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Introduction of Itemized Billing at the Santa Fe Indian Hospital

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Rationale for Expansion of Billing Programs at the Santa Fe Indian Hospital

The IHS goal is to raise the health status of American Indians and Alaska Natives to the highest possible level. An environment of increasing health costs, a growing service population, and decreasing resources means that survival of a viable health care system will depend on innovative management strategies.

Limitations in income have reduced funding for new supplies and equipment and diminished full time and contract clinical positions. For Indian Health Service hospitals to remain competitive with standards of care found in private facilities, service units must find creative ways to reduce contract costs and to optimize billing from Medicare, Medicaid, and private insurance.

Billing from Private Insurance

In the United States, physicians and other providers bill insurance companies for their professional services through negotiated or nonnegotiated contracts. With negotiated contracts, physicians are limited on the total charges they can bill the patient and the insurance company (based on CPT codes), but in return they generally get more referrals via incentives given to the patients or referring physicians through the insurance company. In nonnegotiated contracts, the insurance company will still generally limit payment for professional services, but the provider may bill the patient a higher fee (see table 1).

The Indian Health Service has not negotiated professional services bills with the private insurance companies, and therefore may bill at a higher rate than would be allowed by negotiated contracts, but the payment is limited by usual and customary rates allowed by the insurance companies. Since the patients are not responsible for paying the additional bill, essentially the reimbursement to the Indian Health Service is similar to that which would be obtained if a negotiated contract were in effect.

Insurance companies receive not only a professional bill based on CPT code, but also a hospital bill from the Indian Health Service. The hospital bill may also be negotiated or non-negotiated. In a negotiated contract, the reimbursement is based only on ICD9 diagnostic and procedural codes, but is generally sufficient to cover non-billed services such as operating room time, emergency room visits, itemized supplies, laboratory fees,

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and so on. The Indian Health Service does not have contracts with the insurance companies that negotiate hospital charges based on ICD9 codes. We must submit a bill to the insurance companies which separately bills room charge, time in the operating room, emergency room visit, itemized supplies, pharmaceuticals, and so on in order to receive fair collections for services provided.

Approximately 13% of the patients seen at the Santa Fe Indian Hospital have private insurance. Nine percent of our collections comes from these patients. In order to increase revenues, itemized, supplementary "superbills" must be attached to the base bill for room charges to cover itemized supplies, x-rays, laboratory studies, equipment use fees, etc.

Itemized Bills for Disposable Supplies

In the past, the Indian Health Service has billed private insurance companies for medications, but has not billed for disposable medical items. In addition to the loss of income, the lack of an itemization system has made it difficult for the IHS to maintain an inventory, avoid over-purchasing, and track costs of supplies used in various areas of the hospital.

At the Santa Fe Indian Hospital, we discovered that some surgical procedures cost our hospital hundreds of dollars in supplies, but we were not billing private insurance companies for these items. For example, a large sheet of PTFE patch used to repair a ventral hernia costs our hospital almost $1500. A laparoscopic cholecystectomy kit costs almost $900. We were not billing insurance companies for these items, and therefore were losing thousands of dollars a year. We felt that keeping a record of which items were used would provide not only a system for billing insurance companies to recover our expenses, but also provide our hospital with a record of how many items were being used each month. In the spring of 1995, we began a pilot project to itemize billing in the operating room, where supplies are among the most costly.

Setting up an Itemized Billing System

When tracking items used by patients, we found it cumbersome to type in a complete description, catalogue number, and cost for each item used. To minimize the time and errors in this process, we assigned a code to each item. This code was linked to a description of the item, catalogue number, manufacturer, and cost.

Many medical items already had a code consisting of letters and numbers translated into a bar code on the package. While any database system, including a Mumps-based database such as the Resource and Patient Management System (RPMS), could be used to do this, we used Microsoft Access (a PC-based programmable database) to link a code to the detailed information about each item. Microsoft Access was chosen due to its superior report generator, easy programming language, and optimized query engine.

