAUPR	UAB*	SCCO*	UH	IAUPR	PUCO	UH*	SCO	SUNY	NEWENCO	MCO*	NSUCO	NSUCO	PUCO	ICO	UAB	NSUCO
SCO	MCO	SUNY	ICO	UAB	NEWENCO	IU	MCO	UCB	PUCO	PUCO	SUNY	SUNY	UAB	IAUPR*	IU	NEWENCO*	SCCO	SCO	IAUPR	SUNY	ICO	SCCO
OSU	SCO	MCO	UMSL	IAUPR	UCB	OSU	SCO	NSUCO*	NEWENCO*	SUNY	OSU	MCO	NOVA	IU*	NOVA	NOVA*	PUCO	MCO	ICO	IAUPR	NOVA	OSU
SCCO	ICO*	SCCO	SCCO	NEWENCO	UAB	SCO	UCB‡	UH*	UAB*	NEWENCO	NEWENCO	UAB	NSUCO*	NOVA*	MCO	OSU*	NOVA	UMSL	OSU	PUCO	SCO	IU
UMSL	PUCO*	NSUCO	SUNY	SUNY	MCO	UMSL	UH‡	MCO	IU	MCO*	IAUPR*	IAUPR	SCCO*	NSUCO*	OSU	SCO*	SUNY	IU	UH	MCO	SUNY	UMSL
NSUCO	SCCO*	IU	PUCO	NOVA	OSU	NSUCO	ICO*	UAB	MCO	NOVA*	SCCO*	ICO*	UCB	OSU*	SCCO	SUNY*	IAUPR*	NEWENCO	SCO	OSU	PUCO	NEWENCO
UH	UCB	UMSL	SCO	IU	UMSL	NEWENCO	SUNY*	OSU*	ICO	OSU*	MCO	NEWENCO*	IAUPR*	SCCO*	SCO	UAB*	ICO*	OSU	UCB	SCO	OSU	IAUPR
MCO	UMSL	NEWENCO	NEWENCO	SCO	SCO	MCO	PUCO	UMSL*	UMSL	UAB*	IU	OSU*	ICO*	UAB*	ICO	UCB*	OSU*	SUNY	UAB	NSUCO	UCB	SCO
PUCO	OSU	UCB	MCO	UH	IAUPR	ICO	NEWENCO	SUNY	UCB	UH*	ICO	SCO	IU*	UCB*	NSUCO	UH*	UCB*	PUCO	UMSL	UCB	NSUCO	UCB
UCB	IAUPR	NOVA	UAB	UCB	IU	UH	IAUPR	NEWENCO	SCO	UMSL*	UCB	UCB	SUNY*	UH*	UAB	UMSL*	UMSL*	NOVA	NSUCO	UMSL	UMSL	MCO

Note: Successive * or ‡ marks indicate a tie between the schools bearing the individual symbols.

Table 5

Proportion of Total Clock Hours in Each Category

School	BB	OD	OA	OS	VS	VT	PC	LV	Rx	CL	ST	PM	PH	EO	PS	O	CE1	CE2	CE3	CE4	Total Clinic	Total Didactic
IAUPR	7.6%	2.2%	3.4%	5.8%	5.3%	2.5%	8.2%	0.0%	3.3%	3.8%	0.9%	0.9%	0.9%	0.0%	0.0%	1.1%	0.0%	0.0%	15.3%	38.8%	54.1%	45.9%
ICO	8.7%	3.9%	2.8%	5.2%	6.3%	4.7%	5.2%	0.9%	2.8%	2.5%	5.7%	0.5%	0.7%	0.0%	0.2%	0.5%	0.0%	0.0%	13.2%	36.3%	49.5%	50.5%
IU	7.4%	4.3%	2.2%	8.1%	4.1%	2.1%	7.5%	1.4%	3.2%	2.6%	1.0%	0.7%	1.0%	0.0%	0.0%	0.8%	0.0%	2.3%	8.5%	42.7%	53.6%	46.4%
MCO	5.4%	4.5%	2.6%	4.2%	6.2%	4.3%	5.7%	1.4%	2.5%	3.0%	0.0%	0.8%	1.1%	0.8%	0.5%	0.8%	0.0%	2.1%	11.4%	42.6%	56.1%	43.9%
NEWENCO	9.6%	5.0%	1.7%	3.7%	4.6%	4.2%	5.1%	0.3%	1.6%	2.7%	0.4%	0.9%	0.7%	0.6%	0.8%	0.9%	0.0%	2.0%	6.3%	48.8%	57.1%	42.9%
NOVA	9.9%	4.1%	1.6%	7.5%	4.3%	5.5%	8.9%	2.0%	2.8%	3.2%	0.0%	1.6%	2.0%	0.4%	0.0%	0.8%	0.0%	0.7%	1.8%	43.1%	45.6%	54.4%
NSUCO	6.7%	5.7%	2.6%	8.3%	6.3%	5.6%	6.9%	1.6%	2.8%	4.2%	2.0%	2.4%	1.6%	0.4%	0.0%	0.4%	0.4%	1.7%	14.1%	26.4%	42.6%	57.4%
OSU	7.0%	3.3%	3.5%	7.3%	7.8%	4.3%	7.8%	2.8%	2.3%	3.8%	0.0%	1.2%	0.8%	1.2%	0.0%	0.6%	0.0%	0.0%	6.2%	40.1%	46.2%	53.8%
PUCO	3.0%	4.2%	3.9%	5.2%	7.8%	6.3%	9.7%	0.7%	3.4%	3.1%	0.7%	1.5%	1.1%	0.7%	0.4%	1.5%	0.9%	0.9%	5.0%	40.0%	46.8%	53.2%
SCCO	5.8%	3.7%	2.2%	4.8%	6.6%	4.6%	7.8%	1.5%	2.6%	3.3%	0.9%	0.8%	1.2%	0.3%	0.0%	0.5%	0.4%	0.9%	11.8%	40.0%	53.1%	46.9%
SCO	7.2%	4.4%	2.9%	5.0%	4.7%	3.6%	7.6%	1.3%	3.7%	2.4%	1.5%	2.1%	0.5%	0.6%	0.5%	0.6%	0.0%	2.4%	11.9%	37.2%	51.5%	48.5%
SUNY	10.2%	5.1%	2.5%	5.0%	4.7%	5.2%	10.1%	0.9%	2.1%	3.0%	0.6%	1.4%	1.0%	0.0%	0.1%	1.7%	0.0%	0.7%	4.9%	40.8%	46.3%	53.7%
UAB	12.6%	4.1%	3.5%	3.1%	5.1%	3.8%	9.8%	1.3%	2.1%	2.7%	0.0%	1.7%	0.9%	0.4%	0.0%	0.1%	0.0%	6.6%	16.1%	25.9%	48.6%	51.4%
UCB	3.2%	4.4%	2.0%	7.1%	2.7%	4.8%	13.6%	1.3%	3.2%	2.6%	2.5%	0.3%	0.3%	0.2%	0.0%	1.8%	0.0%	0.0%	15.6%	34.3%	49.9%	50.1%
UH	4.8%	4.2%	2.7%	7.5%	3.5%	7.9%	4.5%	1.0%	2.3%	2.8%	0.0%	1.9%	1.0%	0.6%	0.0%	2.3%	0.0%	3.9%	16.8%	32.3%	53.0%	47.0%
UMSL	7.7%	4.2%	2.5%	6.6%	8.0%	4.2%	8.3%	2.1%	2.6%	3.0%	0.0%	2.2%	1.8%	0.9%	1.1%	1.5%	0.0%	0.0%	12.1%	31.3%	43.4%	56.6%
Mean	7.3%	4.2%	2.7%	5.9%	5.5%	4.6%	7.9%	1.3%	2.7%	3.0%	1.0%	1.3%	1.0%	0.5%	0.2%	1.0%	0.1%	1.5%	10.7%	37.5%	49.8%	50.2%
St. Dev	2.6%	0.8%	0.7%	1.6%	1.6%	1.4%	2.3%	0.7%	0.6%	0.5%	1.5%	0.6%	0.4%	0.4%	0.3%	0.6%	0.3%	1.8%	4.7%	6.2%	4.4%	4.4%
Median	7.3%	4.2%	2.6%	5.5%	5.2%	4.4%	7.8%	1.3%	2.7%	3.0%	0.7%	1.3%	1.0%	0.4%	0.0%	0.8%	0.0%	0.9%	11.9%	39.4%	49.7%	50.3%

Table 6

Rankings By Percentages

BB	OD	OA	OS	VS	VT	PC	LV	Rx	CL	ST	PM	PH	EO	PS	O	CE1	CE2	CE3	CE4	Total Clinic	Total Didactic
UAB	NSUCO	PUCO	NSUCO	UMSL	UH	UCB	OSU	SCO	NSUCO	ICO	NSUCO	NOVA	OSU	UMSL	UH	PUCO	UAB	UH	NEWENCO	NEWENCO	NSUCO
SUNY	SUNY	OSU*	IU	OSU*	PUCO	SUNY	UMSL	PUCO	IAUPR*	UCB	UMSL	UMSL	UMSL	NEWENCO	UCB	SCCO	UH	UAB	NOVA	MCO	UMSL
NOVA	NEWENCO	UAB*	UH*	PUCO*	NSUCO	UAB	NOVA	IAUPR	OSU*	NSUCO	SCO	NSUCO	MCO	SCO*	SUNY	NSUCO	SCO	UCB	IU	IAUPR	NOVA
NEWENCO	MCO	IAUPR	NOVA*	SCCO	NOVA	PUCO	NSUCO	UCB*	SCCO	SCO	UH	SCCO	PUCO	MCO*	UMSL*	IAUPR*	IU	IAUPR	MCO	IU	OSU
ICO	SCO*	SCO	OSU	ICO*	SUNY	NOVA	SCCO	IU*	NOVA	IU	UAB	PUCO*	NEWENCO*	PUCO	PUCO*	ICO*	MCO	NSUCO	SUNY	SCCO	SUNY
UMSL	UCB*	ICO	UCB	NSUCO*	UCB	UMSL	IU*	NSUCO‡	PUCO	IAUPR*	NOVA	MCO*	UH*	ICO	IAUPR	IU*	NEWENCO	ICO	OSU	UH	PUCO
IAUPR	IU	UH	UMSL	MCO	ICO	IAUPR	MCO*	NOVA‡	SUNY*	SCCO*	PUCO	UH‡	SCO*	SUNY	NEWENCO	MCO*	NSUCO	UMSL	SCCO*	SCO	UAB
IU	UH*	NSUCO*	IAUPR	IAUPR	SCCO	SCCO*	UAB‡	ICO‡	MCO*	PUCO	SUNY	IU‡	NSUCO‡	IAUPR*	IU*	NEWENCO*	PUCO*	SCO	PUCO*	UCB	ICO
SCO	PUCO*	MCO*	ICO*	UAB	MCO*	OSU*	SCO‡	UMSL*	UMSL*	SUNY	OSU	SUNY‡	UAB‡	IU*	MCO*	NOVA*	SCCO*	SCCO	IAUPR	ICO	UCB
OSU	UMSL*	UMSL‡	PUCO*	SUNY*	OSU*	SCO	UCB‡	SCCO*	UH	NEWENCO	IAUPR*	IAUPR*	NOVA‡	NOVA*	NOVA*	OSU*	NOVA‡	MCO	SCO	UAB	SCO
NSUCO	NOVA‡	SUNY‡	SCO‡	SCO*	NEWENCO‡	IU	UH	MCO	NEWENCO*	MCO*	NEWENCO*	UAB*	SCCO	NSUCO*	OSU‡	SCO*	SUNY‡	IU	ICO	PUCO	UH
SCCO	UAB‡	SCCO*	SUNY‡	NEWENCO	UMSL‡	NSUCO	SUNY*	OSU*	UAB*	NOVA*	MCO‡	OSU	UCB	OSU*	SCO‡	SUNY*	IAUPR*	NEWENCO	UCB	SUNY	SCCO
MCO	ICO	IU*	SCCO	NOVA	UAB	MCO	ICO*	UH*	IU‡	OSU*	SCCO‡	ICO*	IAUPR*	SCCO*	SCCO*	UAB*	ICO*	OSU	UH	OSU	IU
UH	SCCO	UCB	MCO	IU	SCO	ICO	PUCO	UAB‡	UCB‡	UAB*	IU	NEWENCO*	ICO*	UAB*	ICO*	UCB*	OSU*	PUCO	UMSL	NOVA	IAUPR
UCB	OSU	NEWENCO	NEWENCO	UH	IAUPR	NEWENCO	NEWENCO	SUNY‡	ICO	UH*	ICO	SCO	IU*	UCB*	NSUCO	UH*	UCB*	SUNY	NSUCO	UMSL	MCO
PUCO	IAUPR	NOVA	UAB	UCB	IU	UH	IAUPR	NEWENCO	SCO	UMSL*	UCB	UCB	SUNY*	UH*	UAB	UMSL*	UMSL*	NOVA	UAB	NSUCO	NEWENCO

Note: Successive * or ‡ marks indicate a tie between the schools bearing the individual symbols.

By Percentages	1991-92 Medical	1995-96 Medical	2001-02 Medical
ICO	19.8%	21.6%	18.1%
IU	27.6%	19.7%	17.0%
MCO	14.1%	16.2%	15.1%
NEWENCO	23.8%	21.9%	17.8%
NOVA	24.8%	22.3%	18.3%
NSUCO	16.8%	17.9%	17.9%
OSU	21.0%	16.9%	16.2%
PUCO	15.7%	15.7%	14.4%
SCCO	16.3%	13.6%	14.4%
SCO	20.6%	18.4%	18.2%
SUNY	18.0%	19.6%	19.9%
UAB	23.1%	26.8%	22.3%
UCB	15.9%	14.7%	12.9%
UH	14.3%	16.2%	14.0%
UMSL	18.1%	21.2%	17.0%
Mean	19.3%	18.8%	16.9%
Std. Dev	4.1%	3.5%	2.5%
Median	18.1%	18.4%	17.0%

Table 7

Curriculum Metacategory Results For Each School

By Total Hours	1991-92 Medical	~~1995-96~~ Medical	~~2001-02~~ Medical
ICO	730	770	690
IU	830	870	651
MCO	560	690	528
NEWENCO	878	853	768
NOVA	1110	1078	783
NSUCO	662	642	655
OSU	700	598	586
PUCO	525	575	511
SCCO	640	620	573
SCO	870	780	641
SUNY	819	904	825
UAB	845	1127	979
UCB	719	615	352
UH	720	720	636
UMSL	675	705	565
Mean	752	770	649
Std. Dev	146	169	149
Median	720	720	641

By Total Hours	1991-92 Optometric	1995-96 Optometric	2001-02 Optometric
ICO	750	830	855
IU	885	838	826
MCO	900	1005	783
NEWENCO	607	683	728
NOVA	900	1053	1044
NSUCO	932	945	987
OSU	930	1020	1059
PUCO	975	620	976
SCCO	960	970	965
SCO	800	790	679
SUNY	875	895	808
UAB	880	770	740
UCB	958	856	663
UH	960	795	1080
UMSL	825	870	841
Mean	876	863	869
Std. Dev	98	123	140
Median	900	856	841

By Percentages	1991-92 Optometric	1995-96 Optometric	2001-02 Optometric
ICO	20.4%	23.3%	19.6%
IU	29.4%	19.0%	18.4%
MCO	22.6%	23.6%	19.9%
NEWENCO	16.5%	17.5%	16.3%
NOVA	20.2%	21.8%	22.9%
NSUCO	23.6%	26.5%	26.3%
OSU	27.9%	28.8%	27.2%
PUCO	28.9%	16.9%	24.0%
SCCO	24.2%	21.3%	21.2%
SCO	19.0%	21.1%	17.5%
SUNY	19.2%	19.5%	18.8%
UAB	24.0%	18.4%	16.5%
UCB	21.1%	20.5%	18.7%
UH	20.8%	17.8%	23.3%
UMSL	22.2%	26.3%	24.7%
Mean	22.7%	21.5%	21.0%
Std. Dev	3.8%	3.6%	3.5%
Median	22.2%	21.1%	19.9%

By Total Hours	1991-92 Clinical	1995-96 Clinical	2001-02 Clinical
ICO	1660	1512	2160
IU	864	2125	2408
MCO	2040	2160	2212
NEWENCO	1730	1826	2554
NOVA	1910	2143	2080
NSUCO	1525	1283	1598
OSU	1190	1476	1800
PUCO	1200	1940	1906
SCCO	1816	2479	2424
SCO	1940	1864	1994
SUNY	2160	2240	1990
UAB	1427	1788	2176
UCB	2308	2133	1768
UH	2268	2160	2460
UMSL	1636	1215	1479
Mean	1712	1890	2067
Std. Dev	419	373	321
Median	1730	1940	2080

By Percentages	1991-92 Clinical	1995-96 Clinical	2001-02 Clinical
ICO	45.1%	42.4%	49.5%
IU	28.7%	48.2%	53.6%
MCO	51.1%	50.5%	56.1%
NEWENCO	47.0%	46.8%	57.1%
NOVA	42.6%	44.4%	45.6%
NSUCO	38.6%	36.0%	42.6%
OSU	35.7%	41.5%	46.2%
PUCO	35.7%	52.9%	46.8%
SCCO	46.0%	54.6%	53.1%
SCO	45.9%	44.0%	51.5%
SUNY	47.6%	48.6%	46.3%
UAB	38.8%	42.5%	48.6%
UCB	50.8%	50.9%	49.9%
UH	49.1%	48.5%	53.0%
UMSL	44.0%	36.5%	43.4%
Mean	43.1%	45.9%	49.6%
Std. Dev	6.4%	5.5%	4.4%
Median	45.1%	46.8%	49.5%

By Total Hours	1991-92 Other	1995-96 Other	2001-02 Other
ICO	540	458	655
IU	436	572	609
MCO	494	420	417
NEWENCO	470	542	425
NOVA	560	548	657
NSUCO	828	692	513
OSU	510	460	449
PUCO	660	531	683
SCCO	536	474	601
SCO	620	800	561
SUNY	680	570	672
UAB	528	522	580
UCB	556	585	760
UH	672	780	466
UMSL	585	540	520
Mean	578	566	571
Std. Dev	100	112	104
Median	556	542	580

By Percentages	1991-92 Other	1995-96 Other	2001-02 Other
ICO	14.7%	12.7%	12.7%
IU	14.3%	13.1%	11.0%
MCO	12.2%	9.7%	8.9%
NEWENCO	12.7%	13.8%	8.8%
NOVA	12.4%	11.5%	13.2%
NSUCO	21.0%	19.6%	13.3%
OSU	15.4%	12.8%	10.4%
PUCO	19.7%	14.5%	14.9%
SCCO	13.5%	10.5%	11.4%
SCO	14.5%	16.5%	12.9%
SUNY	15.2%	12.3%	14.9%
UAB	14.1%	12.3%	12.5%
UCB	12.2%	13.9%	18.5%
UH	15.8%	17.5%	9.7%
UMSL	15.7%	16.0%	14.8%
Mean	14.9%	13.8%	12.5%
Std. Dev	2.5%	2.7%	2.6%
Median	14.5%	13.1%	12.7%

Table 8

Metacategory Rankings For Each Study Year

Metacategory

Metacategory	By Total Clock Hours				By Percentage of Curriculum			
Medical		199192	1995-96	20014 2		1991-92	1995-96	2001-02
		NOVA	UAB	UAB		IU	UAB	UAB
		NEWENCO	NOVA	*SUNY*		NOVA	NOVA	SUNY
		SCO	SUNY	NOVA		NEWENCO	NEWENCO	NOVA
		UAB	IU	NEWENCO		UAB	ICO	SCO
		IU	NEWENCO	ICO		OSU	UMSL	ICO
		SUNY	SCO	NSUCO		SCO	IU	NSUCO
		ICO	ICO	IU		FCO	SUNY	NEWENCO
		UH	UH	SCO		UMSL	SCO	UMSL
		UCB	UMSL	UH		SUNY	NSUCO	IU
		OSU	MCO	OSU		NSUCO	OSU	OSU
		UMSL	NSUCO	SCCO		SCCO	MCO	MCO
		NSUCO	SCCO	UMSL		UCB	UH	PUCO
		SCCO	UCB	MCO		PUCO	PUCO	SCCO
		MCO	OSU	PUCO		UH	UCB	UH
		PUCO	PUCO	UCB		MCO	SCCO	UCB

Optometric

By Total Clock Hours	1991-92	1995-96	2001-02
	PUCO	NOVA	UH
	SCCO	OSU	OSU
	UH	MCO	NOVA
	UCB	SCCO	NSUCO
	NSUCO	NSUCO	PUCO
	OSU	SUNY	SCCO
	MCO	UMSL	ICO
	NOVA	UCB	UMSL
	IU	IU	IU
	UAB	ICO	SUNY
	SUNY	UH	MCO
	UMSL	SCO	UAB
	SCO	UAB	NEWENCO
	ICO	NEWENCO	SCO
	NEWENCO	PUCO	UCB

By Percentage of Curriculum	1991-92	1995-96	2001-02
	IU	OSU	OSU
	PUCO	NSUCO	NSUCO
	OSU	UMSL	UMSL
	SCCO	MCO	PUCO
	UAB	ICO	UH
	NSUCO	NOVA	NOVA
	MCO	SCCO	SCCO
	UMSL	SCO	MCO
	UCB	UCB	ICO
	UH	*S U M*	SUNY
	ICO	IU	UCB
	NOVA	UAB	IU
	SUNY	UH	SCO
	SCO	NEWENCO	UAB
	NEWENCO	PUCO	NEWENCO

Clinical	By Total Clock Hours	1991-92	1995-96	2001-02	By Percentage of Curriculum	1991-92	1995-96	2001-02
		UCB	SCCO	NEWENCO		MCO	SCCO	NEWENCO
		UH	SUNY	UH		UCB	PUCO	MCO
		SUNY	MCO	SCCO		UH	UCB	IU
		MCO	UH	IU		SUNY	MCO	SCCO
		SCO	NOVA	MCO		NEWENCO	SUNY	UH
		NOVA	UCB	UAB		SCCO	UH	SCO
		SCCO	IU	ICO		SCO	IU	UCB
		NEWENCO	PUCO	NOVA		ICO	NEWENCO	ICO
		ICO	SCO	SCO		UMSL	NOVA	UAB
		UMSL	NEWENCO	SUNY		NOVA	SCO	PUCO
		NSUCO	UAB	PUCO		UAB	UAB	SUNY
		UAB	ICO	OSU		NSUCO	ICO	OSU
		PUCO	OSU	UCB		OSU	OSU	NOVA
		OSU	NSUCO	NSUCO		PUCO	UMSL	UMSL
		IU	UMSL	UMSL		IU	NSUCO	NSUCO

Other

By Total Clock Hours

1991-92	1995-96	2001-02
NSUCO	SCQ	UCB
SUNY	UH	PUCO
UH	NSUCO	SUNY
PUCO	UCB	NOVA
SCO	IU	ICO
UMSL	SUNY	IU
NOVA	NOVA	SCCO
UCB	NEWENCO	UAB
ICO	UMSL	SCO
SCCO	PUCO	UMSL
UAB	UAB	NSUCO
OSU	SCCO	UH
MCO	OSU	OSU
NEWENCO	ICO	NEWENCO
IU	MCO	MCO

By Percentage of Curriculum

1991-92	1995-96	2001-02
NSUCO	NSUCO	UCB
PUCO	UH	SUNY
UH	SCO	PUCO
UMSL	UMSL	UMSL
OSU	PUCO	NSUCO
SUNY	UCB	NOVA
ICO	NEWENCO	SCO
SCO	IU	ICO
IU	OSU	UAB
UAB	ICO	SCCO
SCCO	SUNY	IU
NEWENCO	UAB	OSU
NOVA	NOVA	UH
MCO	SCCO	MCO
UCB	MCO	NEWENCO

Table 9

Summary of Curriculum Metacategories

	Medical	Optometric	Chiropractic	Other
2001-02 Mean in Clock Hours	649	869	967 7	571
1995-96 Mean in Clock Hours	770	863	990 0	566
1991-92 Mean in Clock Hours	752	876	912 2	578
2001-02 Mean in %	16.9%	21.0%	4.6%%	12.5%
1995-96 Mean in %	18.8%	21.5%	4.9%%	13.8%
1991-92 Mean in %	19.3%	22.7%	4.1%%	14.9%
2001-02 Std Dev for Clock Hours	149	140	21	104
1995-96 Std Dev for Clock Hours	169	123	73	112
1991-92 Std Dev for Clock Hours	146	98	11)	100
2001-02 Std Dev for %	2.5%	3.5%	44%	2.6%
1995-96 Std Dev for %	3.5%	3.6%	55%	2.7%
1991-92 Std Dev for %	4.1%	3.8%	44%	2.5%

Table 10

Prerequisite Table

School:	IAUPR	ICO	IU	MCO	NEWENCO	NOVA	NSUCO	OSU	PUCO	SCCO	SCO	SUNY	UAB	UCB	UH	UMSL	Average	Std Dev
Semesters of:																		
General Chemistry	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2		
Gen Chem Lab	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2		
Organic Chemistry	1	1	1	2	1	1	1	1	1	1	2	2	1	2	1	1		
O. Chem Lab	1	0	1	2	1	1	1	0	1	0	2	2	1	2	1	1		
Biochemistry	1	0	0	1	0	1	1	1	0	0	0	0	0	1	1	0		
Biochem Lab	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0		
General Biology	2	2	1	2	2	2	1	2	0	2	2	2	2	2	2	2		
Gen Bio Lab	2	2	1	2	2	2	1	2	0	2	2	2	2	2	2	2		
Advanced Biology	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1		
Advanced Bio Lab	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
Microbiology	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	0		
Micro Lab	1	1	1	1	0	1	0	1	1	1	1	0	1	0	1	0		
Human Anatomy	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0		
Anatomy Lab	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0		
Human Physiology	0	0	0	1	0	0	0	1	1	0	0	0	0	1	1	0		
Physiology Lab	0	0	0	1	0	0	0	0	1	0	0	0	0	1	1	0		
General Physics	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
General Physics Lab	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
Calculus	1	0	1	1	1	1	1	1	1	1	1	1	1	2	1	1		
Statistics	1	1	1	1	0	0	1	0	1	1	1	1	1	1	1	1		
English	2	2	0	2	2	2	2	0	3	2	2	2	2	2	0	2		
Psychology	1	1	0	0	1	0	1	0	1	2	1	1	2	1	1	2		
Additional Social & Behavioral Science	2	1	0	3	0	5	0	0	0	0	2	2	2	0	0	0		
Liberal Arts and Humanities	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	2		
Spanish	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Other Foreign Language	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total	28	20	17	31	18	26	19	18	22	21	25	23	24	27	25	24	23.0	4.0
Total BB	13	11	11	17	10	14	10	13	12	11	14	12	12	17	18	12	12.9	2.5

Figure 1

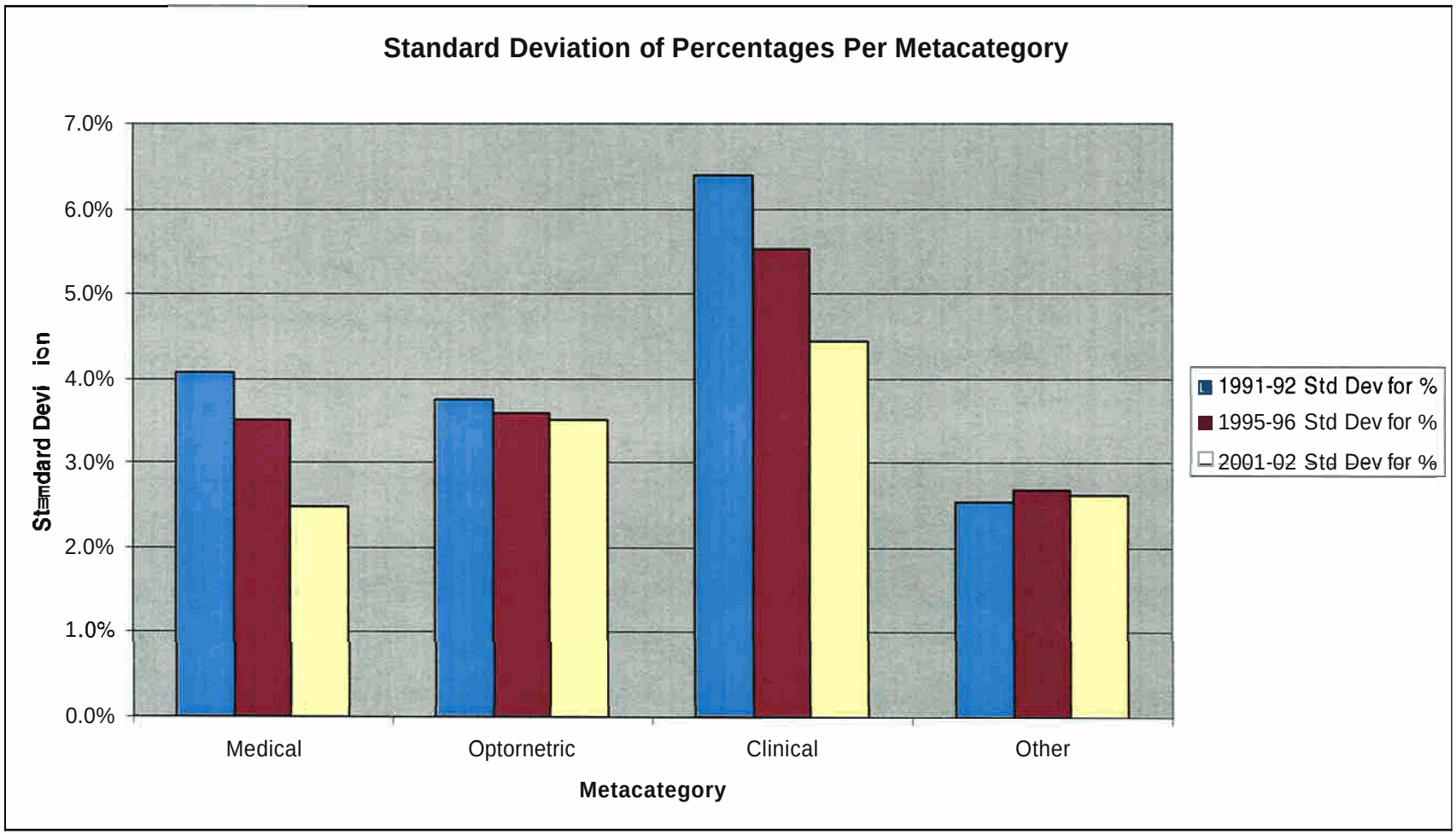

Standard Deviation of Percentages Per Metacategory
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
Standard Deviation
Medical
Optornetric
Clinical
Other
Metacategory
1991-92 Std Dev for %
1995-96 Std Dev for %
2001-02 Std Dev for %

Figure 2

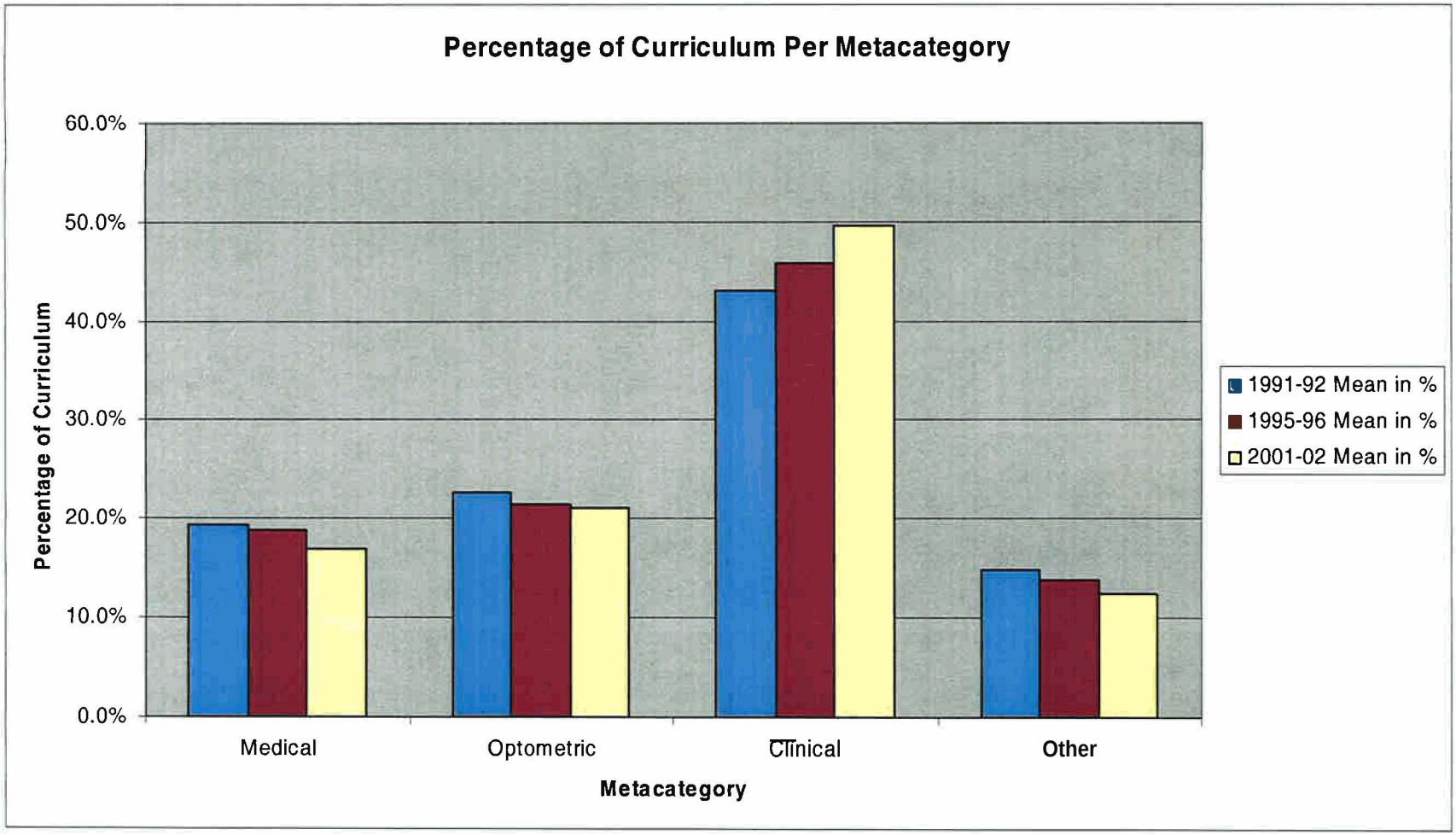

Percentage of Curriculum Per Metacategory
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Percentage of Curriculum
Medical
Optometric
Clinical
Other
Metacategory
1991-92 Mean in %
1995-96 Mean in %
2001-02 Mean in %

Figure 3

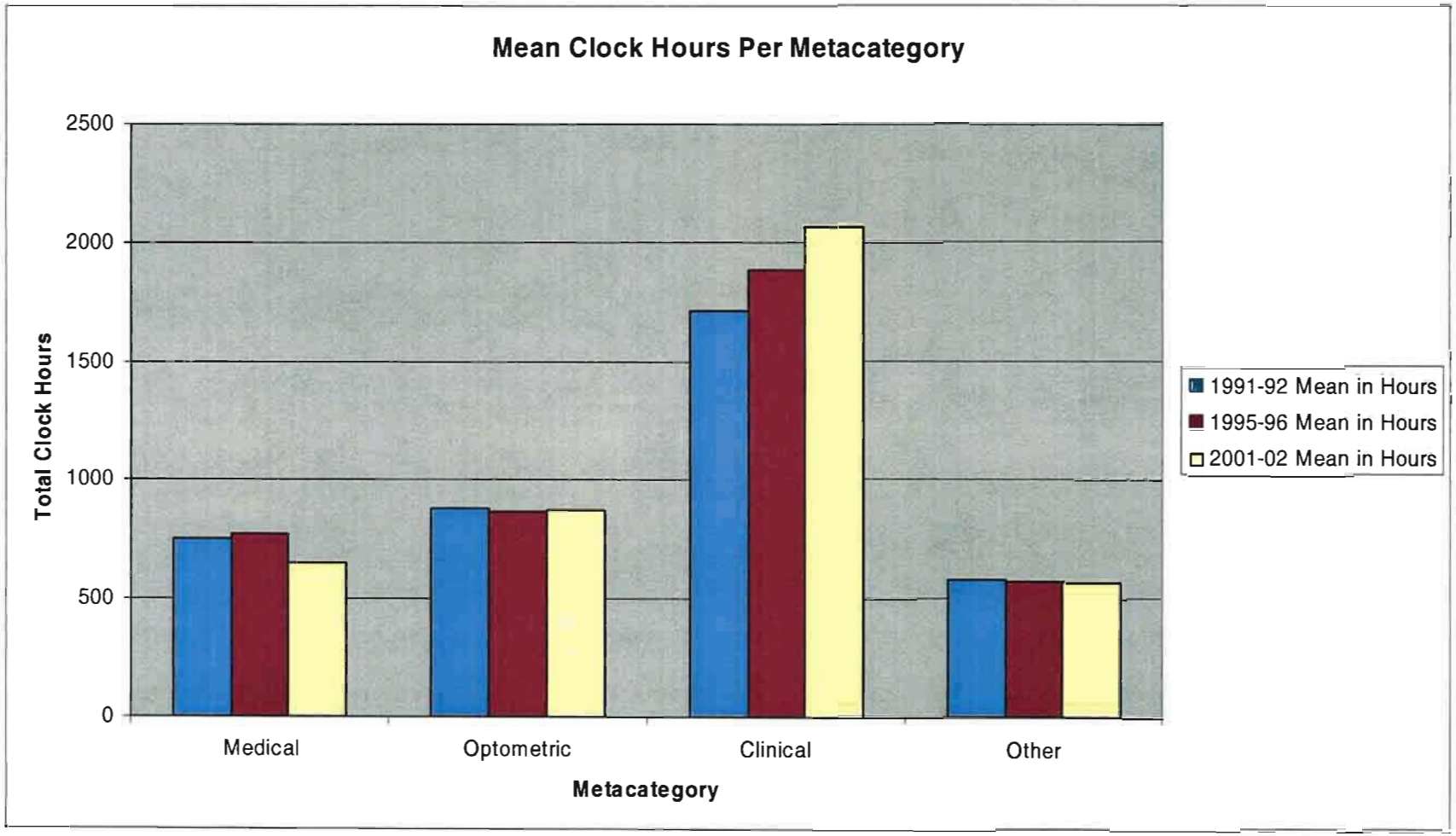

Mean Clock Hours Per Metacategory
Total Clock Hours
2500
2000
1500
1000
500
0
Medical
Optometric
Clinical
Other
Metacategory
1991-92 Mean in Hours
1995-96 Mean in Hours
2001-02 Mean in Hours

Figure 4a

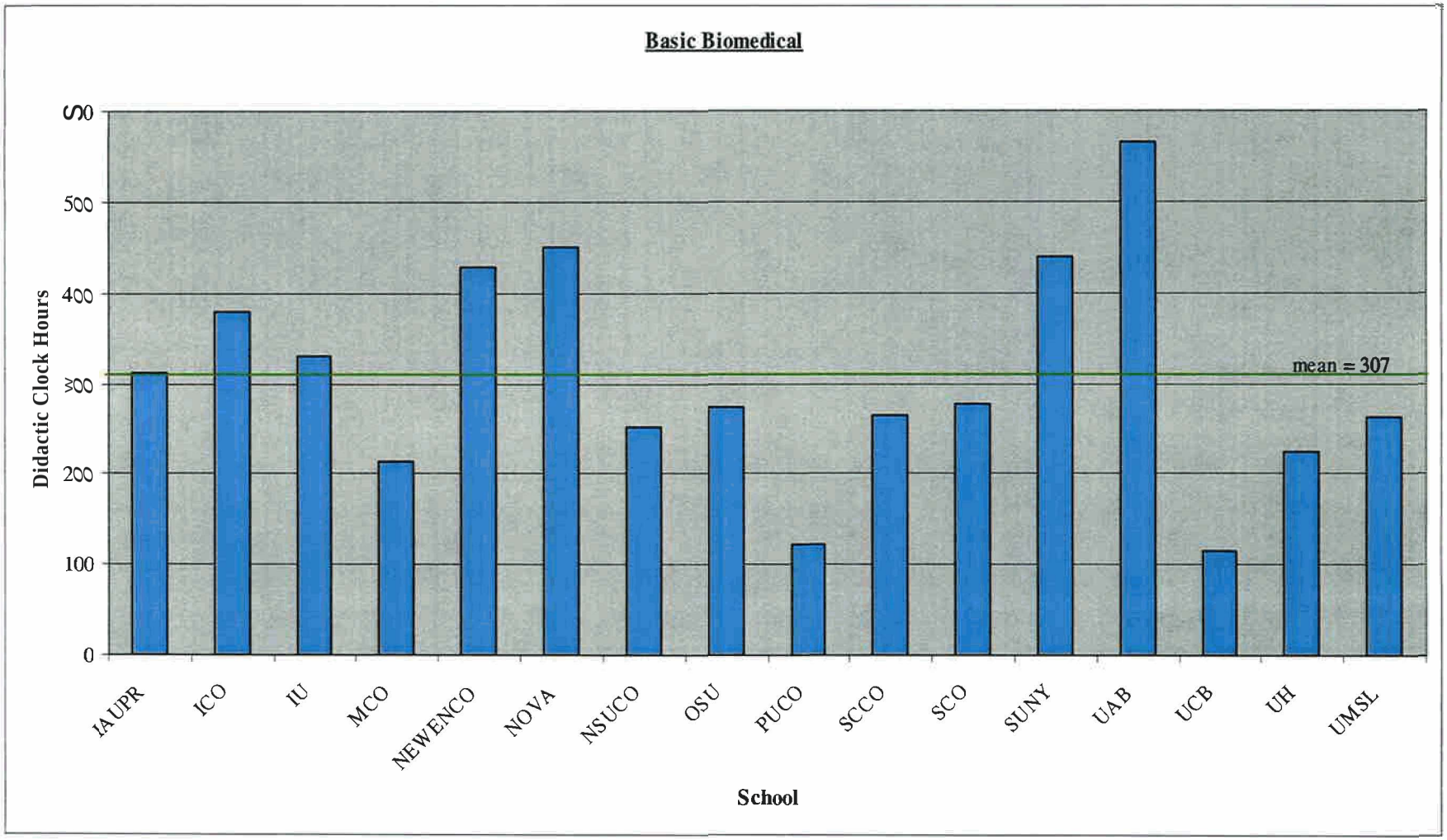

Basic Biomedical
Didactic Clock Hours
600
500
400
300
200
100
0
mean = 307
IA UPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 4b

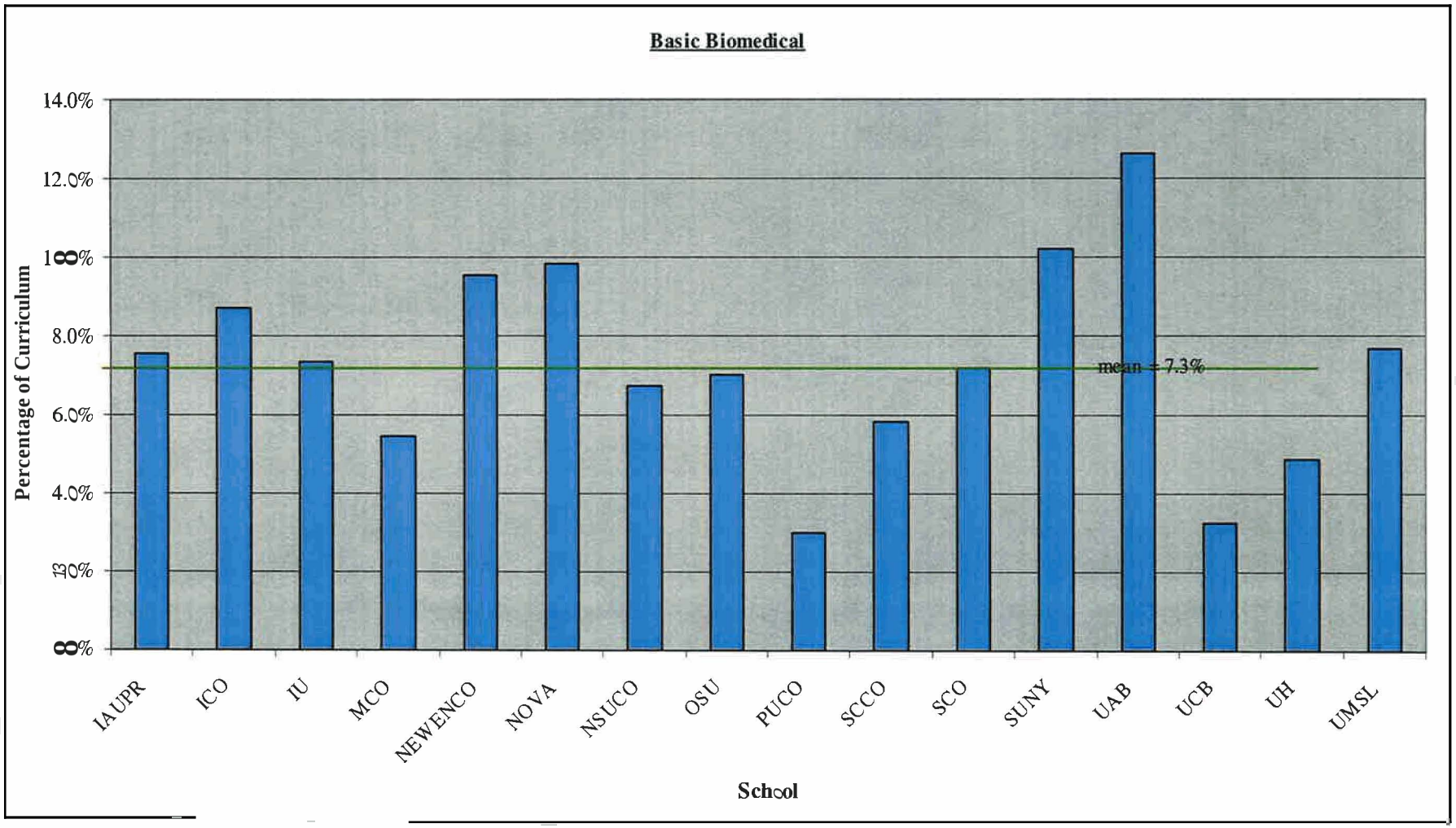

Basic Biomedical
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
Percentage of Curriculum
mean = 7.3%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 5a

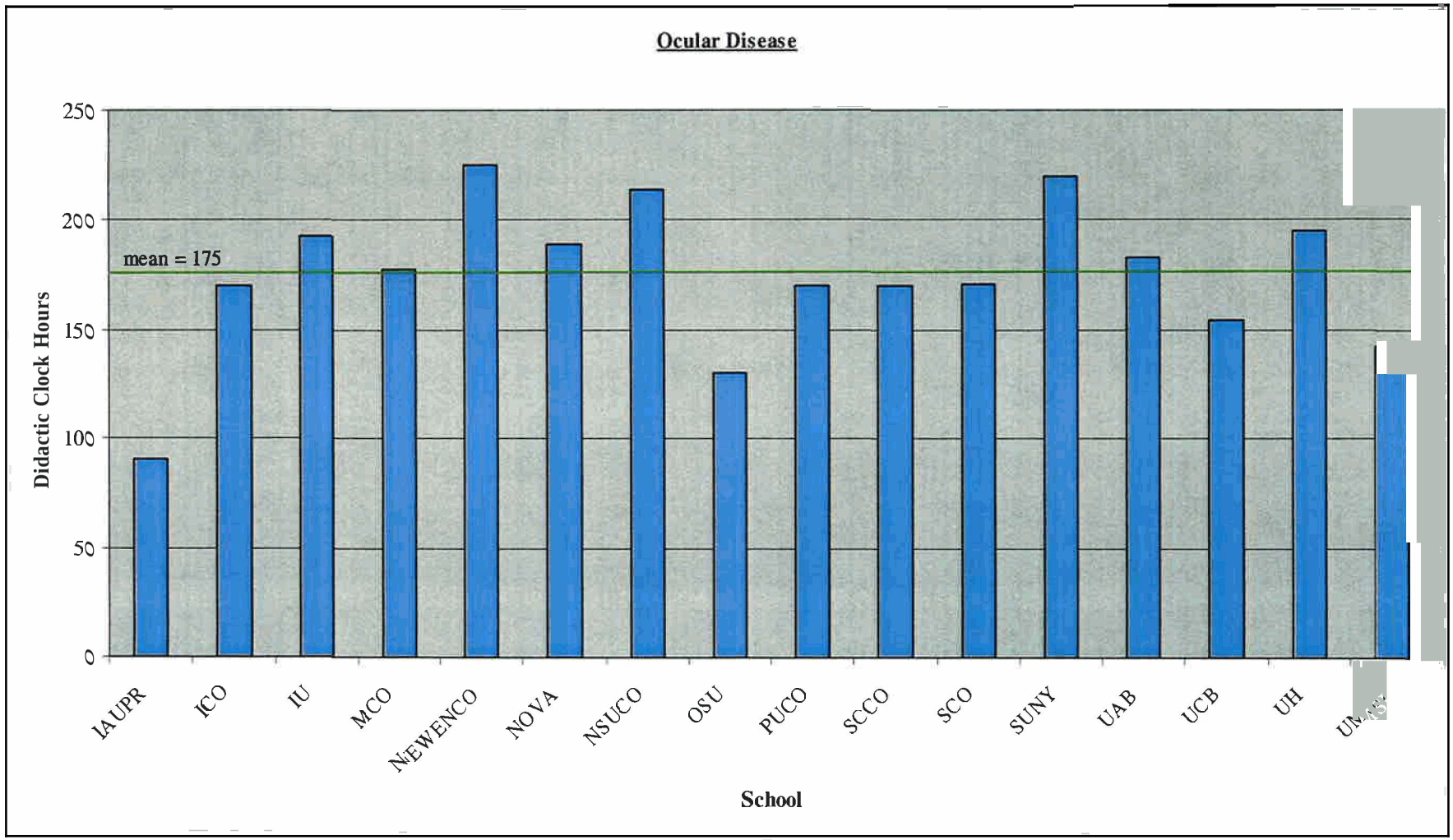

Ocular Disease
Didactic Clock Hours
250
200
150
100
50
0
mean = 175
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
School

Figure 5b

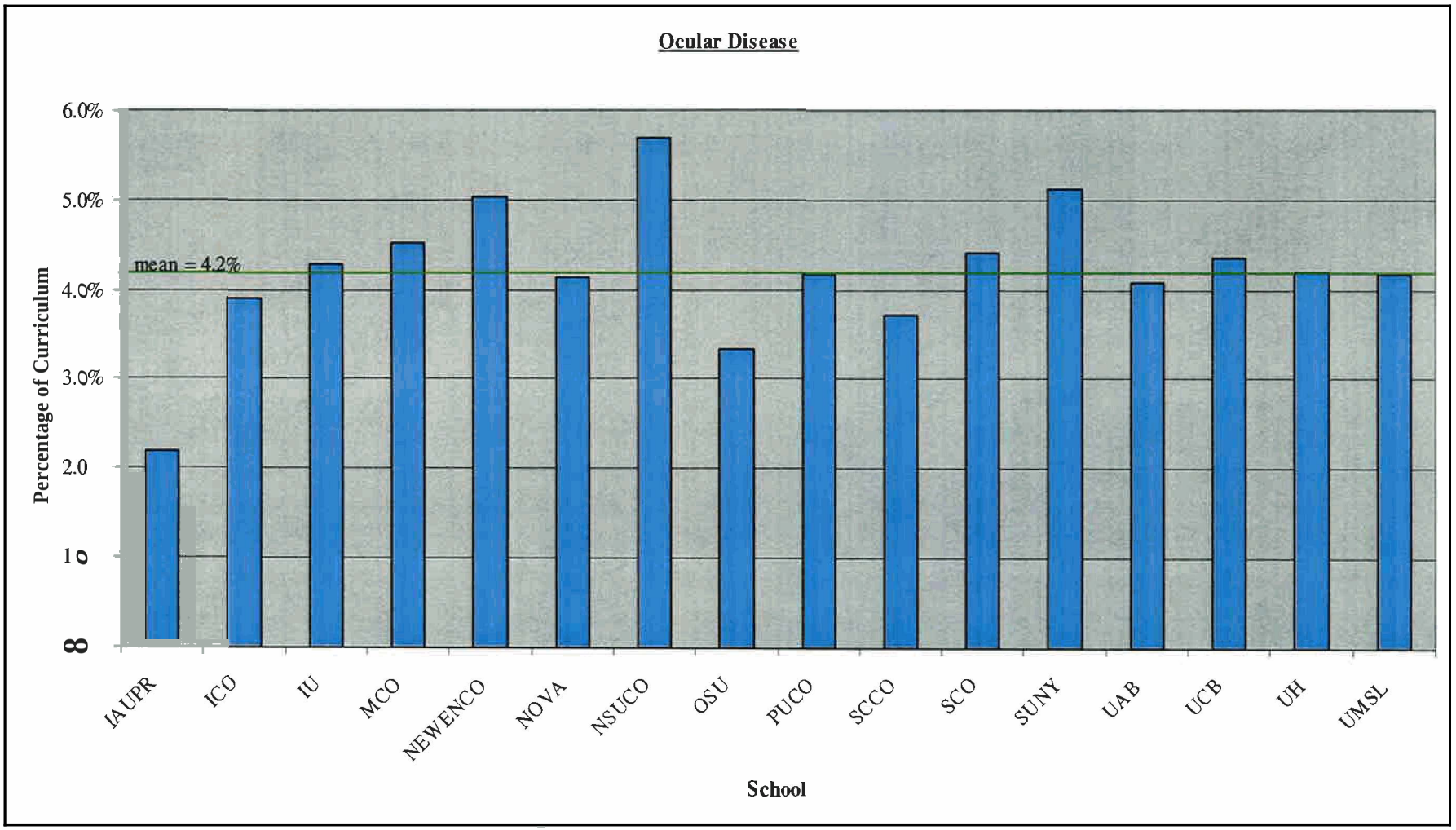

Ocular Disease
6.0%
5.0%
4.0%
3.0%
2.0
1 o
8
mean = 4.2%
Percentage of Curriculum
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 6a