Table 1. Comparison of negotiated versus nonnegotiated contracts.

	Non-Negotiated Contract	Negotiated Contract
Hospital Bill	Daily charge for inpatient bed Daily charge for ICU bed Minute charge for operating room Minute charge for recovery room Laboratory bill X-ray bill Itemized disposable item use bill	ICD9 diagnostic code bill ICD9 procedure bill
Outpatient Bill	Emergency room (ER) visit charge Brief, limited charge Itemized disposable item use bill	Negotiated ER visit bill Negotiated outpatient visit bill
Physician Bill	CPT code visit bill CPT code procedure bill CPT code assistant bill (15% to 20% of surgeon's bill for approved procedures)	CPT code visit bill CPT code procedure bill CPT code assistant bill (15% t0 20% of surgeon's bill for approved procedures)
Other Independent Provider Bills	Anesthesia's bill* based on CPT code, modifiers, and anesthesia time CPT code bill for physical/recreational therapy (PT/RT), pharmaceutical services, etc.	Anesthesia bill* based on CPT code, modifiers, and anesthesia time CPT code bill for PT/RT, etc.

* Departments of surgery, nursing, and business at the Santa Fe Indian Hospital.

Setting up Bar Codes for Items

Typing codes for dozens of items into the itemized bill database is not only time consuming, but prone to errors. To minimize the time and errors, most businesses have used bar codes. These are basically special fonts that translate characters and numbers into thick and thin lines that can be read by bar code reading devices. We found that the most commonly used bar code system for medical items is Code 39. Letters and numbers are translated into a series of bars and spaces and an additional asterisk character (*) is placed at the beginning and end of the code to signify the place to start and end reading by the scanning device. For instance, the code "A12345" would look like this:

Any Windows software that can create labels can be used to generate bar code labels, providing that one has the right bar code fonts available. We used Lotus Corporation's AmiPro for this process. There are advertisements for bar code fonts in most computer magazines and we obtained suitable True Type fonts from a commercial vendor.

Reading Bar Codes

There are three commonly available devices that allow a computer to read bar codes: a wand, a charge coupled device, and a laser reader. They all function like a mouse or keyboard, and are independent of the software program with which one is working. A wand is a pencil-like device, costing between $100 and $200, which is dragged across the code. The computer translates this into the equivalent of typing the characters scanned and pressing the Enter button. Whether one is using a word processor, spreadsheet, or database, the scanning device does the same thing: it "types" the characters and presses the Enter button. Thus, any software that permits one to type characters and press Enter can be used with a bar code scanner. It is not necessary to use software that has bar code reading features built in. The wand is more prone to misreading than other bar code readers, and it does require some practice to use. We chose a charge coupled device (CCD), which costs between $300 and $500. This is a flat ended device that is placed against the code without dragging, and a beam of light moves across the code and similarly "types" the characters and presses the Enter button. It requires that the code be flat, and it will only read codes less than an inch away. The most versatile (and expensive) device is the laser reader, which is the system used at most supermarkets and small businesses. It will read a code several feet away and will scan a label that is curved over a rounded object. These generally cost $500-$1000.

Generating the Bill

To bill for itemized supplies, insurance companies want detailed descriptions of the items used as an attachment to the UB-92 and HCFA-1500 claim forms. The itemized supply listing and cost is generated from the Access database and attached to these forms. Currently, the Business Office is utilizing the RPMS Third Party Billing package and has been successful in ensuring that the total itemized amount was accounted for on each claim. The visit is billed as usual on the UB-92 claim form, but to bill for the surgical supplies, the Revenue Code of 270 and the HCPCs code of A4550 are entered. To include the price of all listed items, prices are entered into the 3P Fee Schedule of the HCPCs code prior to billing the visit. Units are billed on the UB-92 claim form, which is equivalent to the total itemized prices. The total is then automatically added to the charges for the overall claim within the RPMS third party billing package. Upon submission, the itemized listing (which also includes the date of service, patient name, medical record number and surgical procedure) is attached to the UB-92 and HCFA-1500 claim forms.