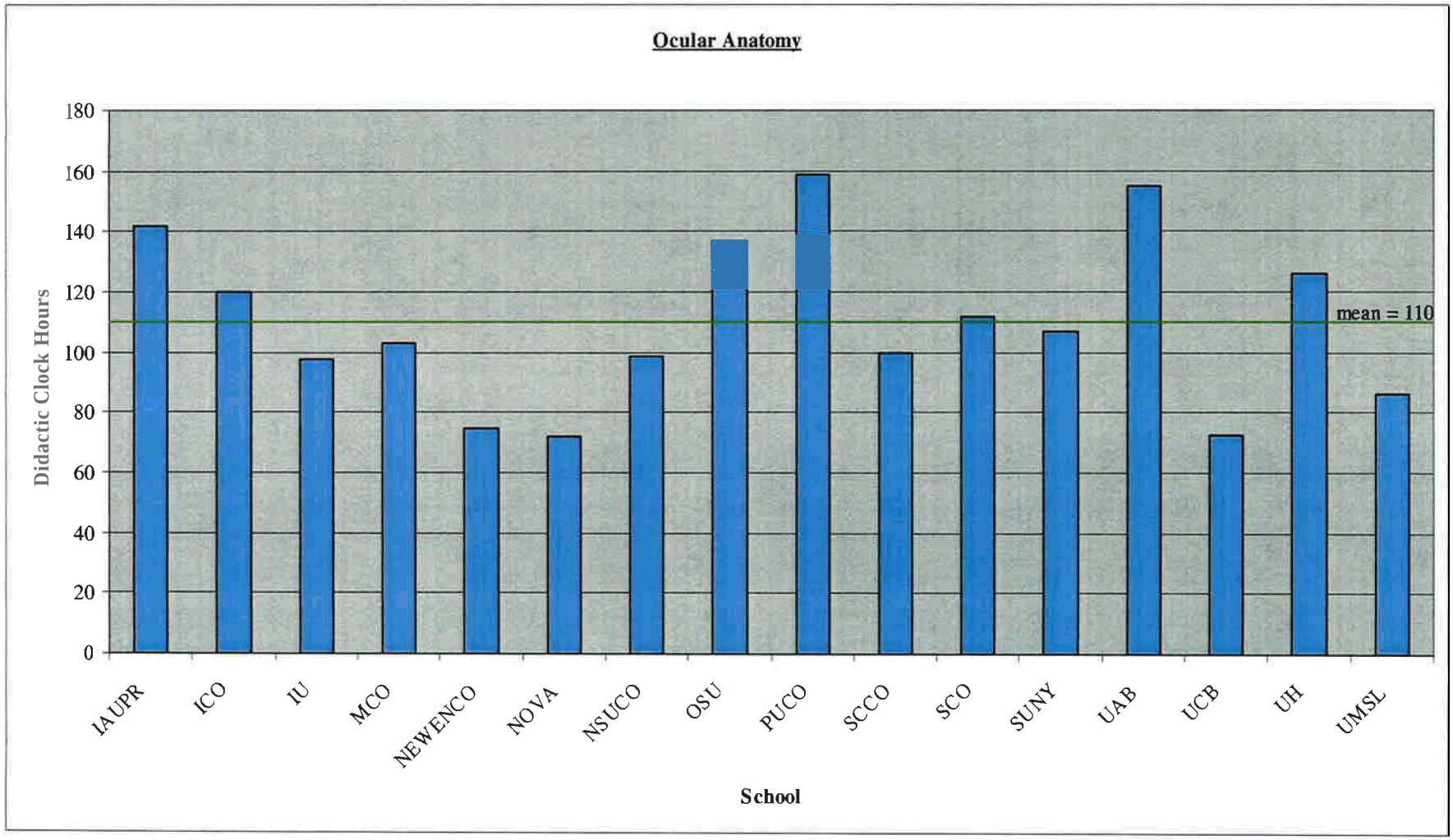

Ocular Anatomy
Didactic Clock Hours
180
160
140
120
100
80
60
40
20
0
mean = 110
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 6b

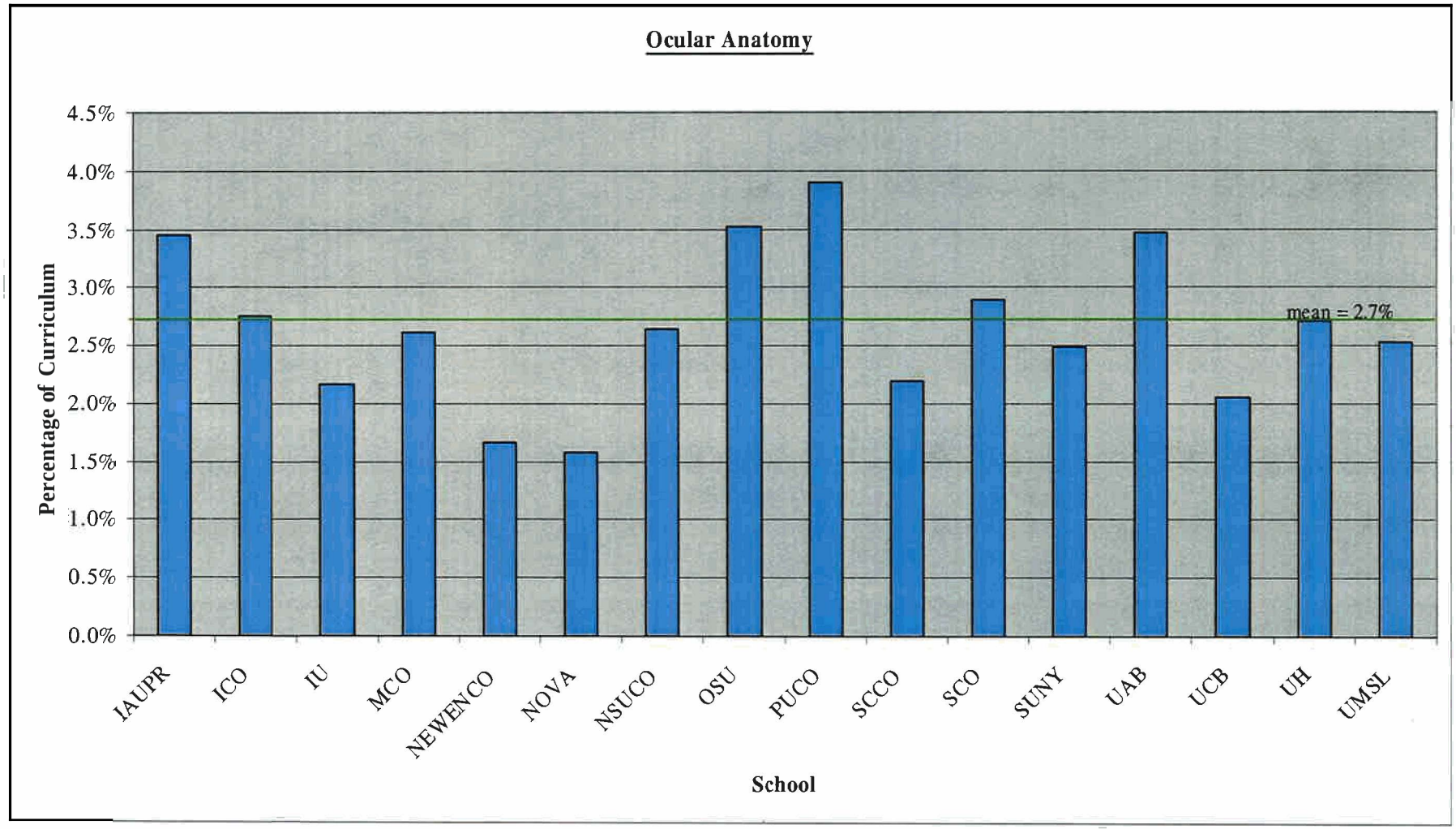

Ocular Anatomy
Percentage of Curriculum
4.5%
4.0%
3.5%
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
mean = 2.7%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 7a

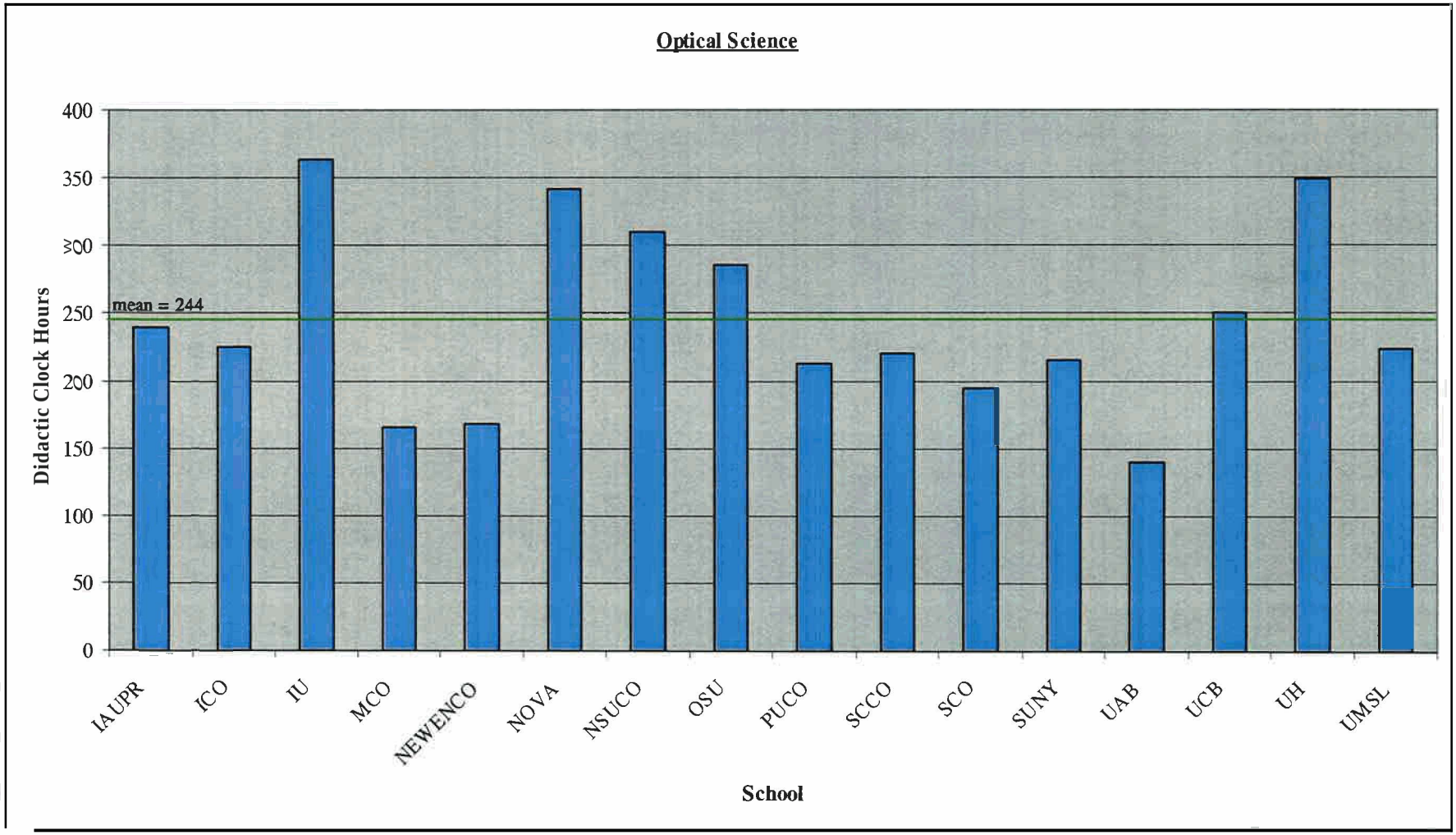

Optical Science
400
350
300
250
200
150
100
50
0
mean = 244
Didactic Clock Hours
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 7b

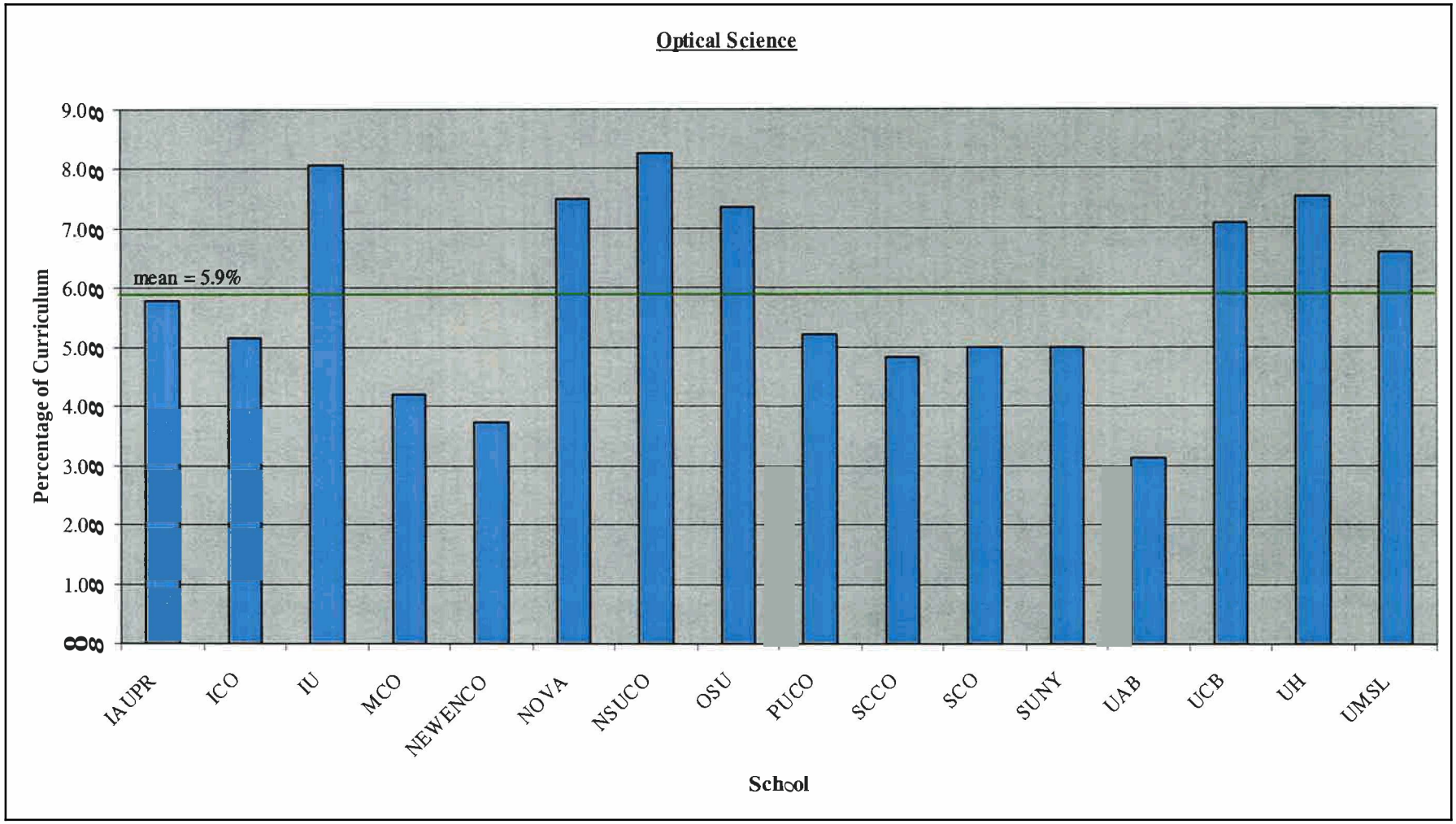

Optical Science
Percentage of Curriculum
9.0%
8.0%
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
mean = 5.9%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 8a

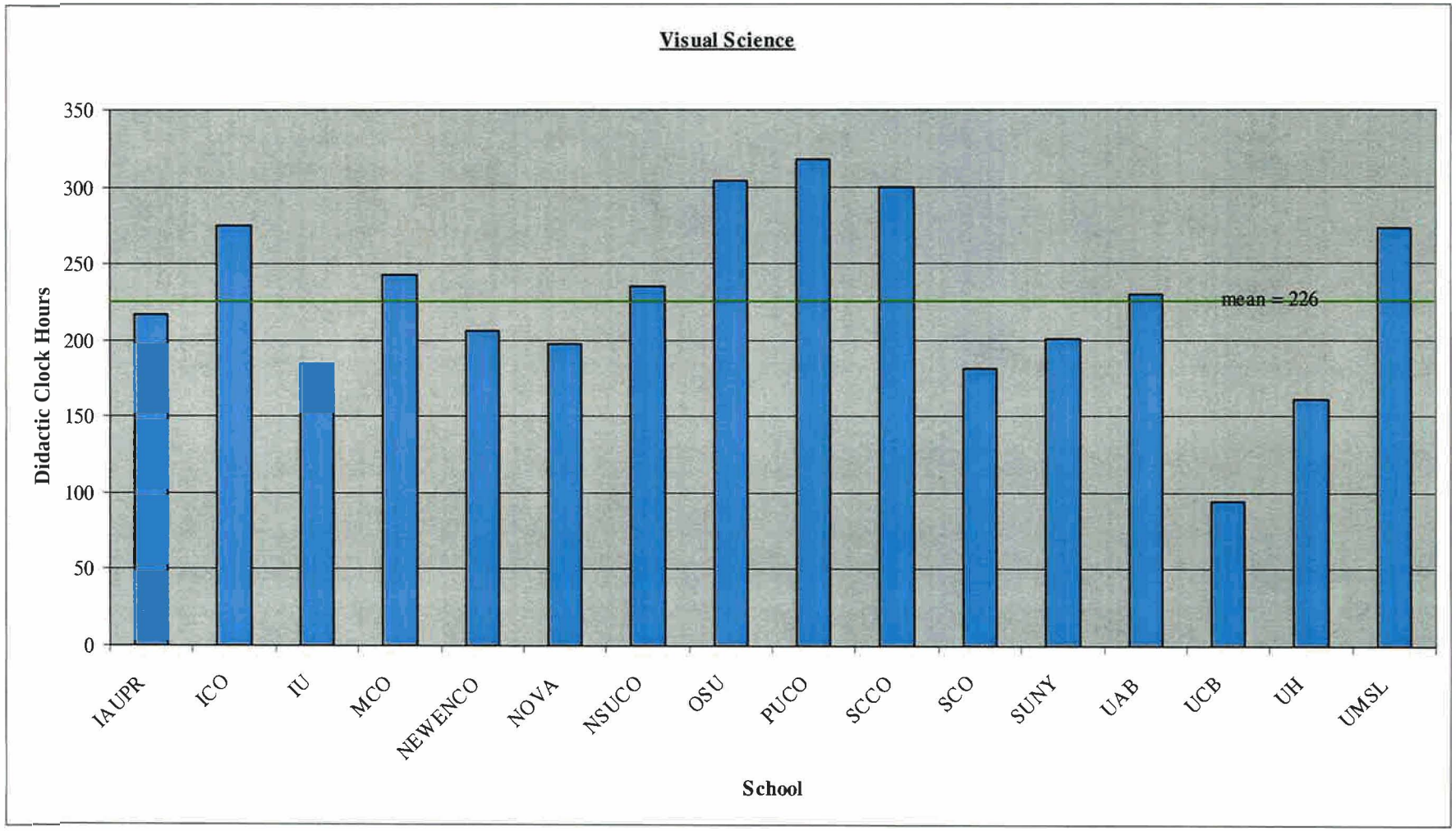

Visual Science
Didactic Clock Hours
350
300
250
200
150
100
50
0
mean = 226
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 8b

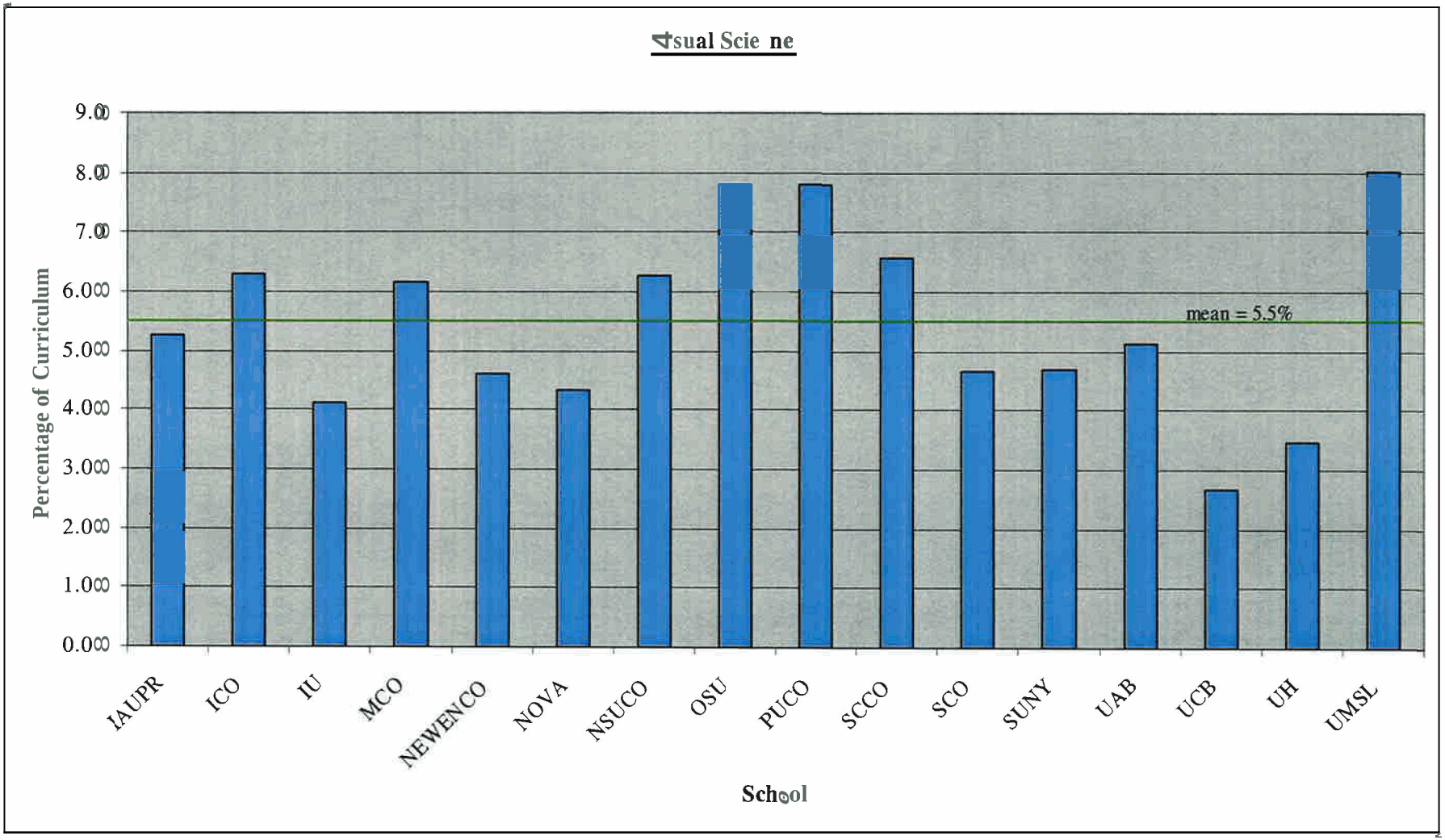

sual Scie ne
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Percentage of Curriculum
mean = 5.5%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 9a

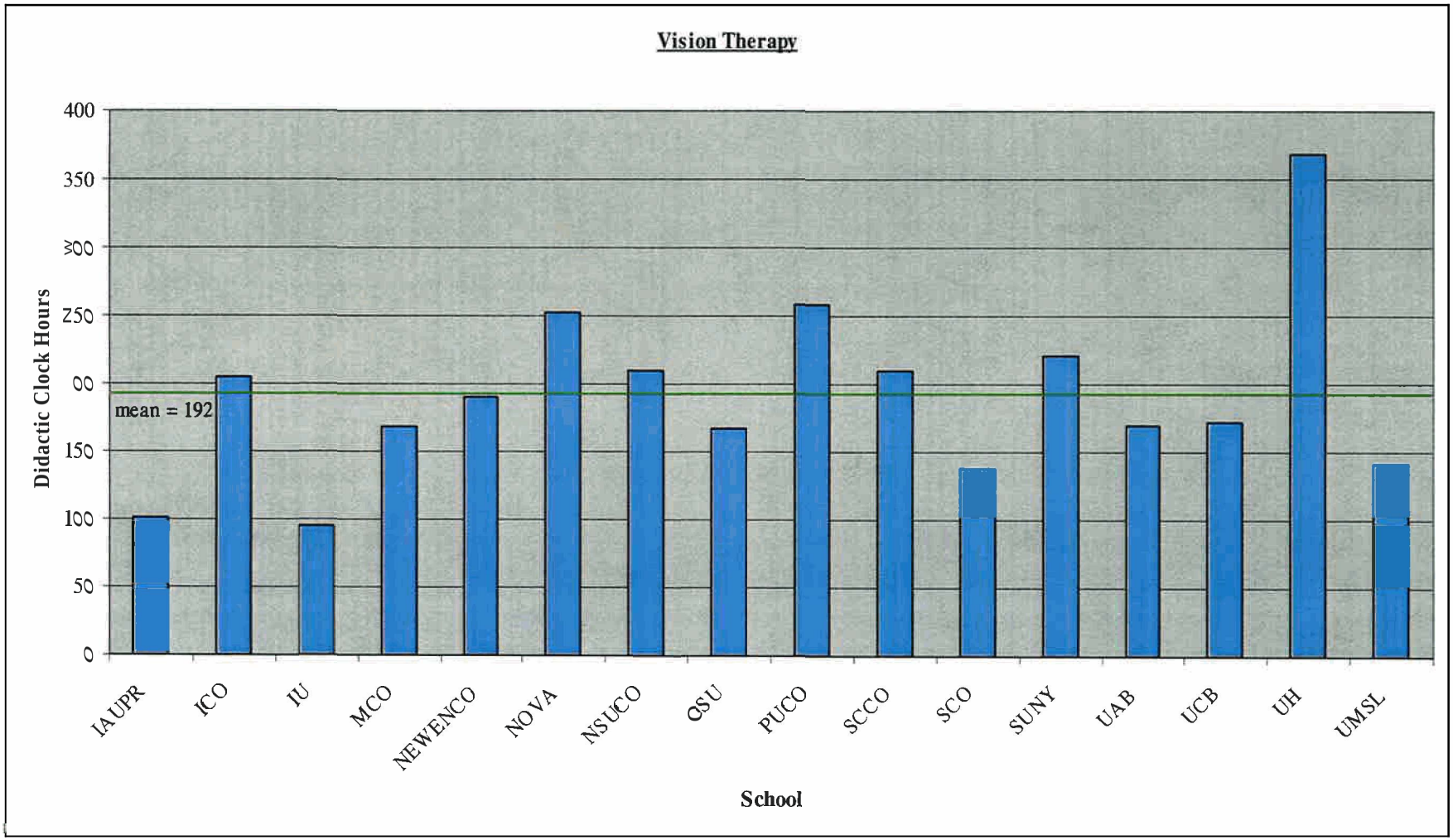

Vision Therapy
Didactic Clock Hours
400
350
300
250
200
150
100
50
0
mean = 192
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 9b