Rationale for Markup of Items

The most difficult decision for us was assigning the correct charge for each item.

Hospitals need to add a certain amount (the markup) to the cost they pay for each item. If there is no markup, hospitals will lose money on shipping charges, lost or expired items, items opened but not used, costs of associated depreciable equipment (like intravenous pumps, etc.) that wear out, and costs of contract personnel who are needed to administer these items. If the hospital keeps careful records of all items purchased, it is easier to calculate the percentage of lost or expired items and create a reasonable markup. Most IHS hospitals, including the Santa Fe Indian Hospital, do not have accurate information about this.

To define the formula used for markup of items, we obtained records on charges for supplies at local hospitals and found that they marked up items anywhere from 6% to 38,000%. When percentage markup was graphed against cost of the item, it was found that there was no linear relationship. Various transformations were tried (such as determining if a fixed cost was added to all items) and again the graph was non linear. However, when the logarithm of the percentage markup was graphed against the logarithm of the cost, an approximately linear relationship was found (see Figure 1).

This made intuitive sense, as high cost items are marked up very little (mainly just to cover lost or expired items), but low cost items are marked up much more to cover not only losses, but also administrative costs, shipping, and handling.

We decided to keep the linear relationship between the logarithm of the percentage markup and the logarithm of the cost in determining our own markup formula. We used a sliding scale for charges, marking up items costing $1000 by 15% to cover expired or lost items, and one-dollar items were marked up 300% ($3) to cover shipping, handling, and administrative costs as well.

We received approval for billing not only disposable supplies in the operating room, but also for marking up pharmaceuticals both in the operating room and in the rest of the hos-

Figure 1. Percent markup at local hospitals versus costs, in dollars.*

* We were able to obtain prices that local hospitals charge for specific items, but were not able to obtain the actual costs to those hospitals. The percent markup (shown in this figure) at local hospitals was estimated utilizing the costs (for these same items) to the Santa Fe Indian Hospital.

pital. We examined the itemized bills from local hospitals, and reduced the average cost by about 30% from their bills. We determined from this that we should mark up medications that are given by intravenous (IV) bolus administration by $10, medications given by slow IV infusion by $40, total parenteral nutrition bags by $50 per liter, and patient controlled anesthesia narcotics by $50 per vial, to cover administrative costs, as well as costs of IV tubing, filters, syringes, and bags. In the operating room our formula for disposable supplies became: percentage markup = $300 / \text{cost}^{0.43}$. Even with this formula, our costs for items were less than 50% of that charged by local hospitals. Over the past month, we have increased the percentage markup to approximate 75% of local hospital charges. This has changed the formula to: charge = cost + $[5 \cdot \sqrt{(\text{cost})}]$.

Implementation

We began an itemized billing system in the spring of 1995. Between June 1, 1995 and December 31, 1995, private insurance revenues increased 27% in the operating room. This was calculated by determining the additional reimbursements we obtained from the insurance companies compared with our billed amounts for non disposable supplies. This formula may underestimate the actual increased revenue, as it assumes that we would have received 100% reimbursement for the parts of the bill not related to disposable supplies. In addition, our itemized billing system has provided us with an inventory of items used, which helps in restocking items and avoids excessive purchase of little-used items. We were able to avoid purchasing expensive and proprietary systems; to do this, the entire cost for the equipment and software to provide itemized billing was under $1000.

Conclusion

The IHS needs to develop additional methods to recover costs of medical care in order to remain competitive with private hospitals. Itemized billing is one such system which is easily implemented with minimal initial cost. ®

Suggested Guidelines When Evaluating Students' Visual Acuity

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Abstract

Traditionally, students with poor, uncorrected vision were prescribed glasses to correct their vision to 20/20, except in cases with minimal refractive error, and were told to wear their prescribed glasses full time. To assist in the assessment of the need for glasses, guidelines for managing students based on the evaluation of chalkboard writing material are offered. Using such guidelines, it is possible to meet two goals. First, whether or not a student requires glasses can be determined. Secondly, those students who do not wear their glasses for various reasons can be seated in the classroom pattern so as to minimize their disability.

Introduction

The management of the student with suboptimal, uncorrected vision is changing.[1] Traditionally, poor vision was corrected to 20/20, except in cases with minimal refractive error, and students were told to wear their glasses full time. Students who chose not to wear the prescribed glasses were told to "sit in the front of the class." More recently, it has been suggested that students with a visual acuity (VA) of 20/40 or better may not require eyeglasses in order to function well in the classroom.[1,2] General, but not specific, pediatric refractive prescribing guidelines are available that do not mention a guideline of 20/40.[3]

In dealing with students with diminished visual acuity, one is frequently presented with the problem of students who do not wear their glasses when prescribed. They might have lost their glasses or, more commonly, the glasses have been damaged.[4] In addition, some students have a negative attitude about wearing glasses, varying from indifference to refusal to wear them. Lastly, due to lack of funds, some cannot obtain glasses.

Within this group of students with poor vision, two main groups stand out. The first group consists of those with marked nearsightedness and farsightedness, strabismus, eye strain, or some evidence of eye disease (such as diseases affecting the retina, eye muscles, etc.). The second group is made up of students with uncorrected VA; that is, students with borderline visual acuity (e.g., 20/25) or worse, who have no evidence of eye disease affecting the retina or eye muscles, etc., and whose poor visual acuity is due solely to mild, moderate, or severe uncorrected nearsightedness or farsightedness.

In most circumstances, the guidelines for the former group are clear because of the underlying eye disease or the severity of the visual impairment: prescribe for maximum visual acuity. For the latter group, the guidelines are less clear. On the one hand, we have the suggestion that we should provide the child with appropriate, full corrective glasses. On the other hand, we have guidelines based on firm, albeit indirect data that if their uncorrected visual acuity is 20/40 or better, their academic performance will not suffer.[2] The authors will build on this available data to develop workable guidelines when evaluating visual acuity in students. The authors' method of approach relies on direct optical measurements. Any effort to determine guidelines must take into account many variables, such as age and different visual tasks, to mention only two. Nevertheless, the need for guidelines is great.

To develop guidelines, we needed to (1) establish a valid relationship between the letters used on the Snellen chart and chalkboard letters, (2) determine the range of sizes of letters in teachers chalkboard handwriting samples, and (3) determine the range of distances in classrooms. Using these data and trigonometric formulae for calculating visual angles, we will propose a threshold VA of 20/40. This threshold would be useful in eliminating potentially unnecessary cost to families with low income, or to third party payers such as Medicaid. The guidelines would also be useful for classroom seating placement of students with vision poorer than 20/20.

Methods

Comparison of visual acuity measured with a Snellen chart to visual acuity measured with chalkboard letters. To compare visual acuity determined by using the Snellen chart to that using chalkboard letters, the Snellen chart was copied as exactly as possible on a classroom-type chalkboard (light green in color) using white chalk (see Figure 1). Chalkboard letters could hardly be made as thin (width of the stroke) as the letters of the 20/20 line on the Snellen chart; thus, the smallest chalkboard letters were equivalent in size to the 20/25 line on the Snellen chart. We used a 40-ft test distance rather than the more standard 20 ft. Testing at 40 feet allowed us to equate visual angles (see box) subtended by the chalkboard letters and the chart letters on the 20/40 lines with the more standard 20/20 line at 20 ft. A distance of two feet was added to compensate for the fact that both eyes were used at the same time; at any given distance, testing with two eyes gives a better visual acuity than testing with one eye. Because of these two compensations, visual acuity measured using both eyes on the Snellen chart's 20/40 line at 42 feet was equivalent to that normally measured with one eye on the 20/20 line at 20 feet.