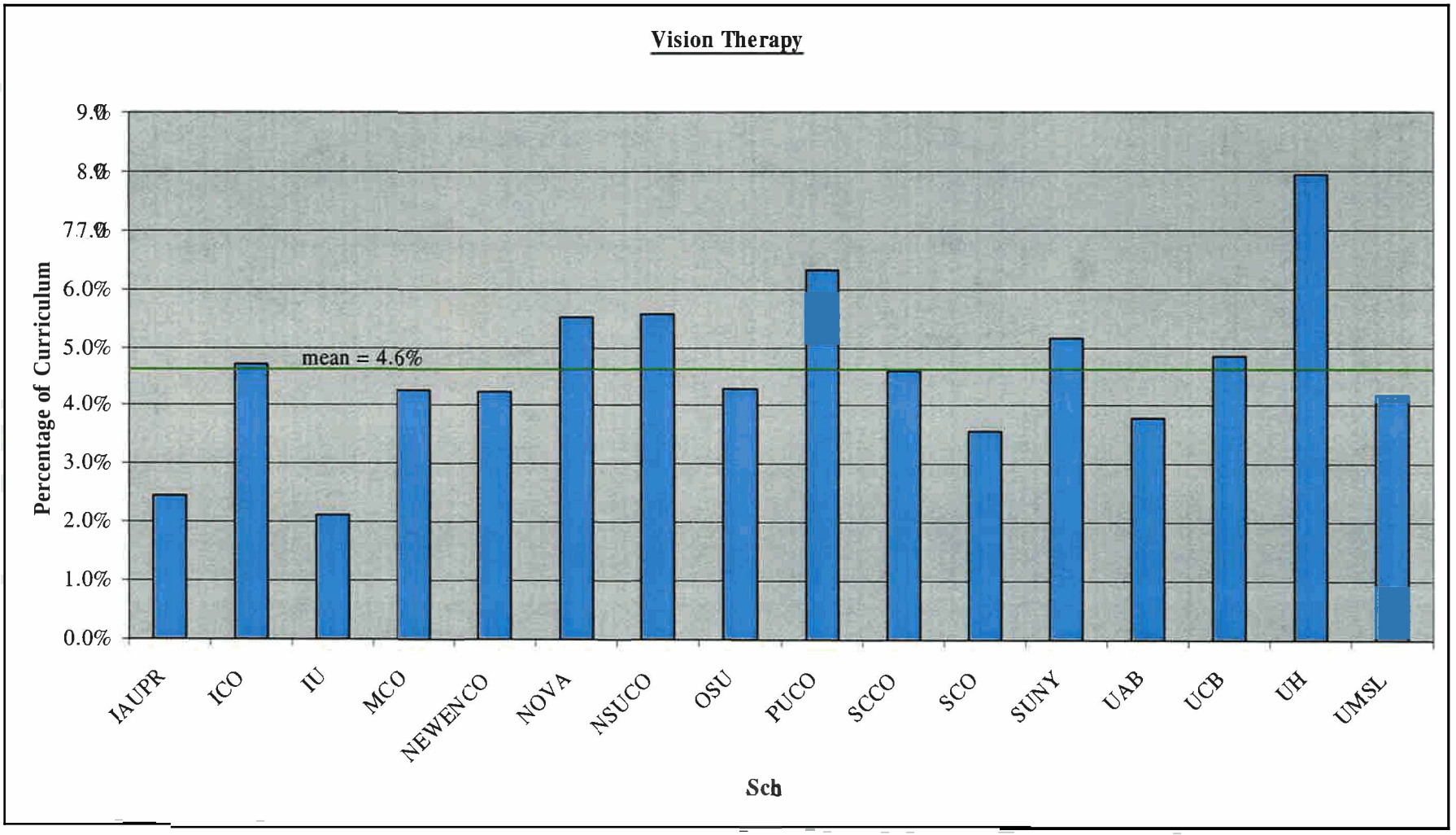

Vision Therapy
Percentage of Curriculum
9.0%
8.0%
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
mean = 4.6%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
Sch

Figure 10a

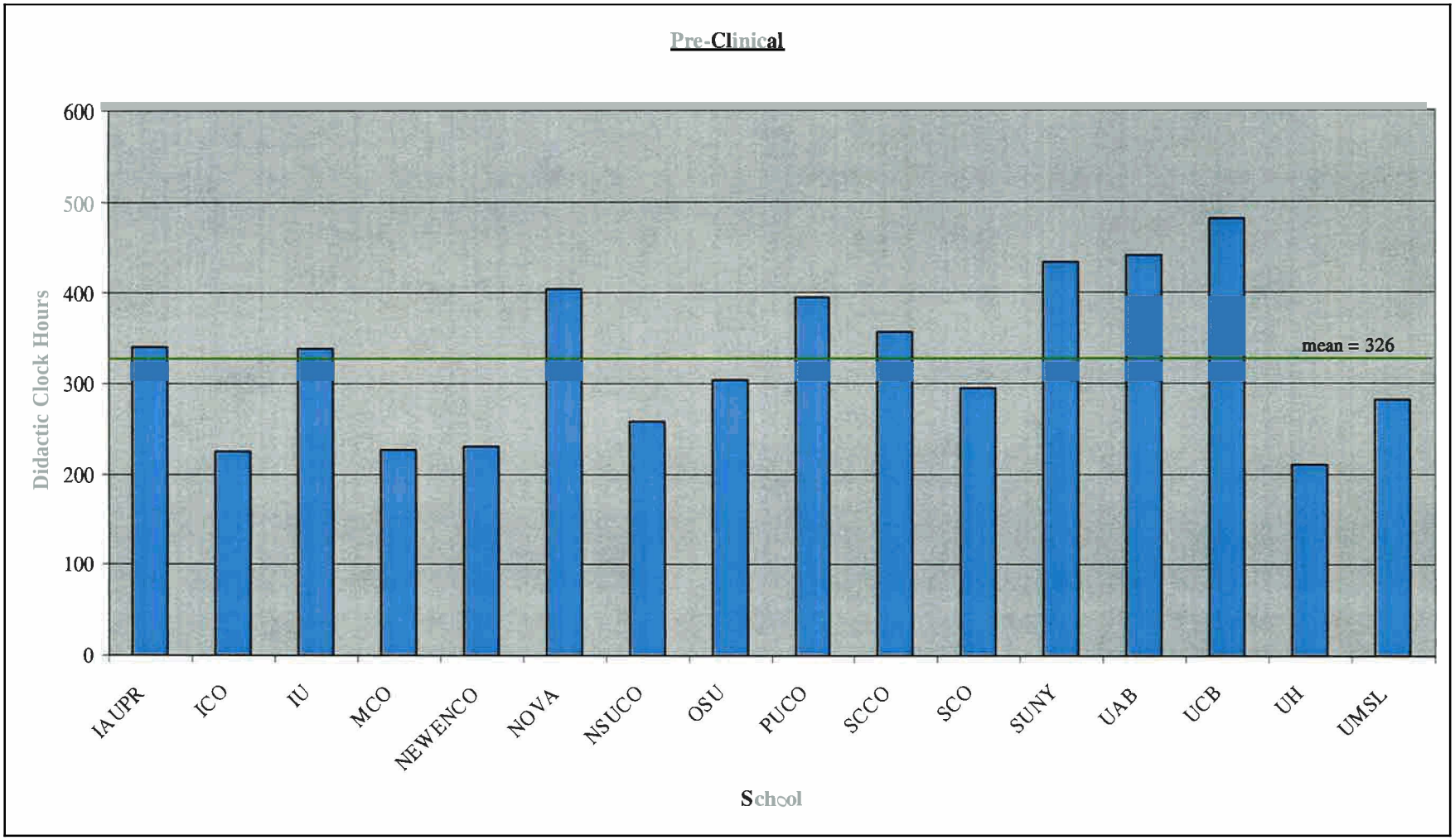

Pre-Clinical
Didactic Clock Hours
600
500
400
300
200
100
0
mean = 326
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 10b

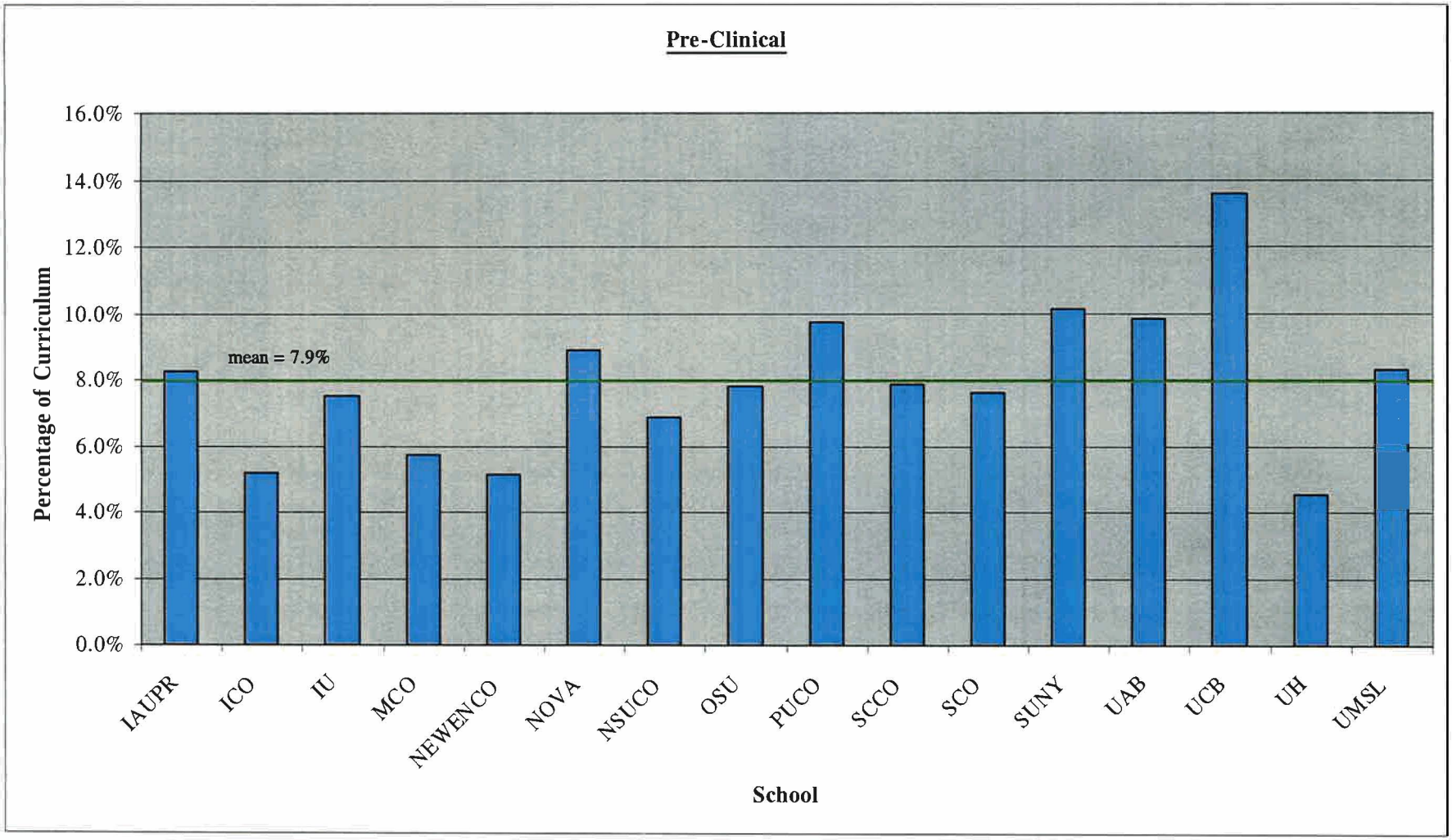

Pre-Clinical
16.0%
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
Percentage of Curriculum
mean = 7.9%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 11a

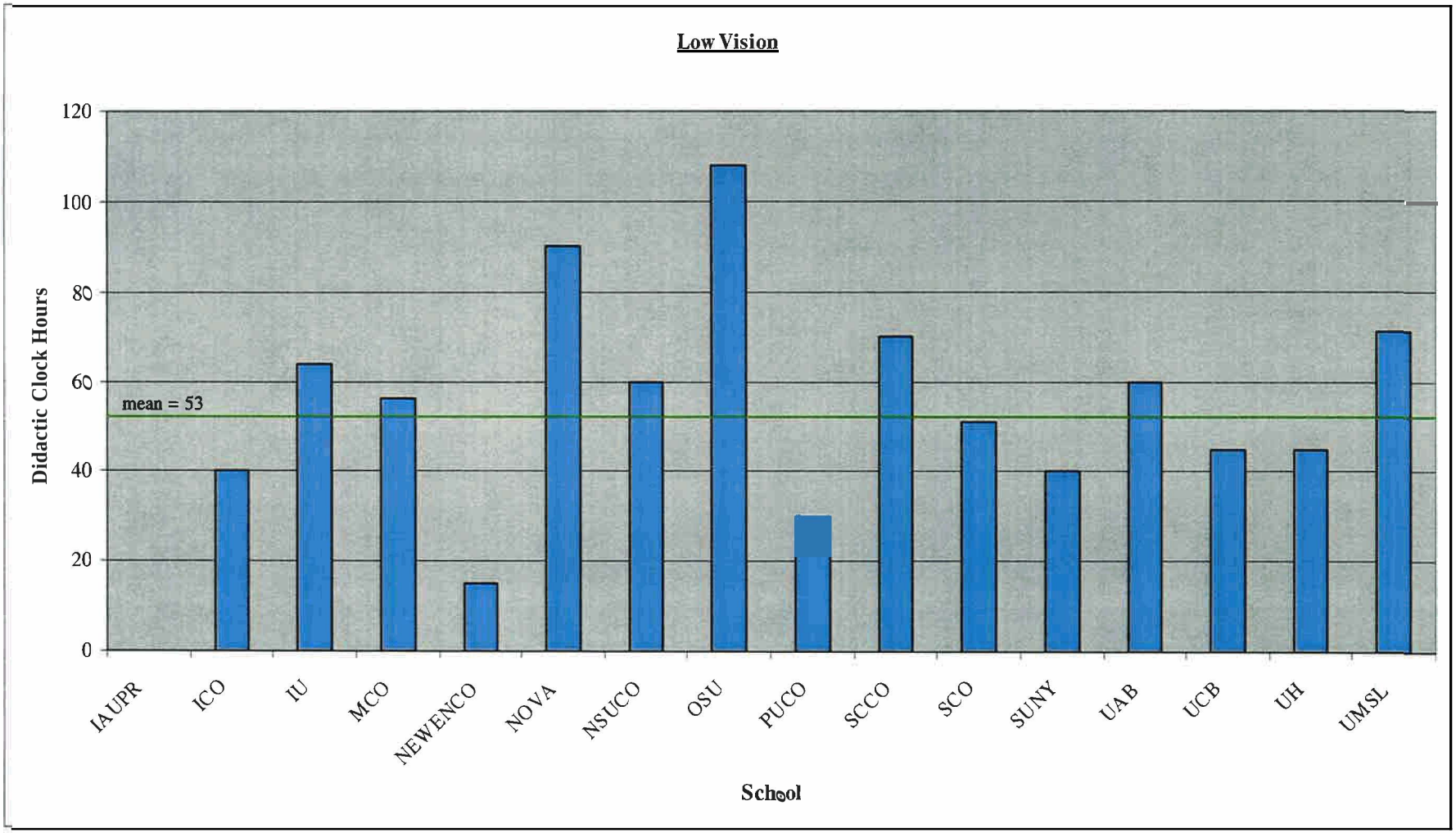

Low Vision
Didactic Clock Hours
120
100
80
60
40
20
0
mean = 53
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 11b

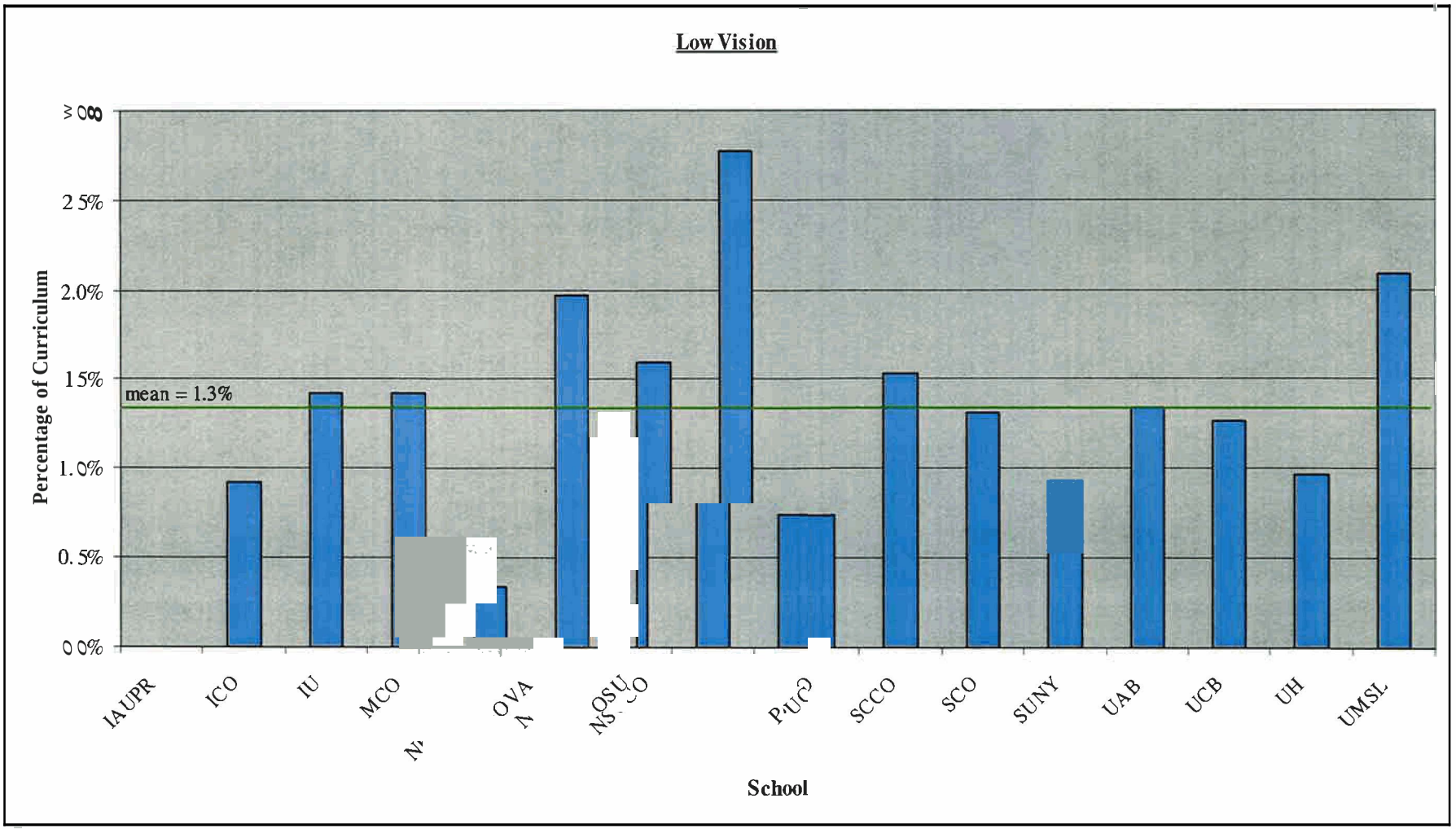

Low Vision
Percentage of Curriculum
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
mean = 1.3%
IAUPR
ICO
IU
MCO
OVA
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 12a

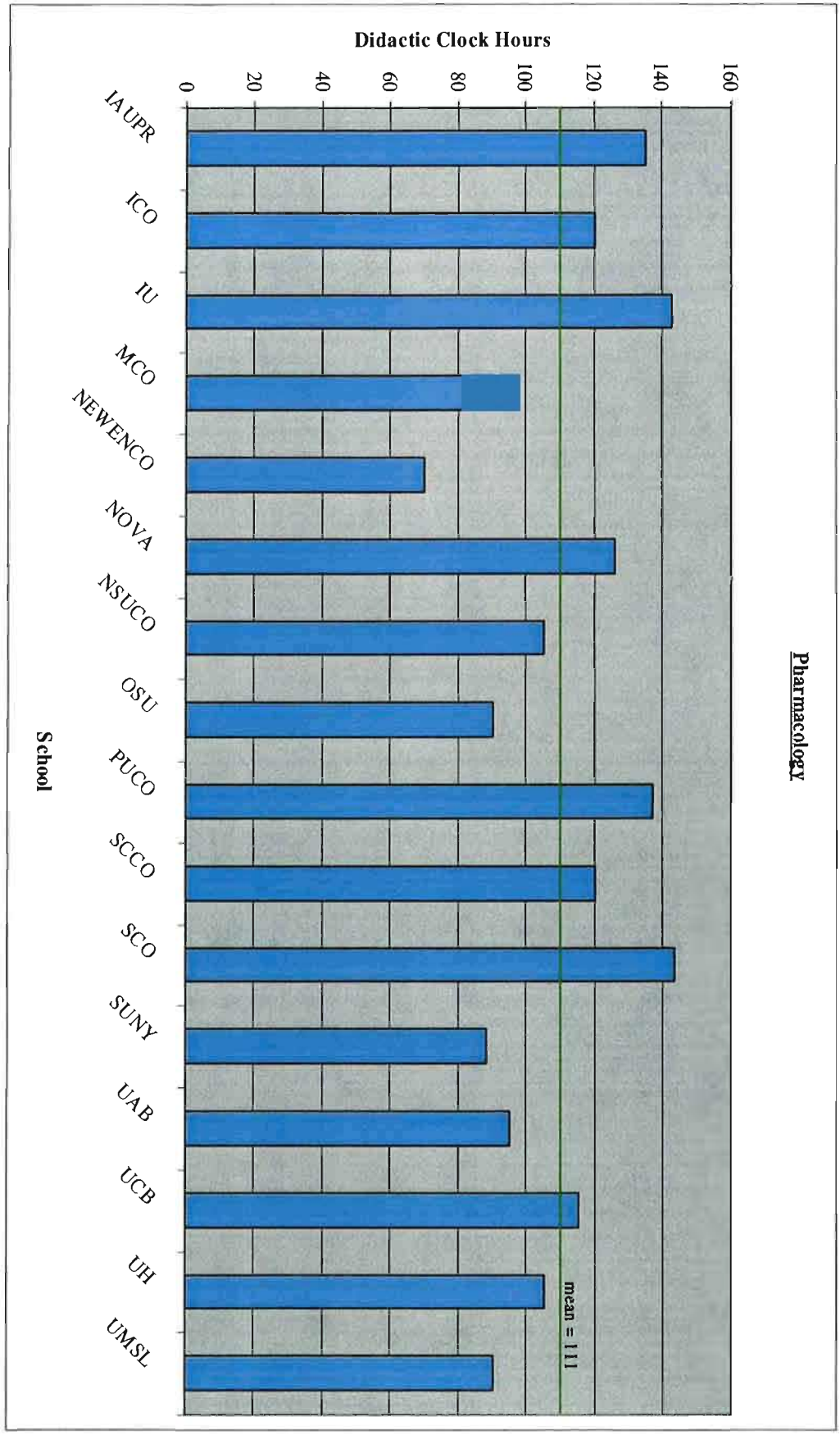

Pharmacology
Didactic Clock Hours
0
20
40
60
80
100
120
140
160
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School
mean = 111

Figure 12b

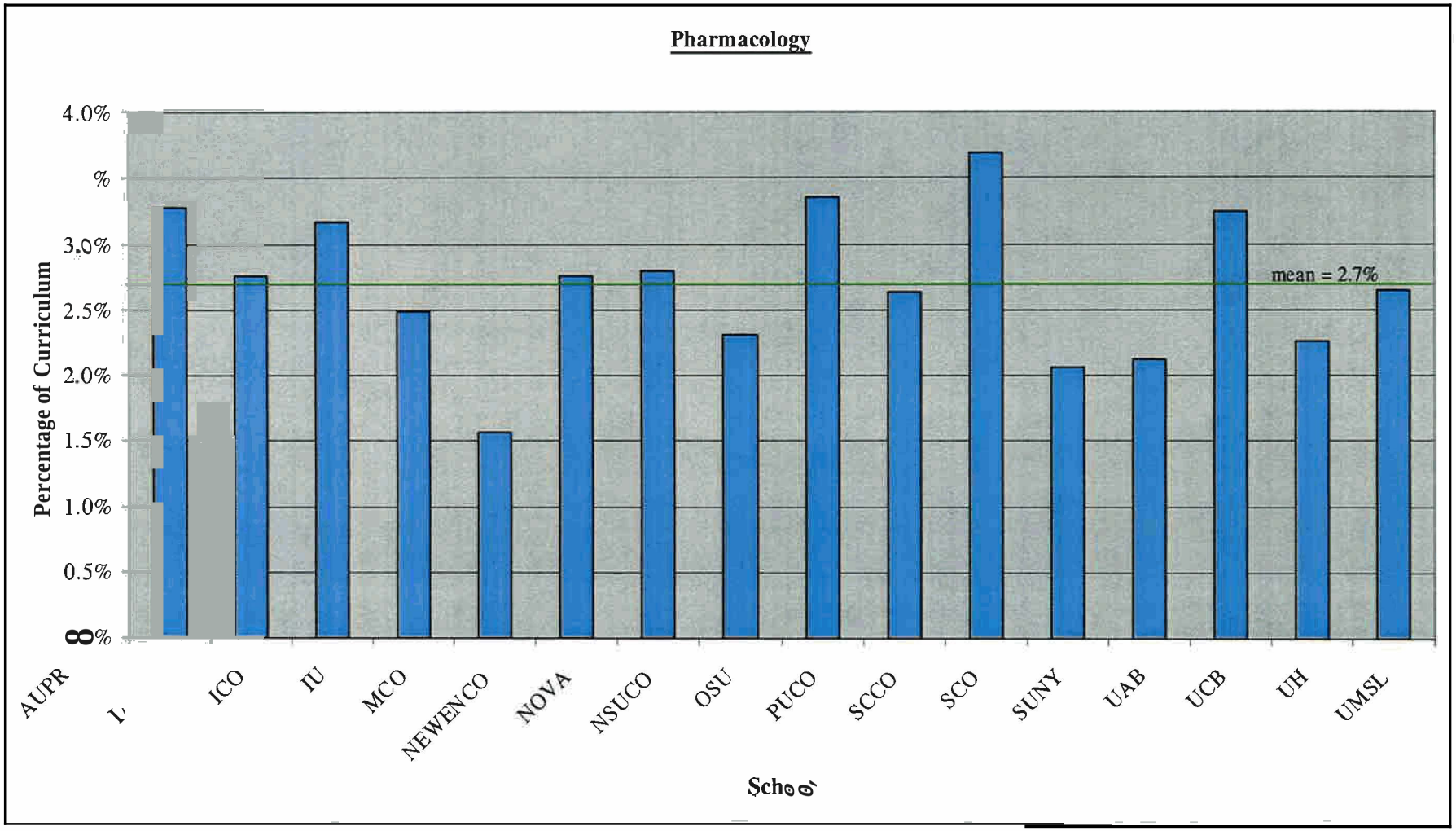

Pharmacology
4.0%
%
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
8%
Percentage of Curriculum
mean = 2.7%
AUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL

Figure 13a

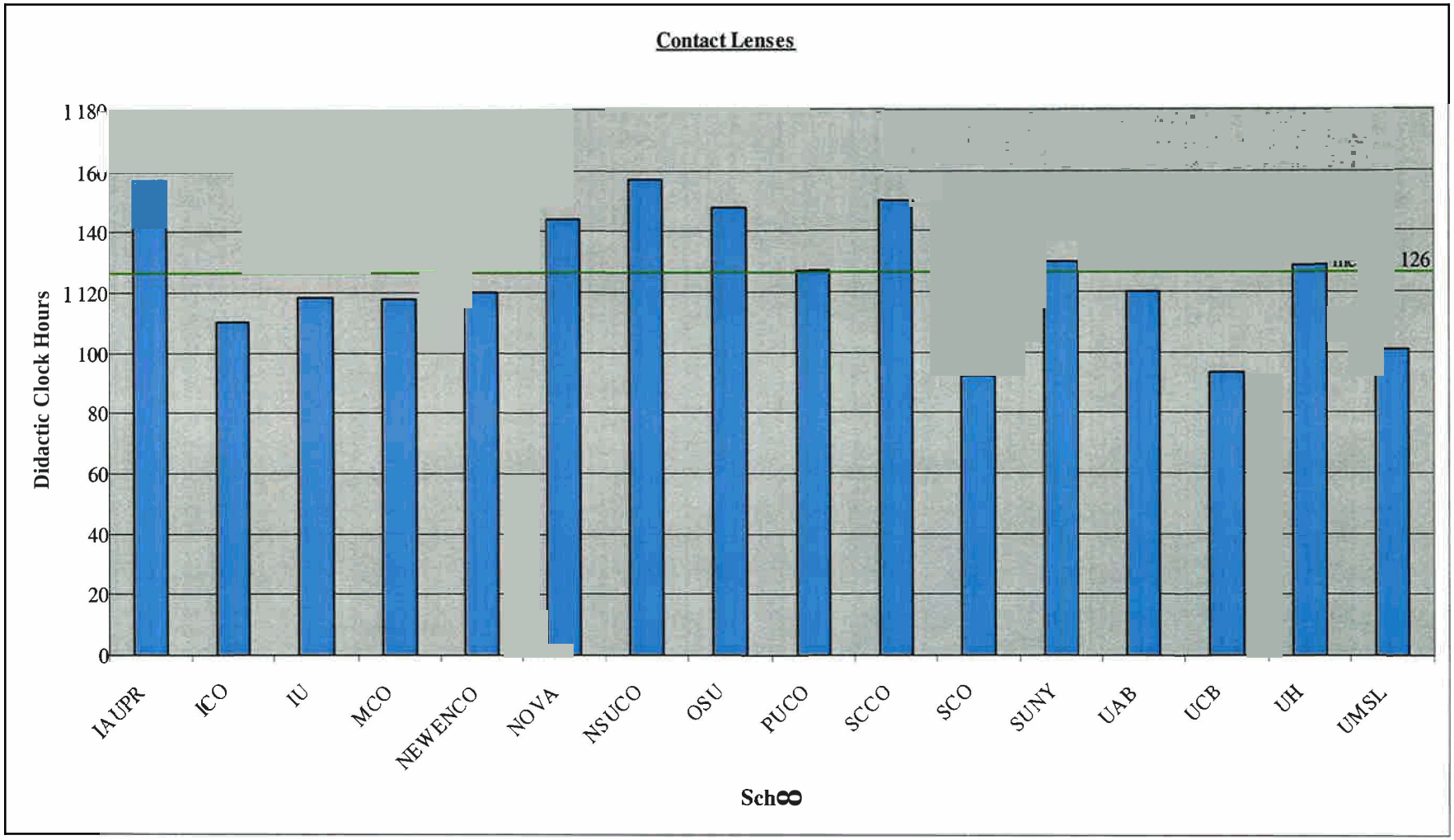

Contact Lenses
Didactic Clock Hours
160
140
120
100
80
60
40
20
0
126
IA UPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL

Figure 13b

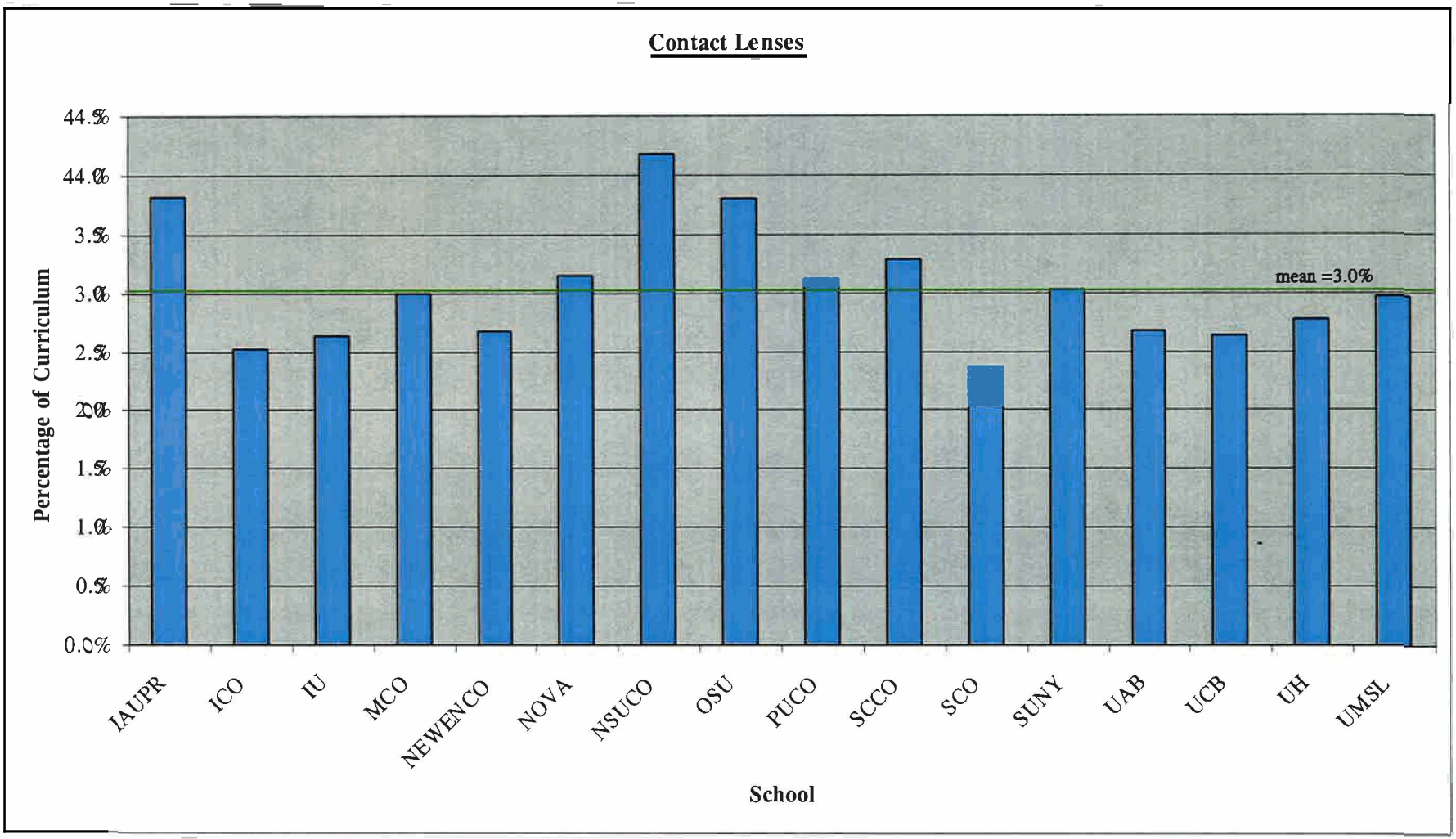

Contact Lenses
Percentage of Curriculum
44.5%
44.0%
3.5%
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
mean =3.0%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 14a

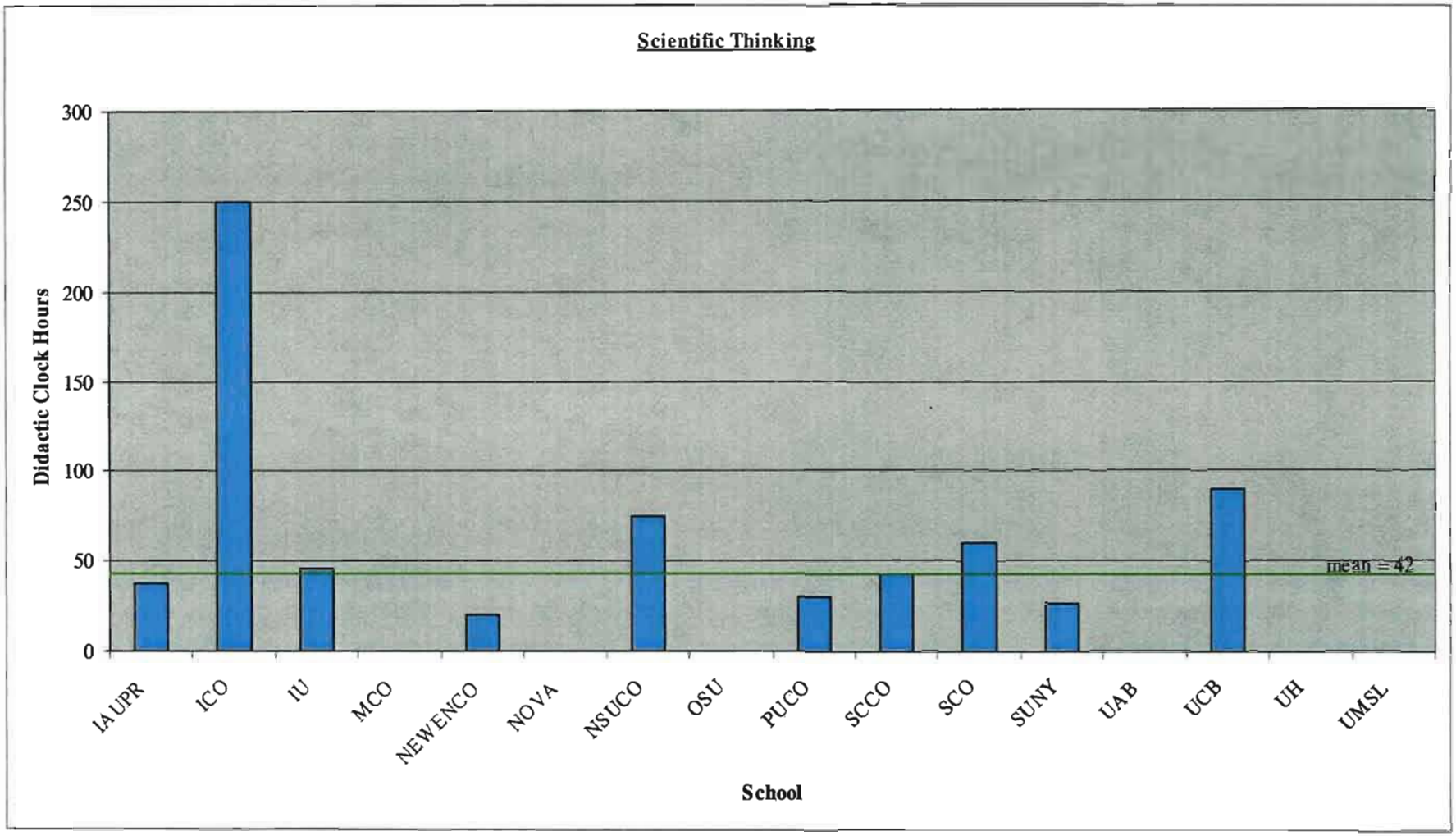

Scientific Thinking
Didactic Clock Hours
300
250
200
150
100
50
0
mean = 42
IA UPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 14b

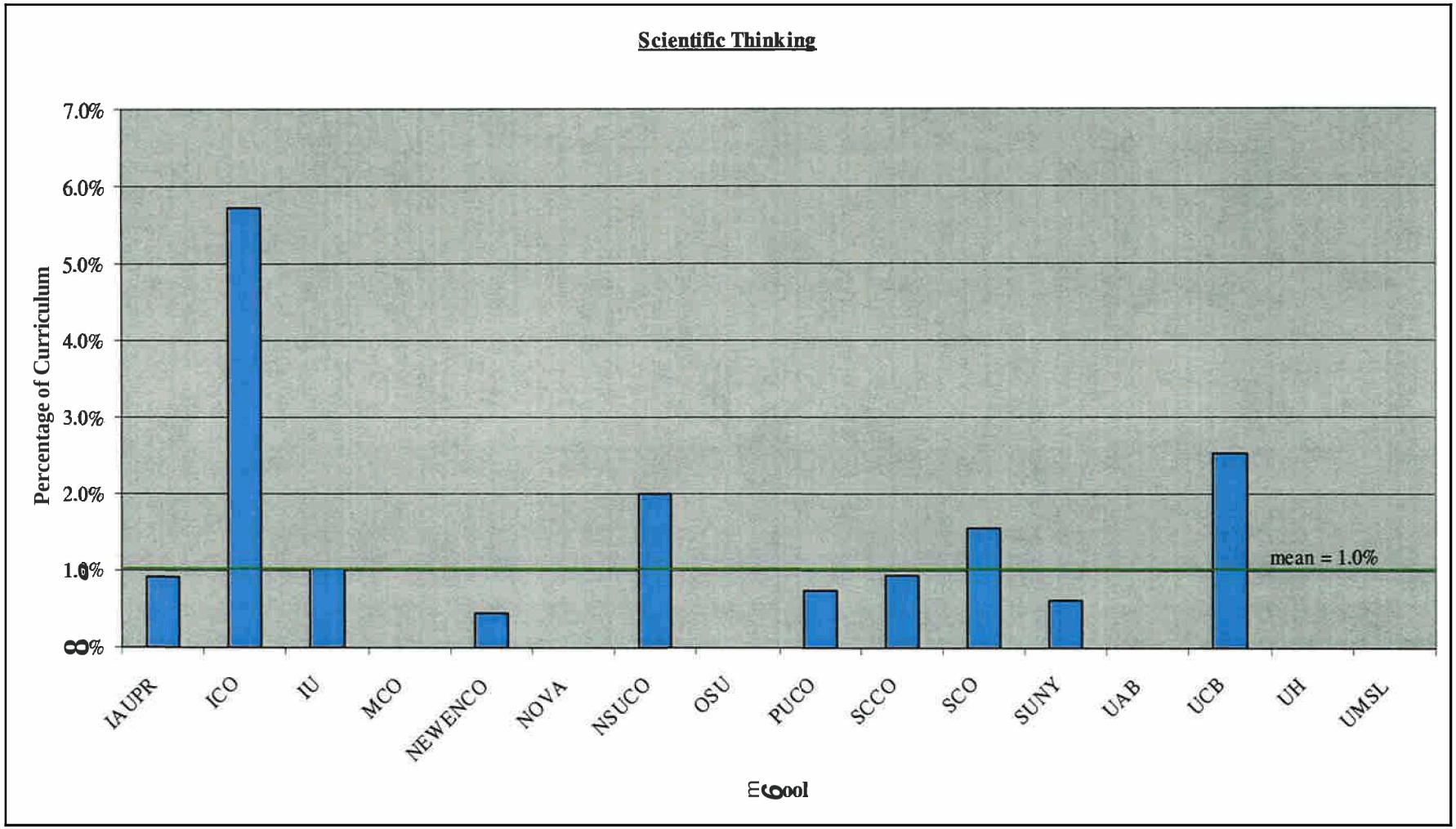

Scientific Thinking
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0%
Percentage of Curriculum
mean = 1.0%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 15a

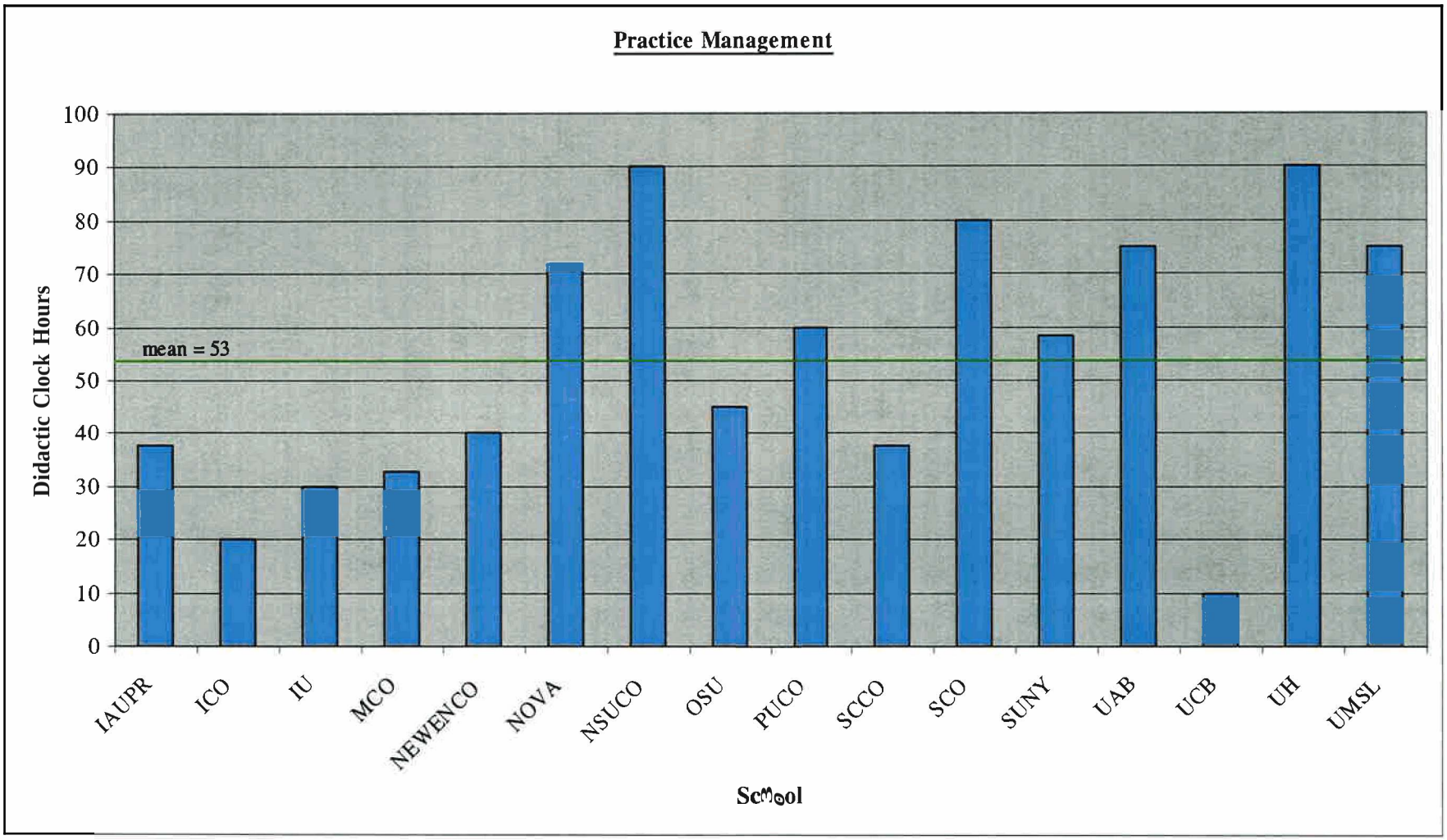

Practice Management
Didactic Clock Hours
100
90
80
70
60
50
40
30
20
10
0
mean = 53
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 15b

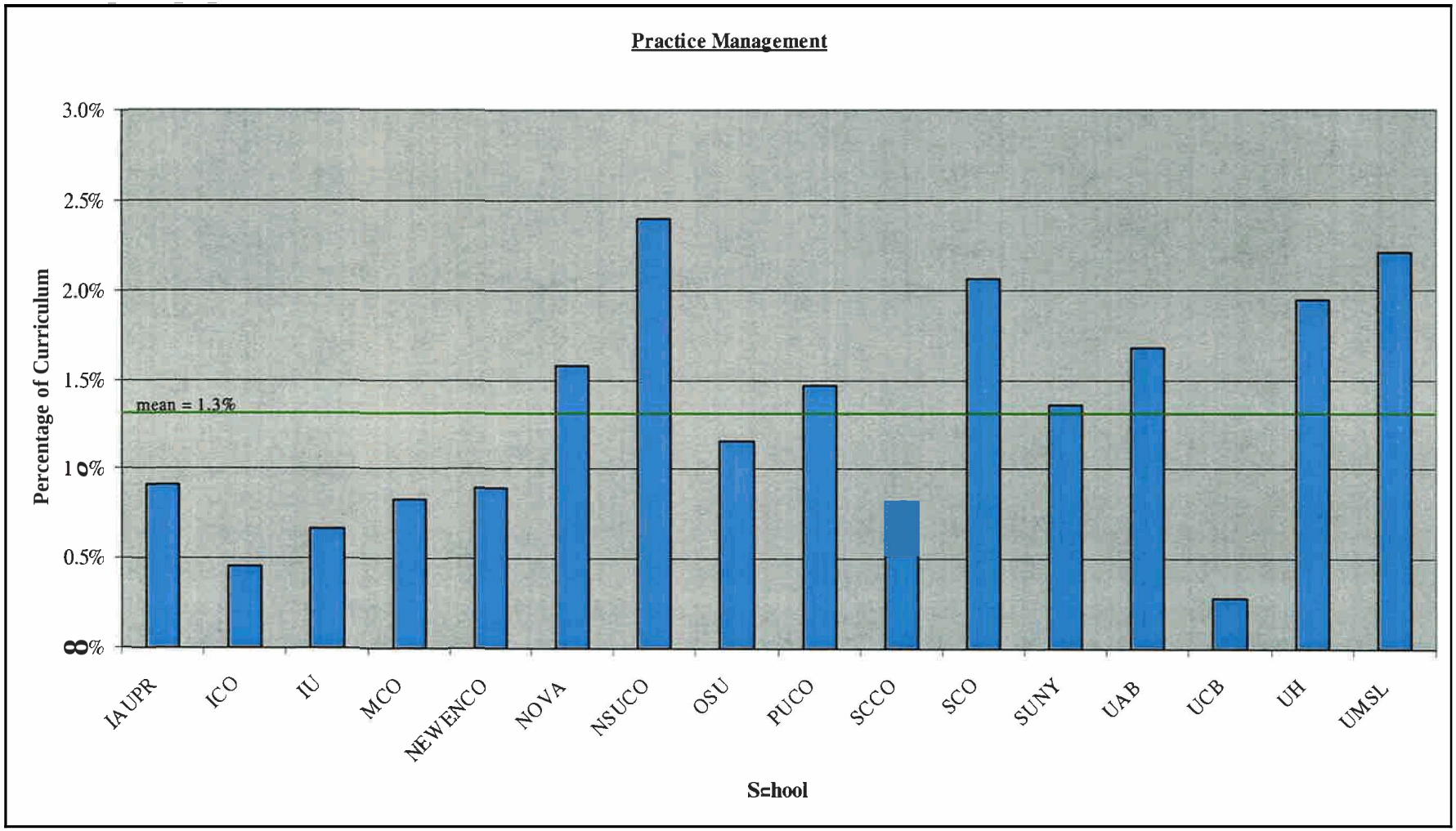

Practice Management
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
0%
Percentage of Curriculum
mean = 1.3%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 16a

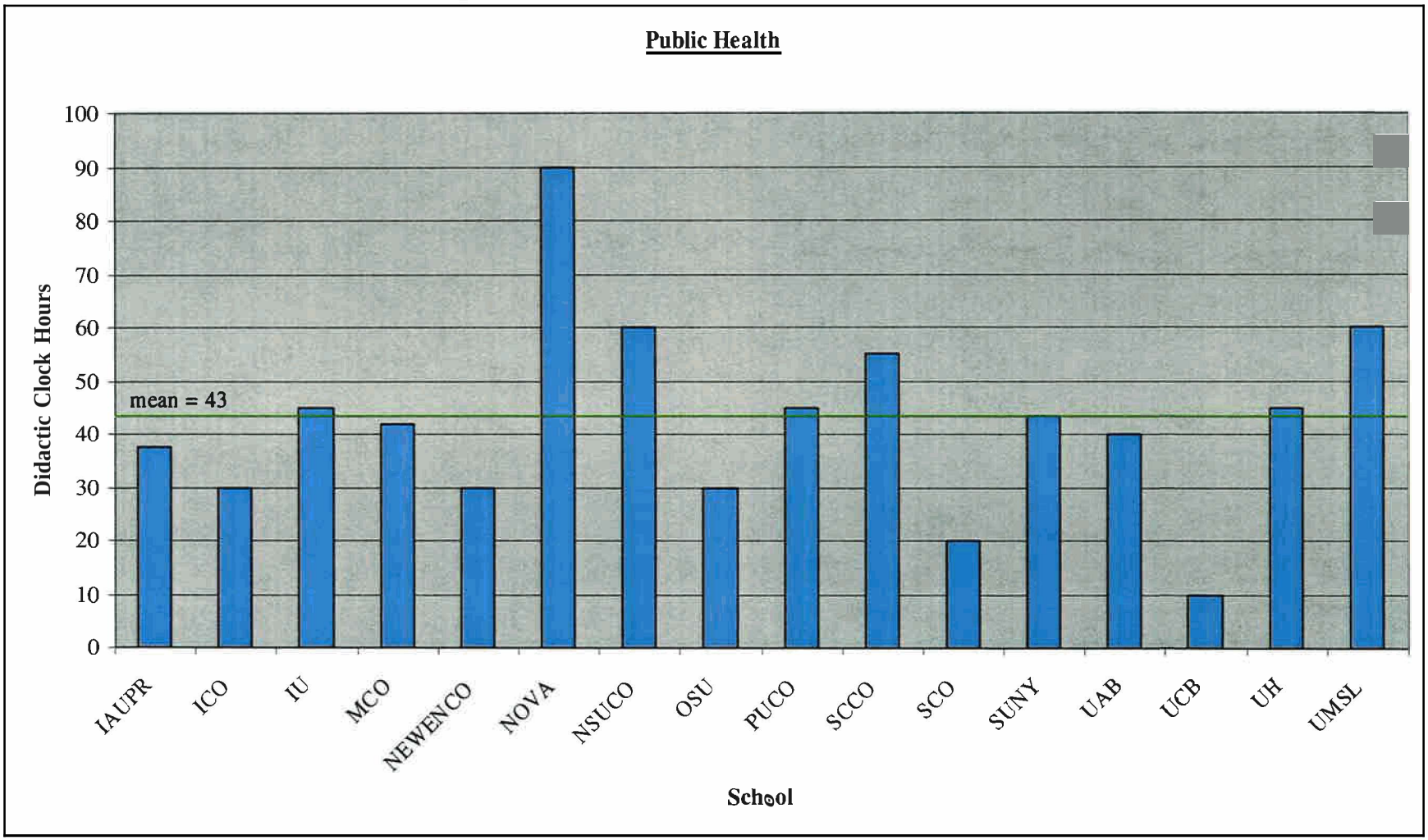

Public Health
Didactic Clock Hours
100
90
80
70
60
50
40
30
20
10
0
mean = 43
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 16b

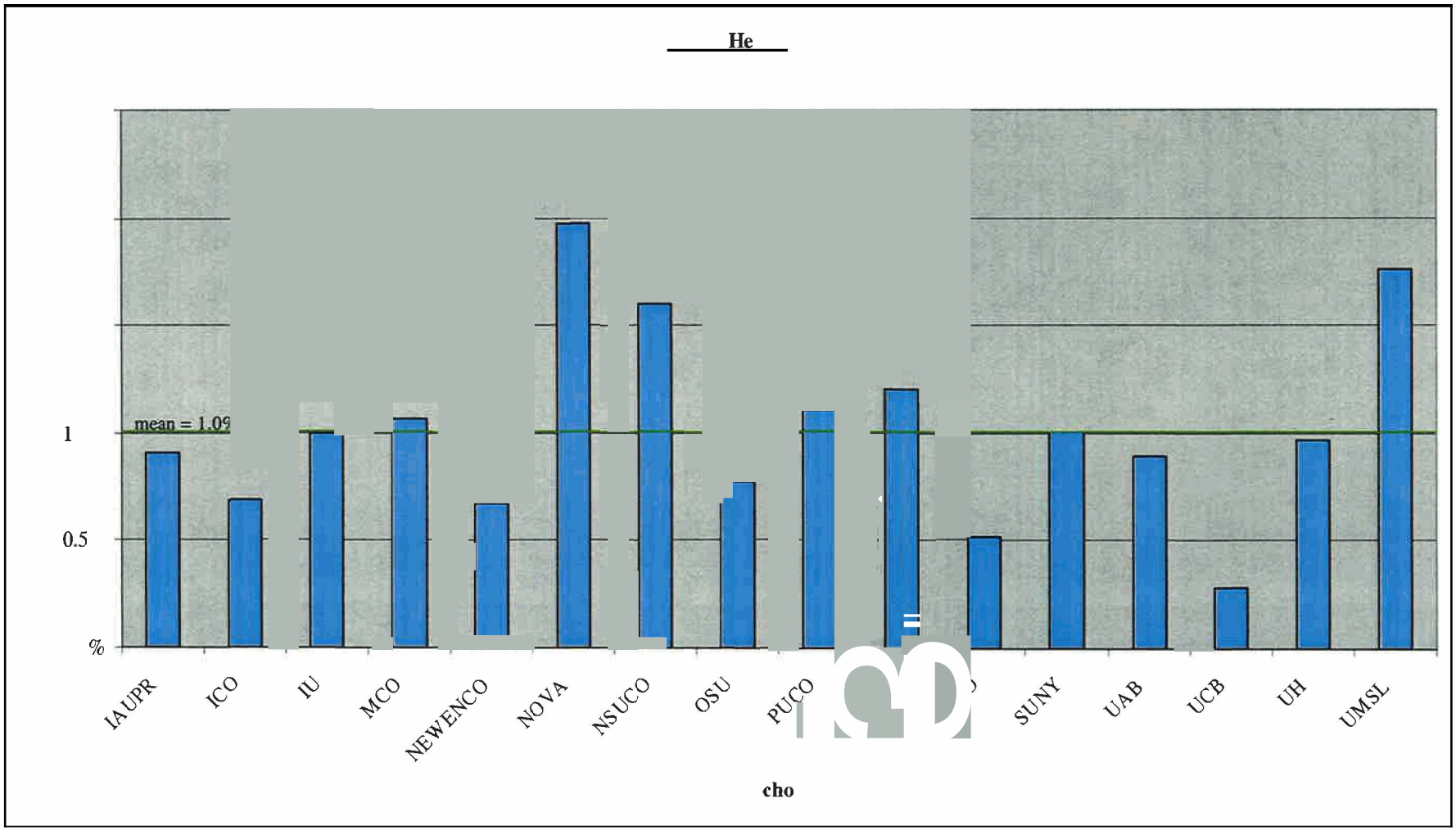

He
mean = 1.09
1
0.5
%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SUNY
UAB
UCB
UH
UMSL
cho

Figure 17a

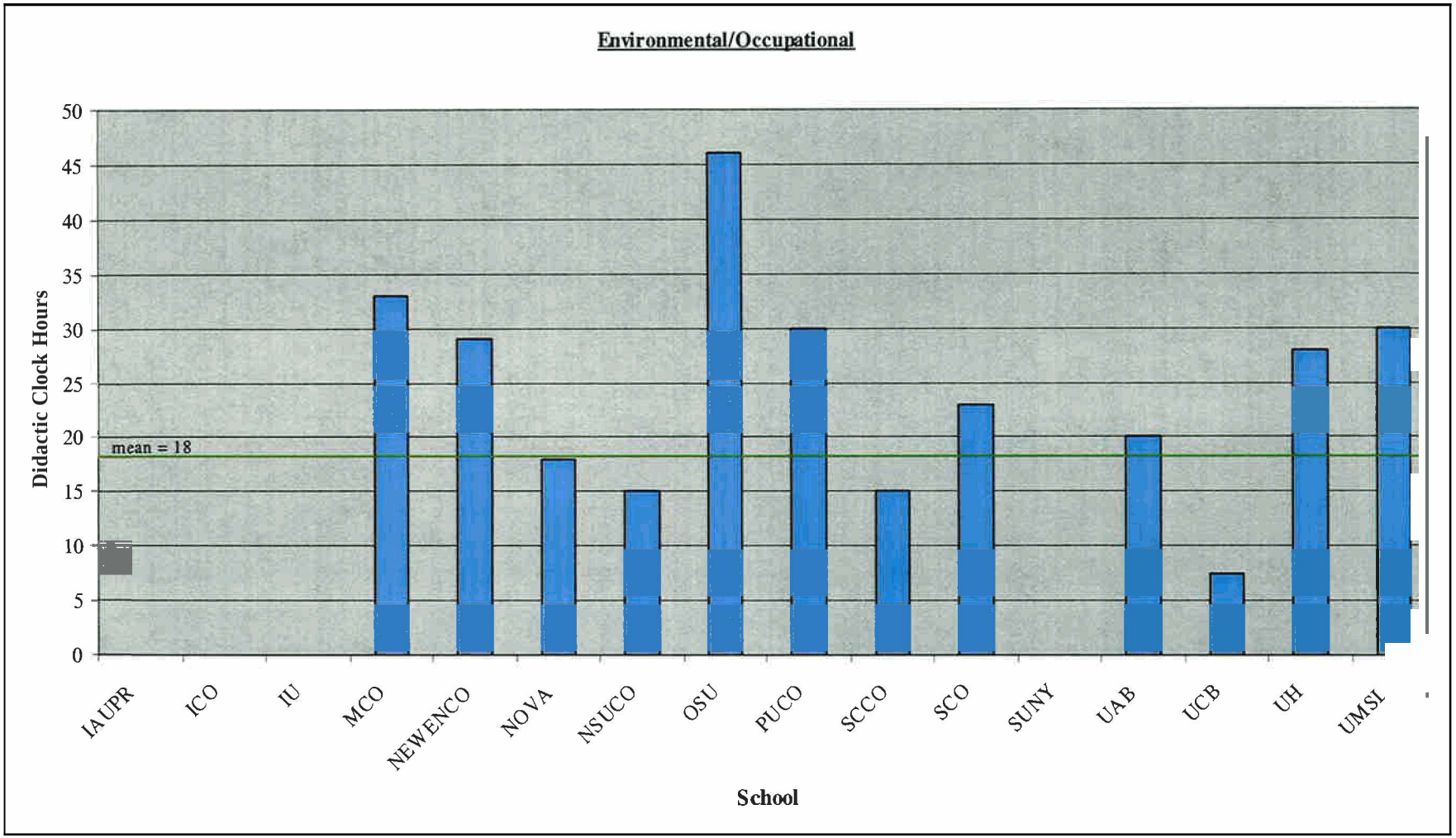

Environmental/Occupational
Didactic Clock Hours
50
45
40
35
30
25
20
15
10
5
0
mean = 18
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 17b

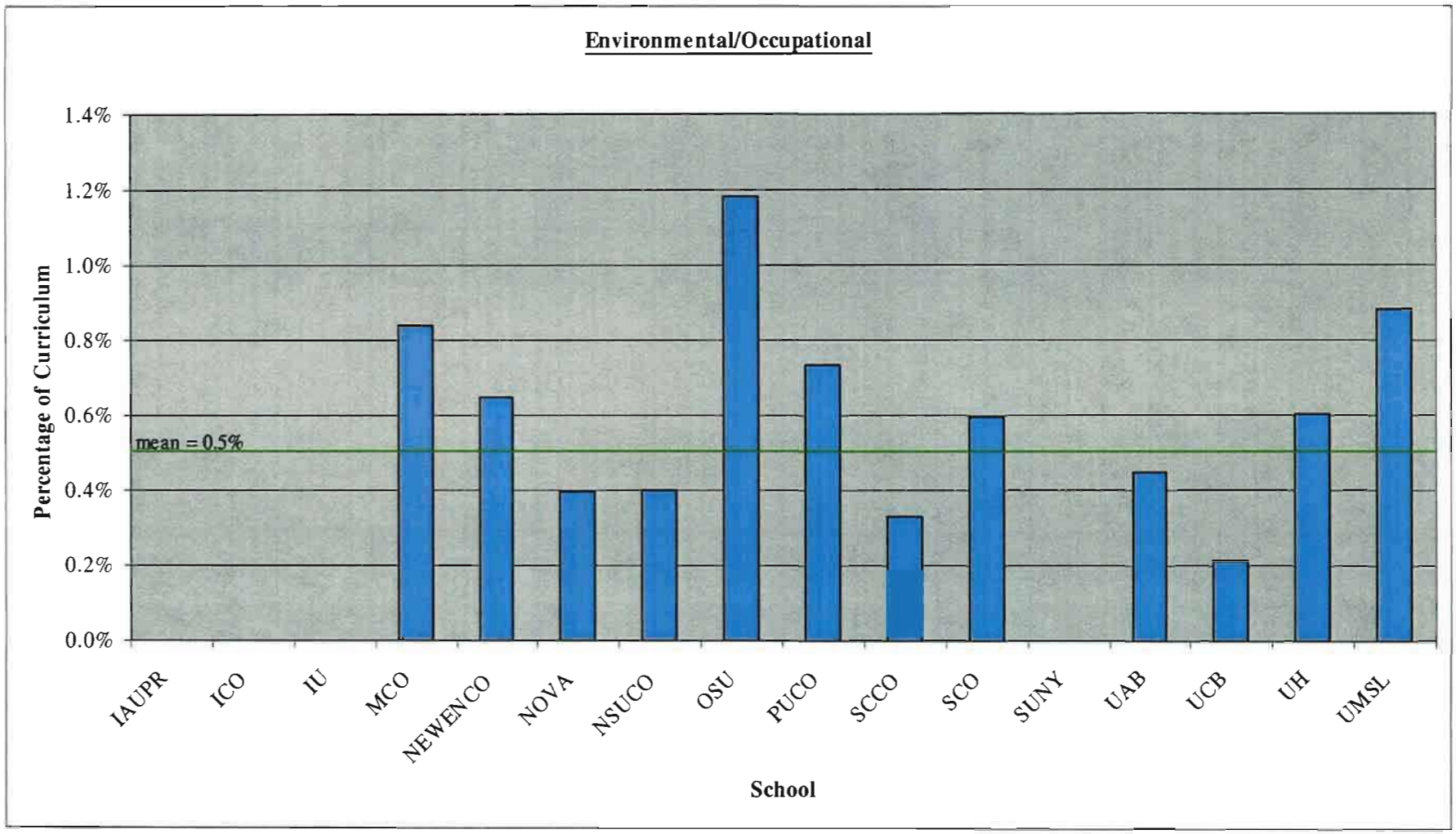

Environmental/Occupational
1.4%
1.2%
1.0%
0.8%
0.6%
0.4%
0.2%
0.0%
Percentage of Curriculum
mean = 0.5%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 18a

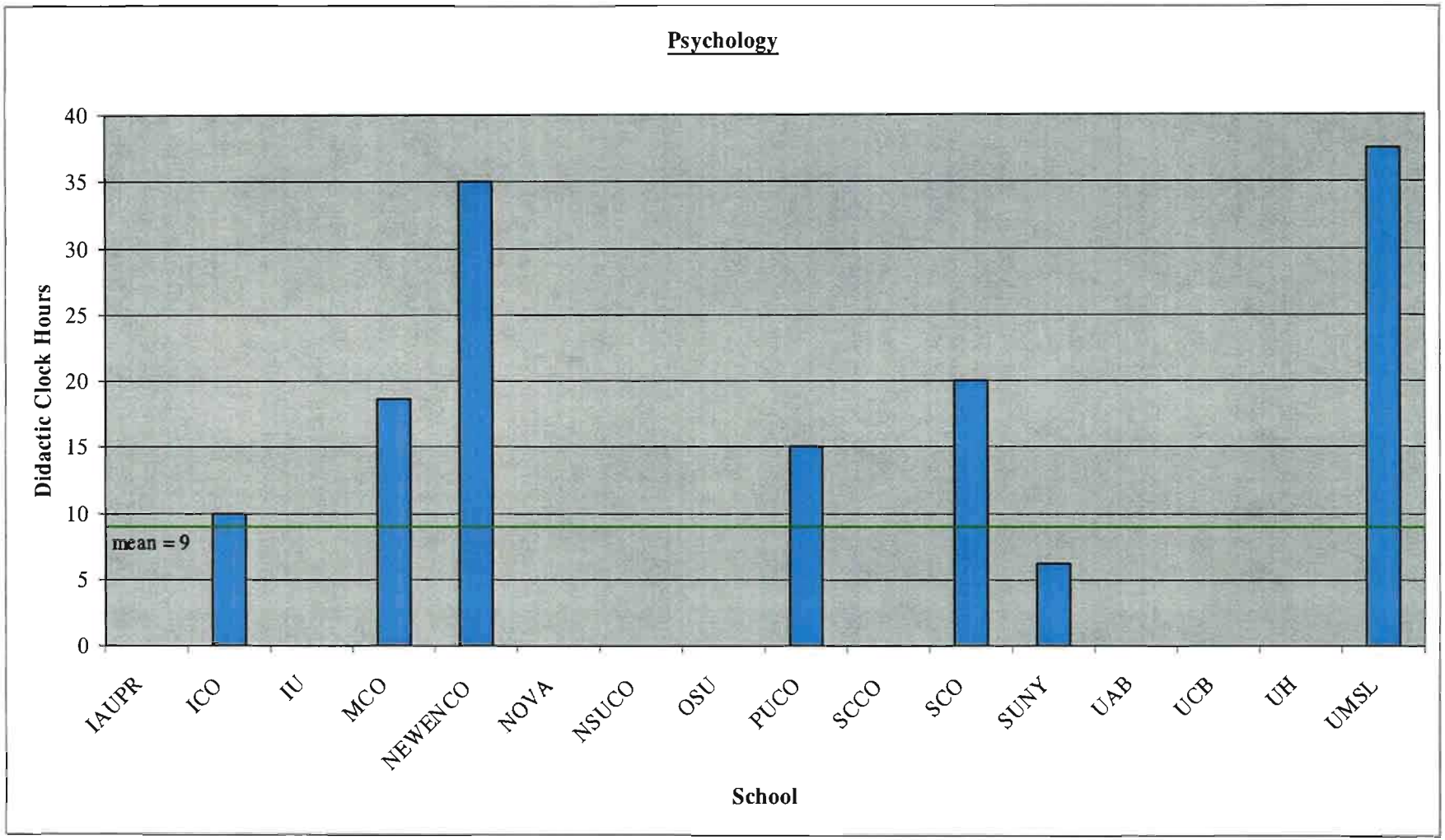

Psychology
Didactic Clock Hours
40
35
30
25
20
15
10
5
0
mean = 9
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 18b

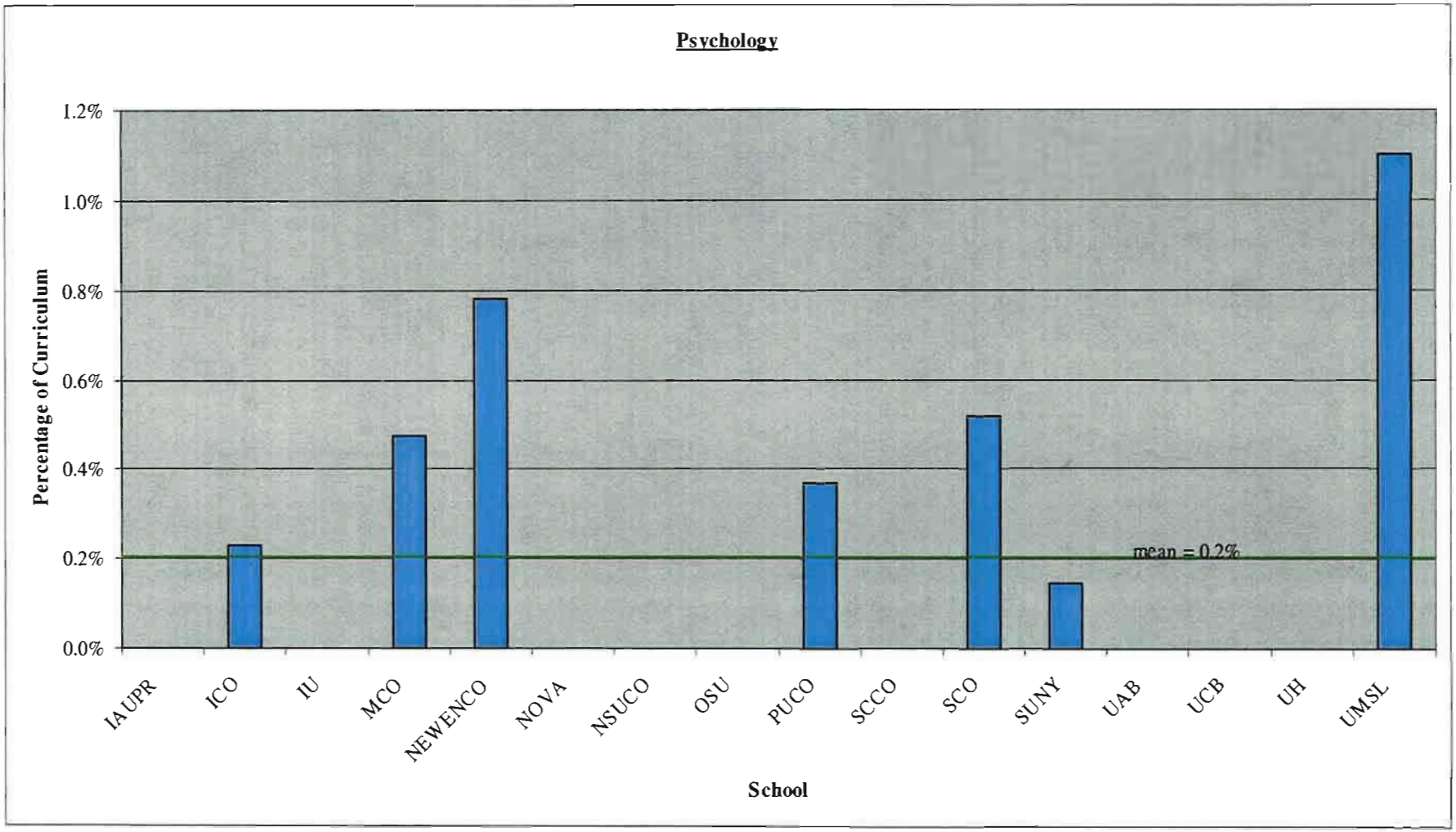

Psychology
1.2%
1.0%
0.8%
0.6%
0.4%
0.2%
0.0%
Percentage of Curriculum
mean = 0.2%
IA UPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 19a

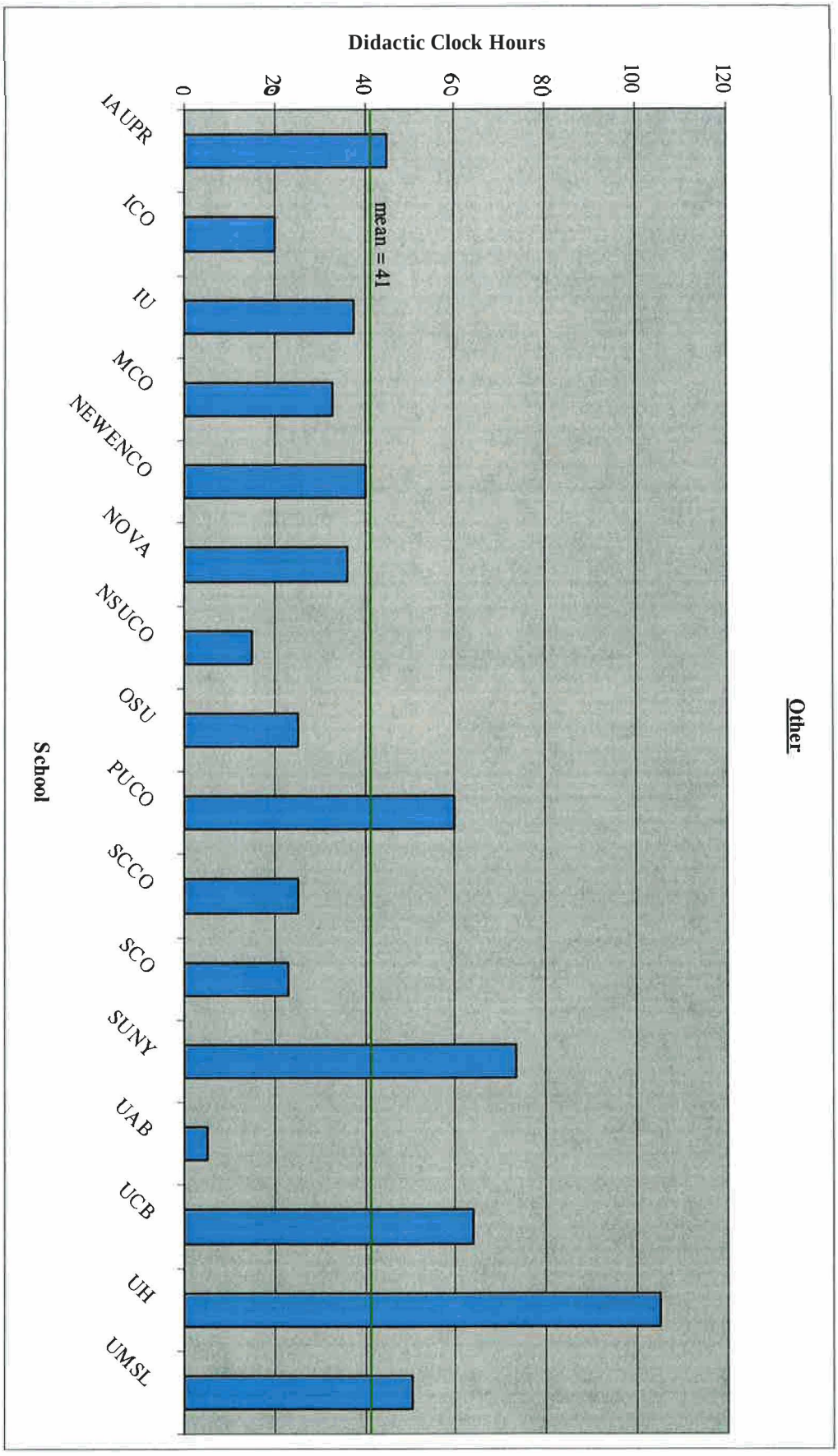

Didactic Clock Hours
0
20
40
60
80
100
120
mean = 41
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School
Other

Figure 19b

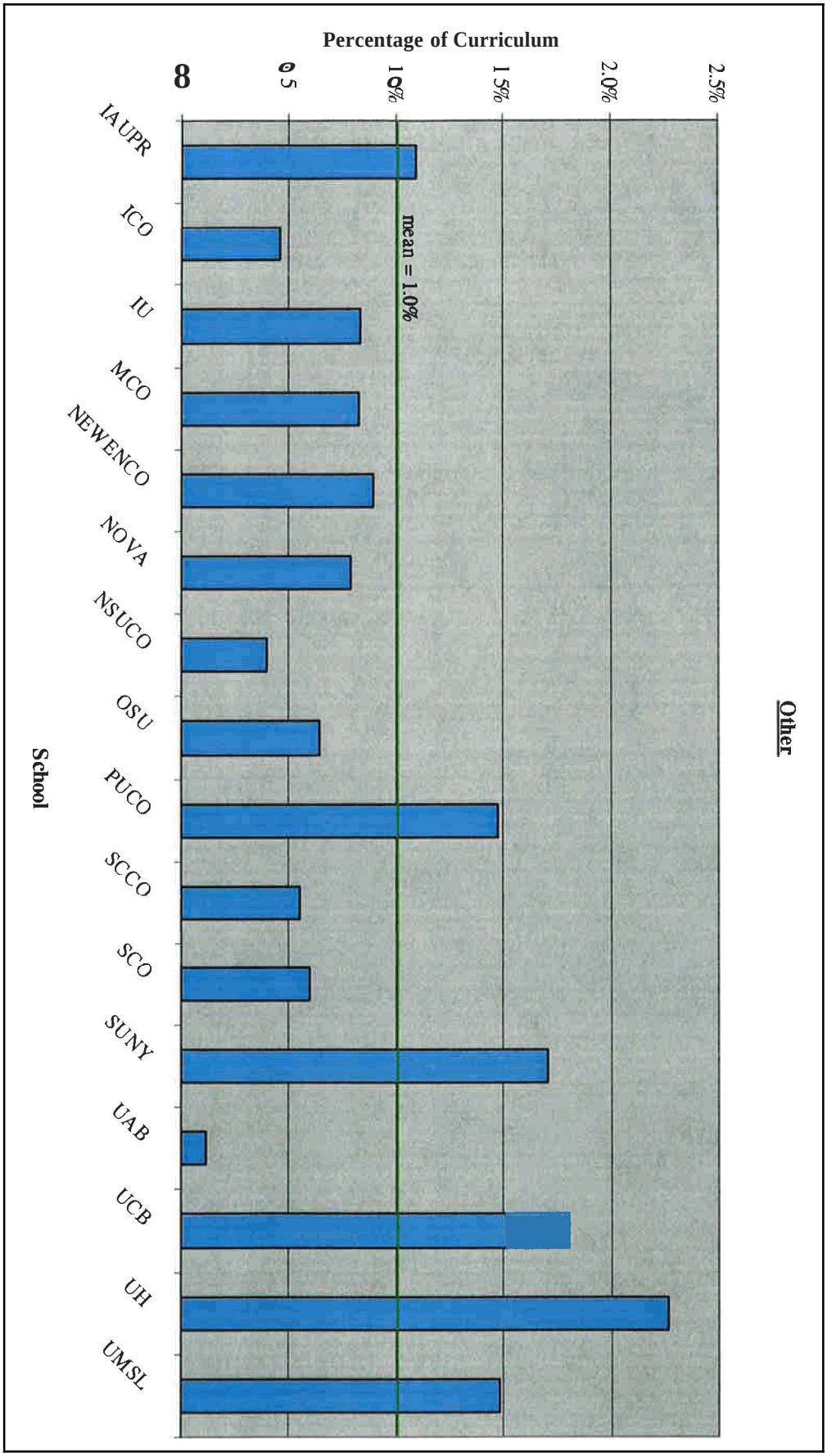

Other
Percentage of Curriculum
0.0%
0.5%
1.0%
1.5%
2.0%
2.5%
mean = 1.0%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 20a

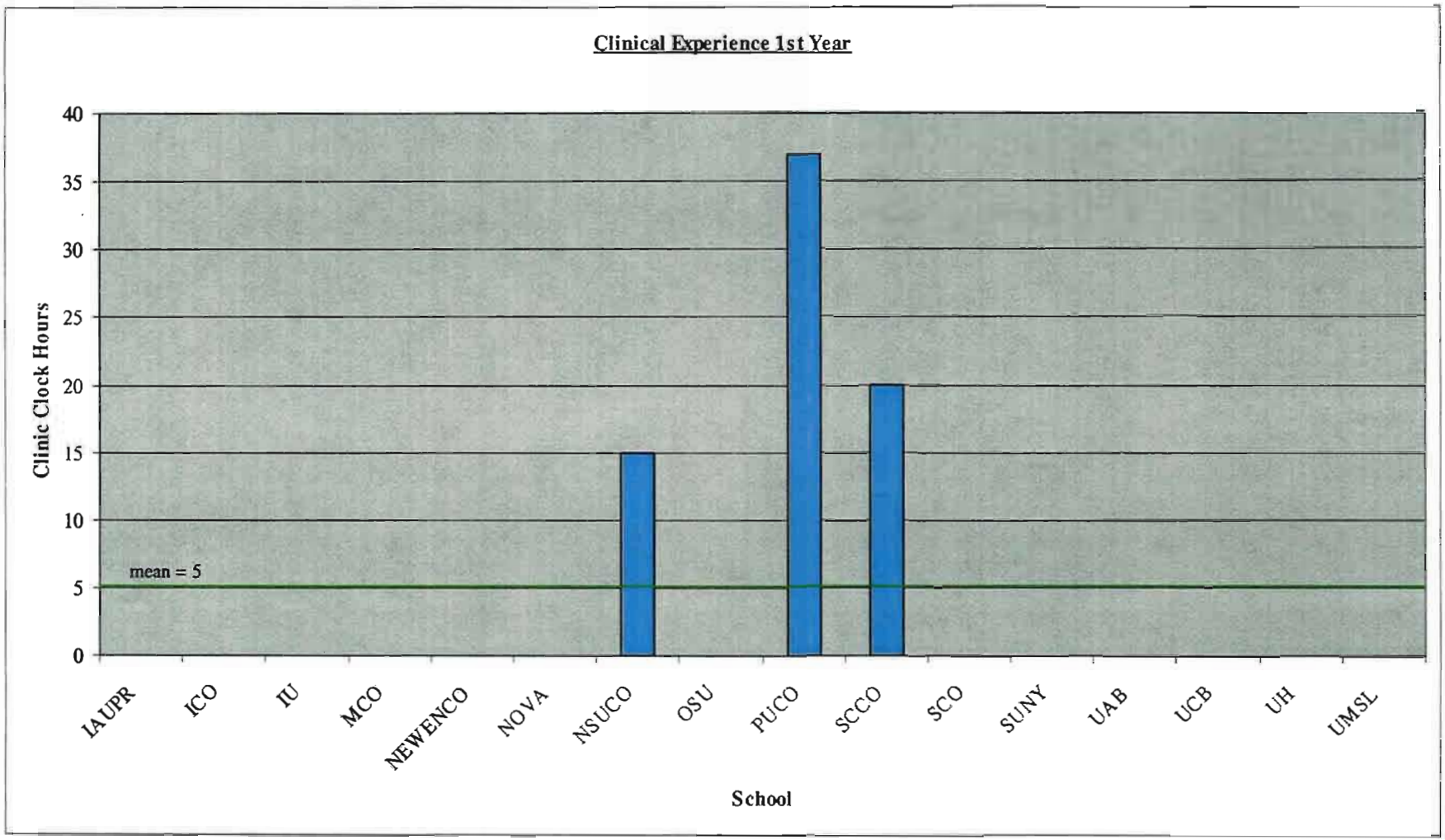

Clinical Experience 1st Year
Clinic Clock Hours
40
35
30
25
20
15
10
5
0
mean = 5
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 20b

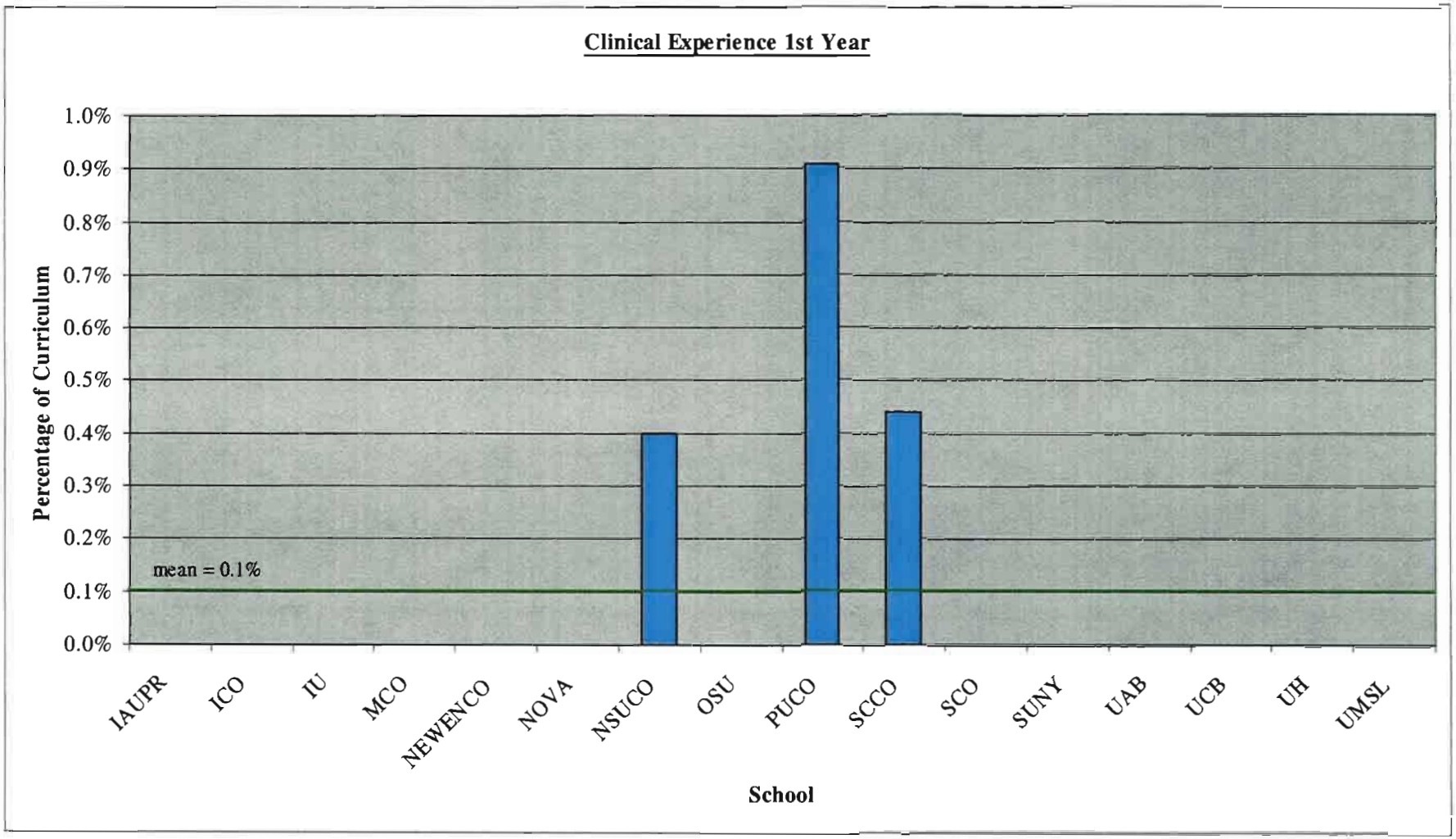

Clinical Experience 1st Year
Percentage of Curriculum
1.0%
0.9%
0.8%
0.7%
0.6%
0.5%
0.4%
0.3%
0.2%
0.1%
0.0%
mean = 0.1%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 21a

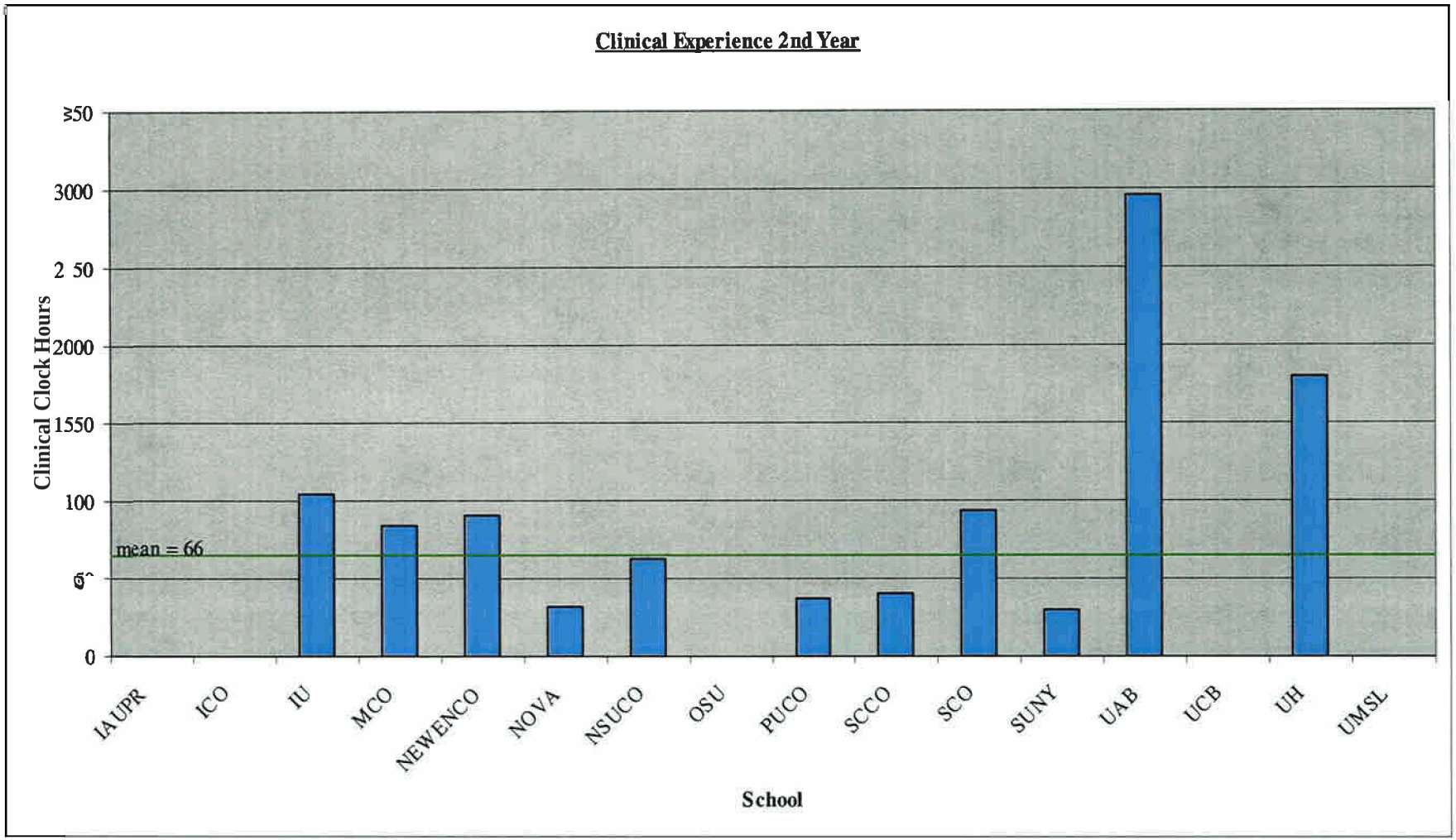

Clinical Experience 2nd Year
Clinical Clock Hours
≥50
3000
2 50
2000
1550
100
mean = 66
0
IA UPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 21b

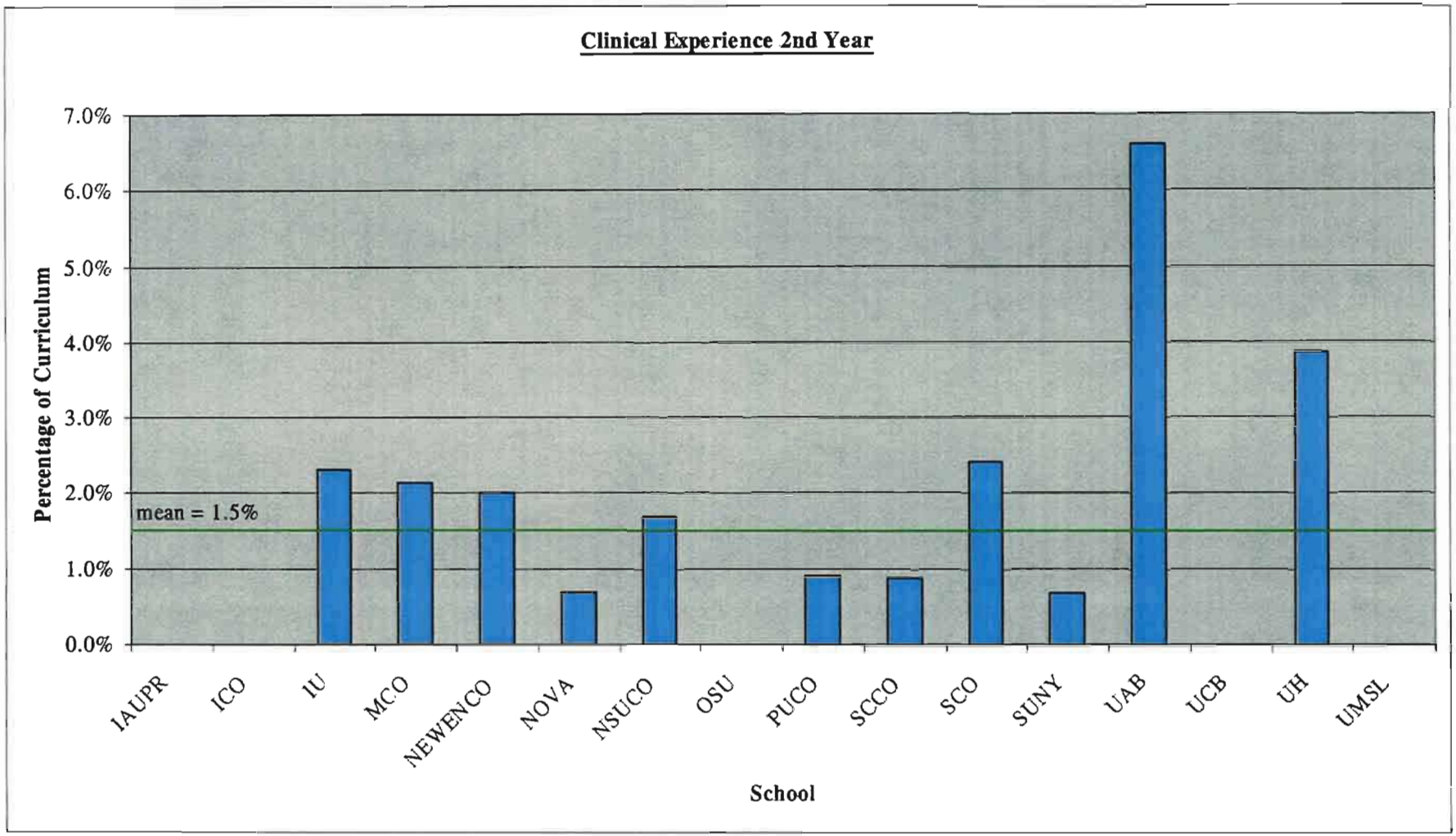

Clinical Experience 2nd Year
Percentage of Curriculum
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
mean = 1.5%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 22a

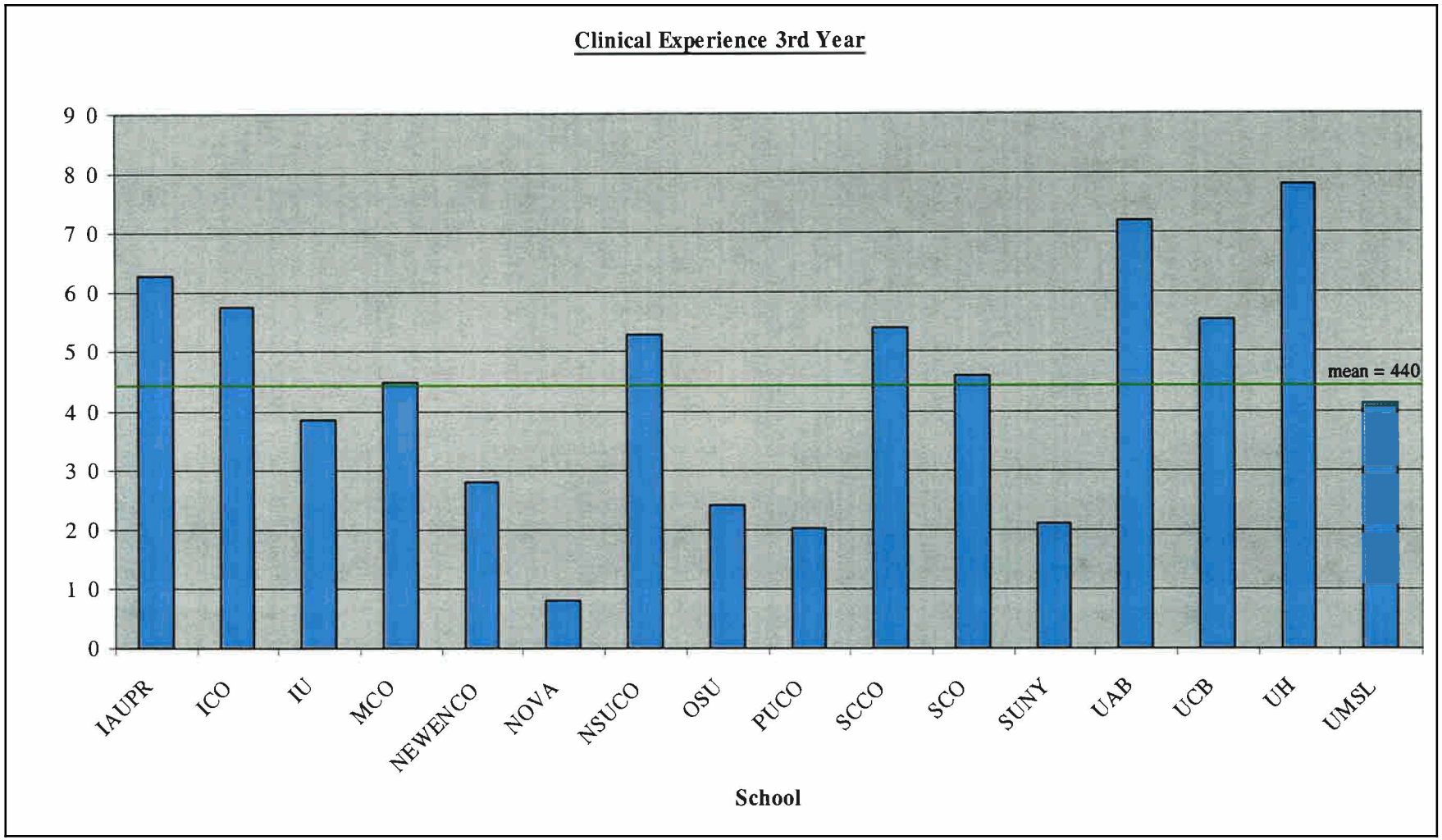

Clinical Experience 3rd Year
9 0
8 0
7 0
6 0
5 0
4 0
3 0
2 0
1 0
0
mean = 440
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 22b

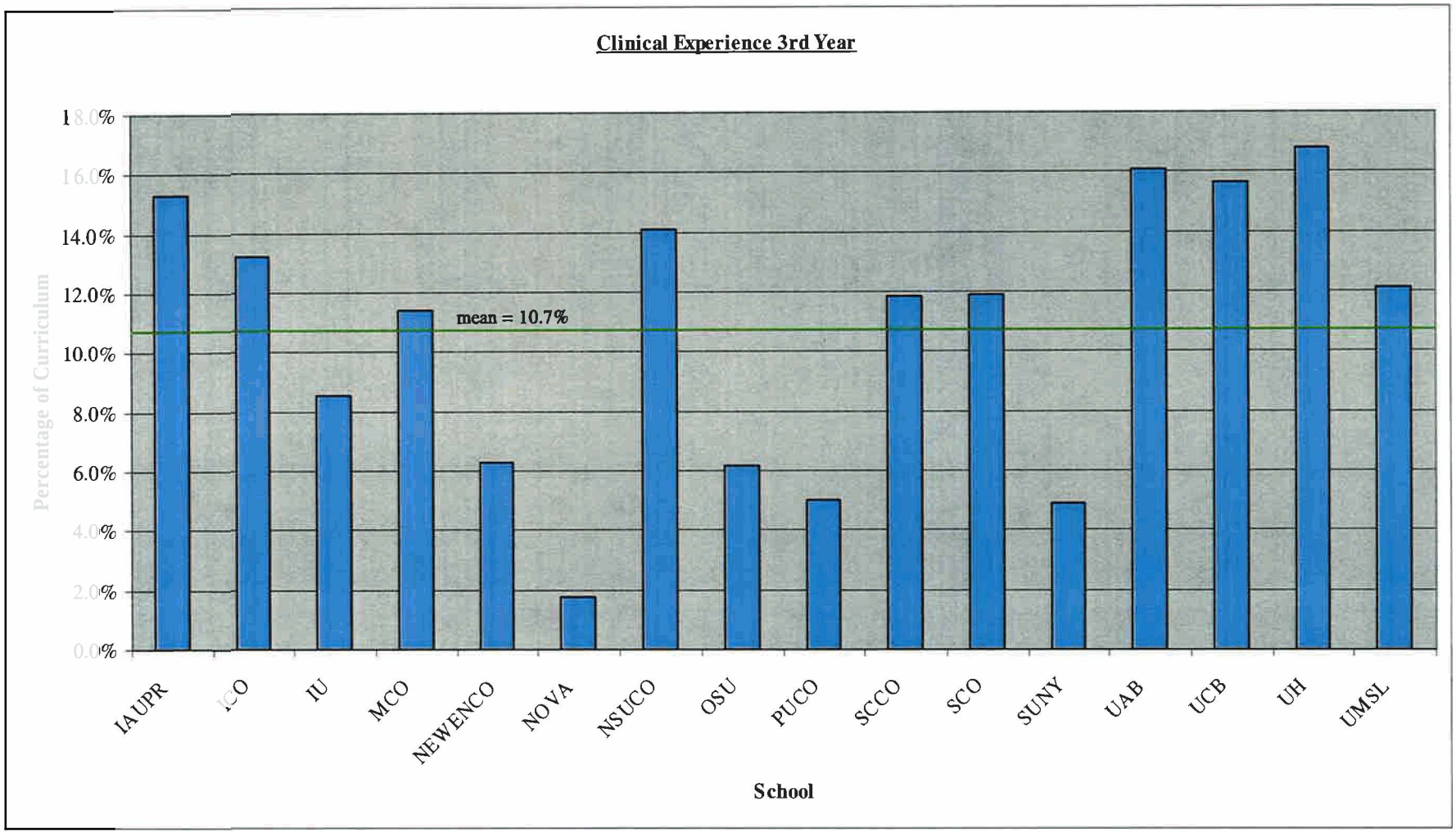

Clinical Experience 3rd Year
18.0%
16.0%
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
Percentage of Curriculum
mean = 10.7%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 23a

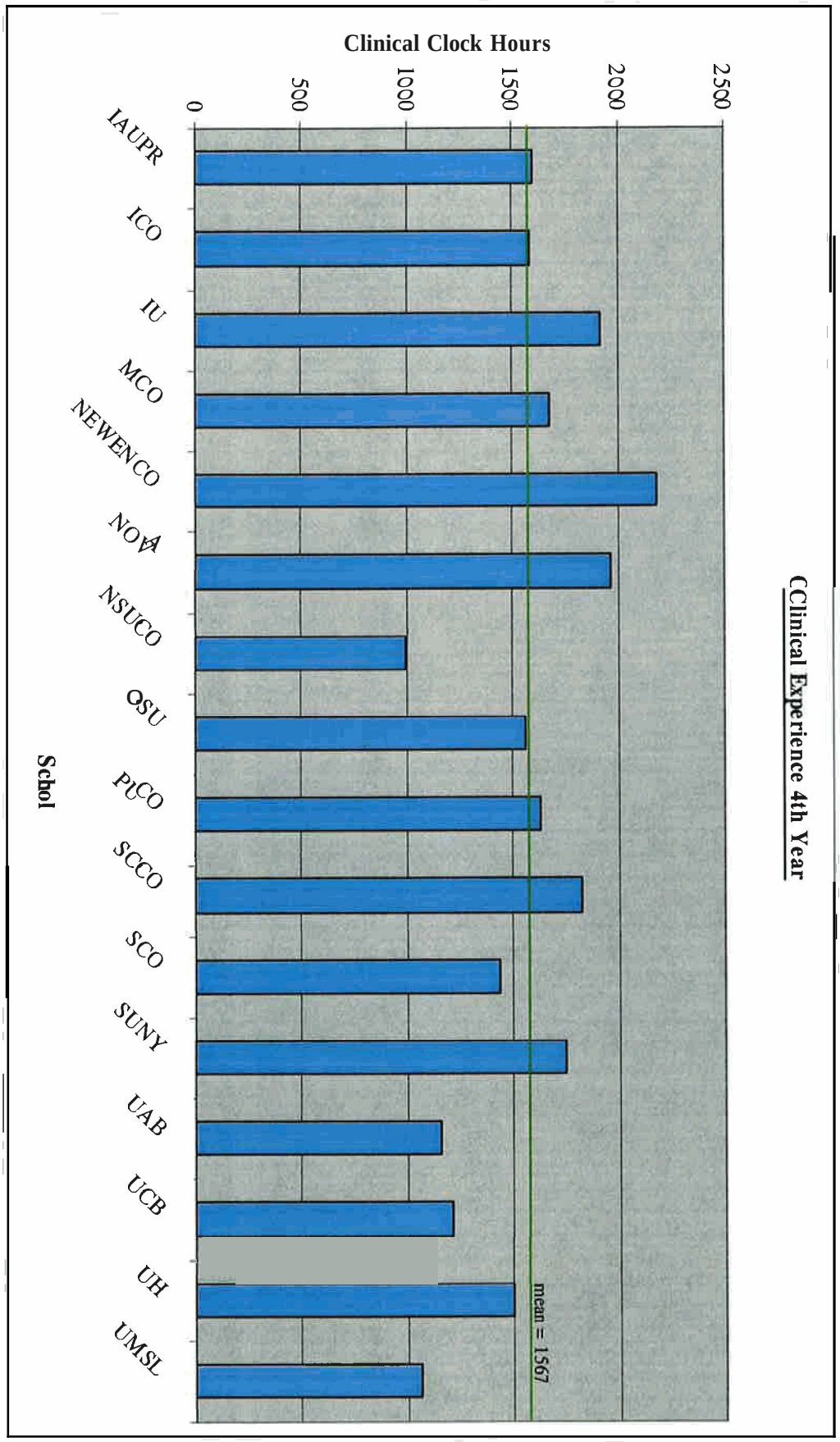

CClinical Experience 4th Year
Clinical Clock Hours
0
500
1000
1500
2000
2500
mean = 1567
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
Schol

Figure 23b

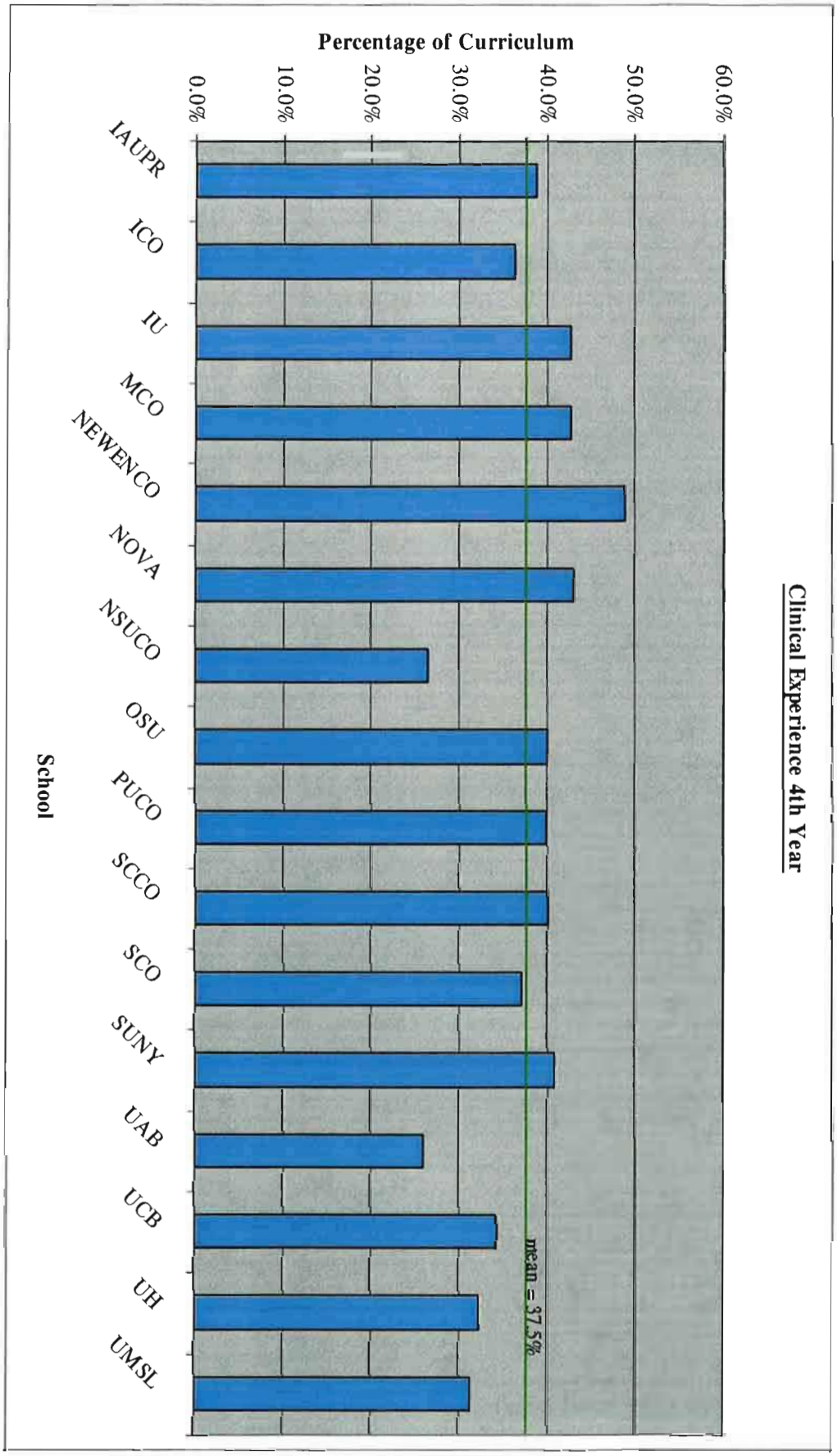

Clinical Experience 4th Year
Percentage of Curriculum
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
mean = 37.5%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 24a

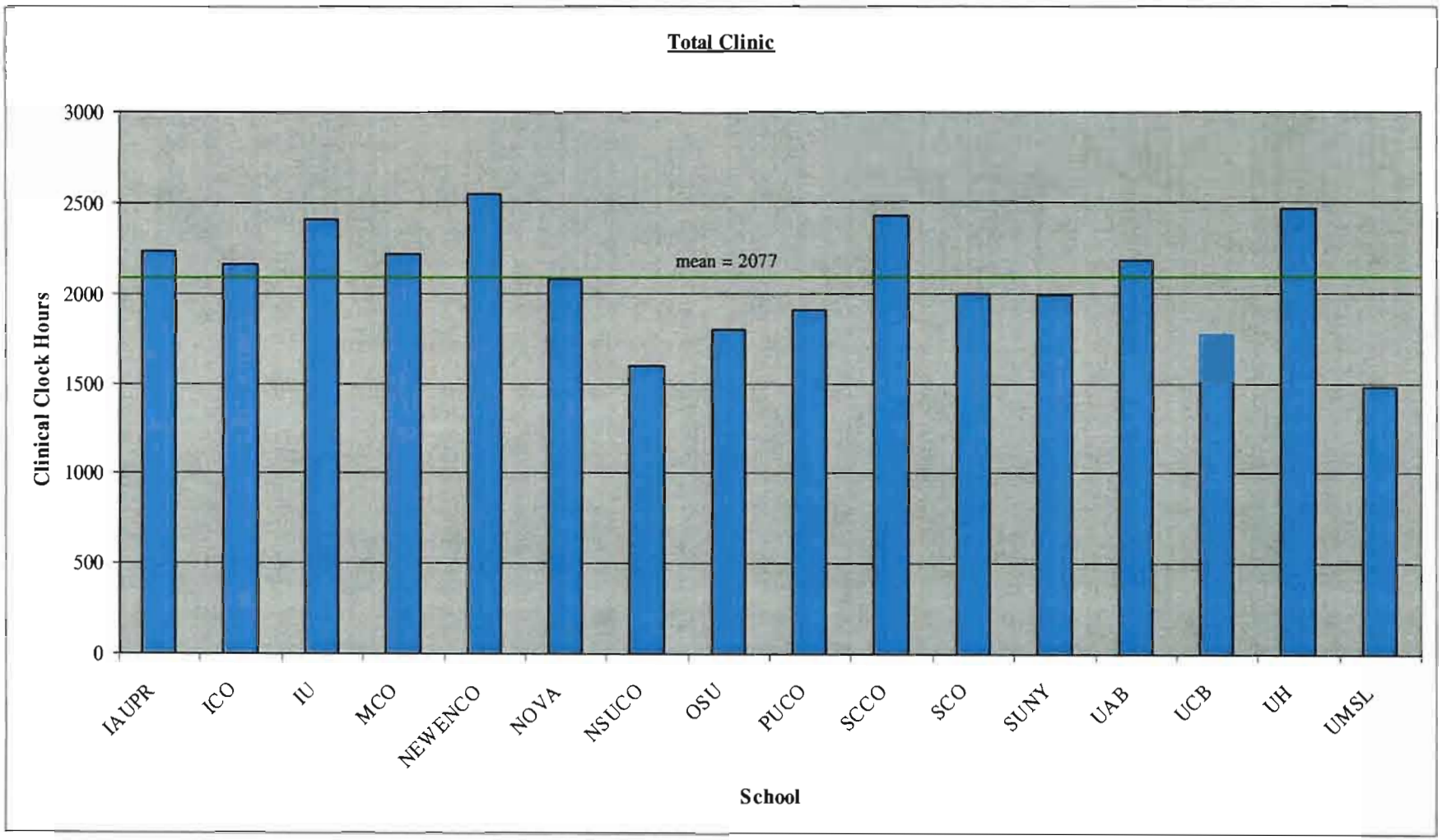

Total Clinic
Clinical Clock Hours
3000
2500
2000
1500
1000
500
0
mean = 2077
IA UPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 24b

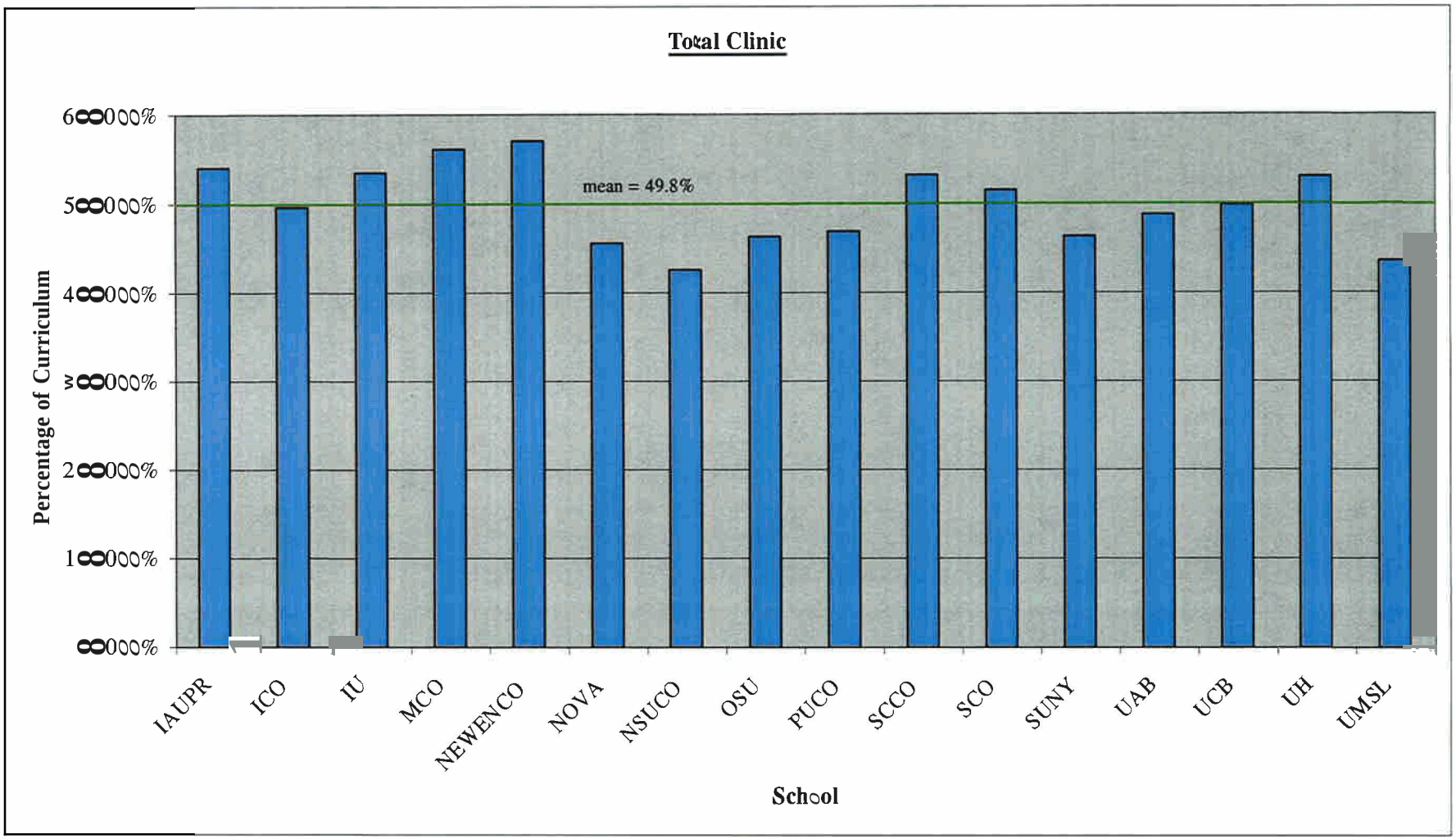

Total Clinic
Percentage of Curriculum
mean = 49.8%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 25a

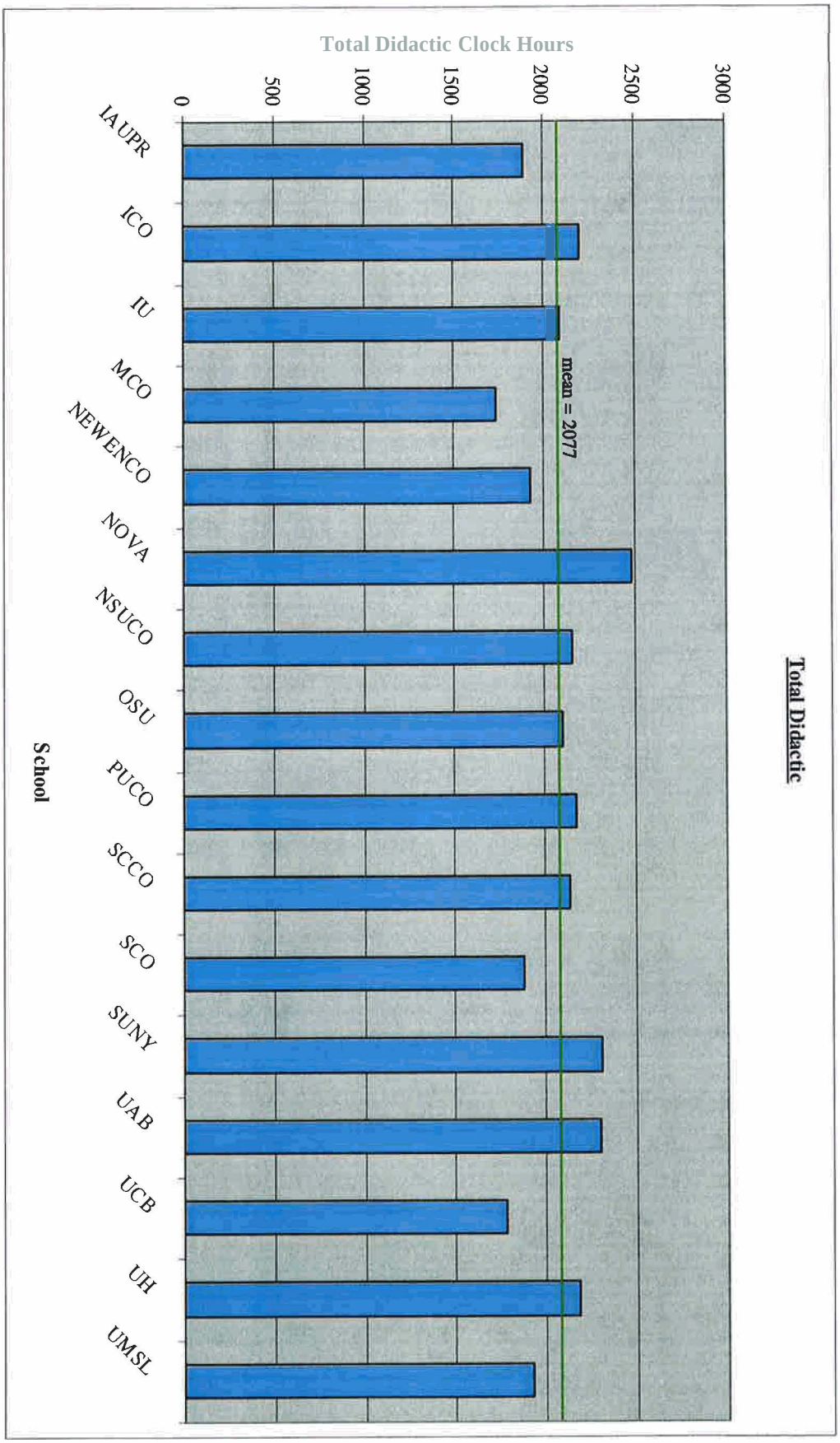

Total Didactic Clock Hours
0
500
1000
1500
2000
2500
3000
mean = 2077
Total Didactic
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 25b

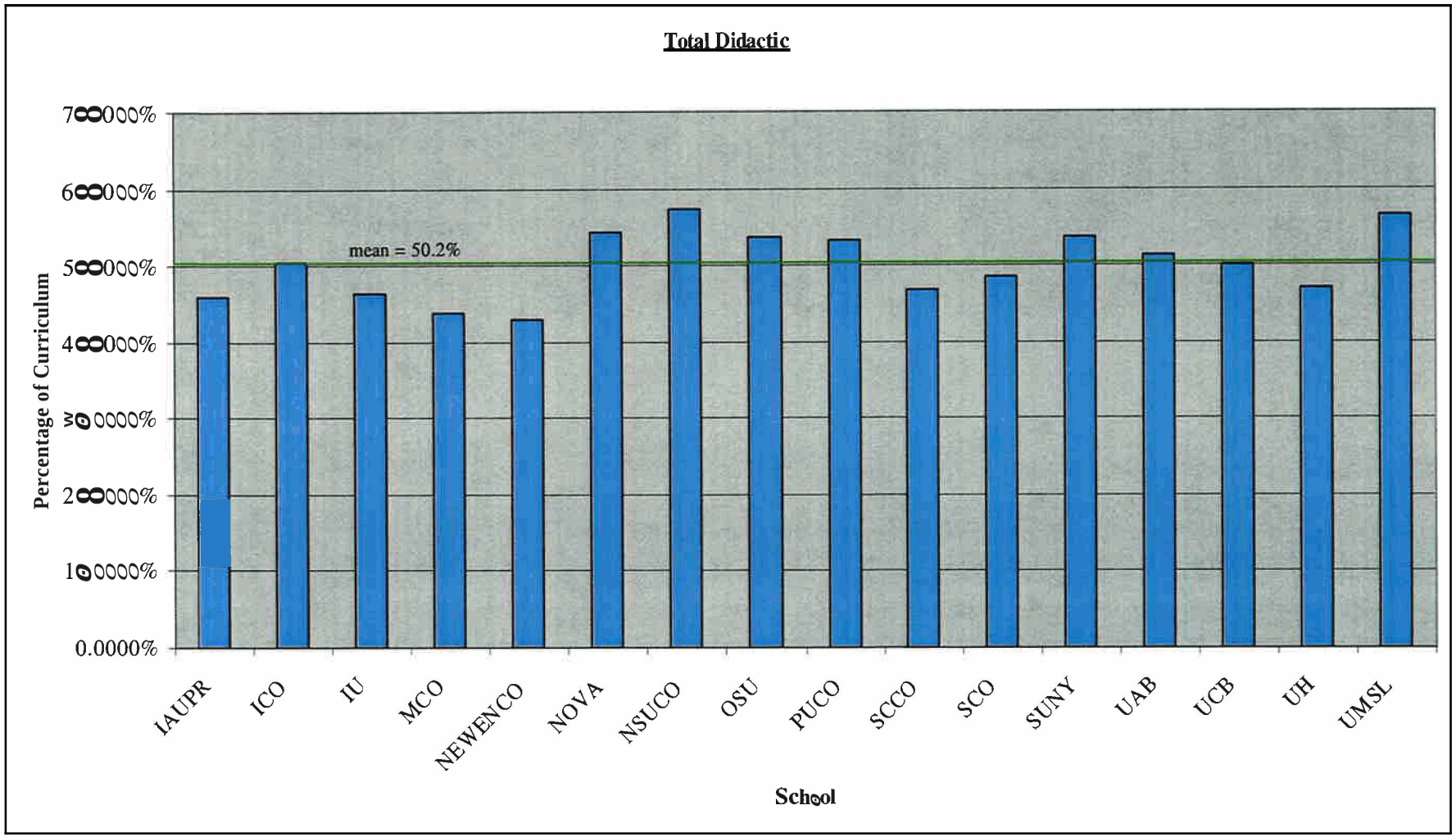
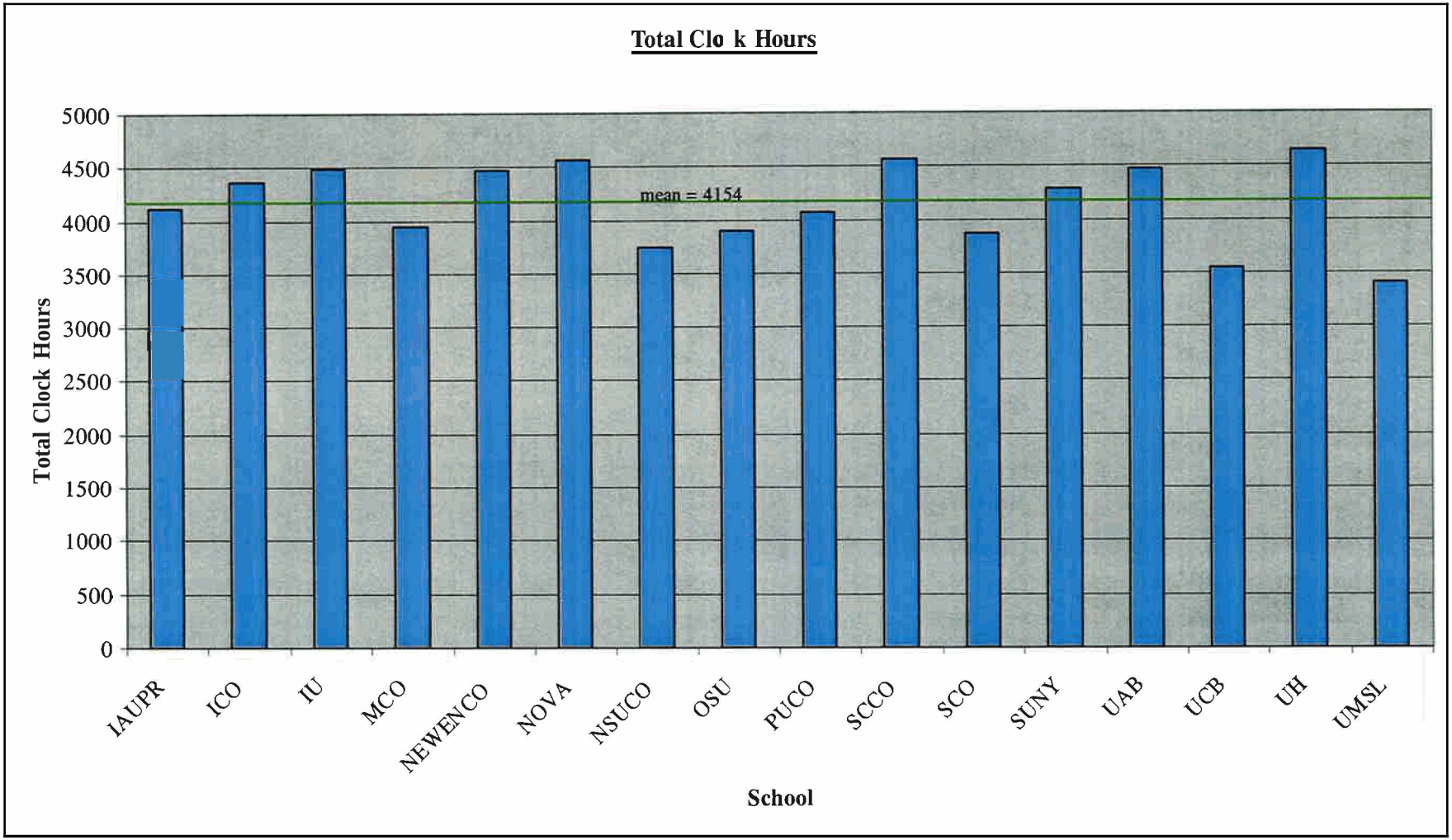

Total Didactic
Percentage of Curriculum
70.0000%
60.0000%
50.0000%
40.0000%
30.0000%
20.0000%
10.0000%
0.0000%
mean = 50.2%
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School

Figure 26


Total Clo k Hours
Total Clock Hours
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
mean = 4154
IAUPR
ICO
IU
MCO
NEWENCO
NOVA
NSUCO
OSU
PUCO
SCCO
SCO
SUNY
UAB
UCB
UH
UMSL
School