The number of letters read correctly by 30 normal subjects at 42 ft was determined for each line of both charts and the entire charts. There was no evidence of eye disease on external ocular examination of any of the subjects. Only subjects whose visual acuity was 42/40 (equivalent to 20/20) or better with both eyes open on the Snellen chart participated in the study.

During testing, the Snellen chart and the chalkboard letters were placed side by side. The illumination where this testing was performed was 60-foot-candles.

An important factor in understanding any possible differences in the ability to read chalkboard writing-determined and

Visual Acuity, Visual Angle, and Snellen Notation

In the study of vision it is customary to measure objects in terms of their visual angle.[5] The visual angle subtended by an object is determined using geometric formulae, the most often used is the arc tangent (object size divided by the distance from the eye to the object). Objects of fixed sizes subtend larger visual angles at closer distances and smaller visual angles at longer distances. However, a fixed visual angle is invariant with viewing distance. Therefore, the visual angle reflects the area of the retina which is stimulated by an object. The presumption, which has been borne out by several centuries of research, is that a pattern which subtends the same visual angle elicits the same perception irrespective of the distance at which it is viewed.

Although it is disguised somewhat, visual angles are the foundation of the measurement of visual acuity using standard clinical or "Snellen" charts.[5] When Snellen, a Dutch ophthalmologist, began to develop a chart for testing patients' visual acuity in the late 1800s, it was well established that the "normal" astronomer could resolve a separation between two stars of about one minute of arc. Therefore, Snellen designed letters that had separations in them which subtended one arc minute at 20 feet. Note that, for the letter as a whole, the size is usually five times that of the separations. The perfect example is the "E." Equally spaced dark and light areas give the E a size five times the size of any one of its elements. Modern visual acuity charts follow this same general strategy.

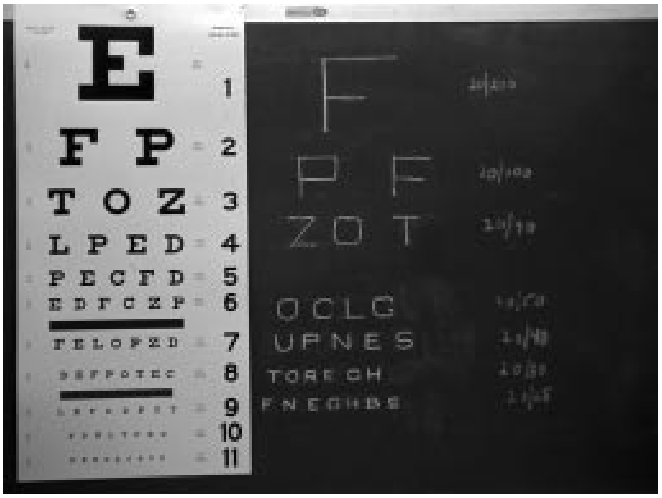
The Snellen fraction (20/20 or 20/40) reflects the visual angles of the elements of patterns at a standard test distance.[5] The standard test distance is the numerator. By historical convention the standard test distance is usually 20 feet or 6 meters. The test distance at which the gaps in the letters subtend one arc minute become the denominator. The standard visual acuity (20/20) is the one which permits perception of one arc minute details at 20 feet, while 20/10 permits perception of 0.5 arc minute details at 20 feet (1 minute at 10 feet) and 20/40 permits perception of 2.0 arc minute details (1 minute at 40 ft). Dividing the Snellen denominator by the numerator gives a quick method of determining the visual angle subtended by the letter elements at the standard test distance.

Naturally, changing the viewing distance also affects the visual angle represented by a line on the chart. For example, the 20/40 line viewed at 40 ft subtends one arc minute, the same angle which the 20/20 line subtends at 20 ft. In this sense, reading the 20/40 line at 42 feet on the chart (in our study) is equivalent to reading the standard 20/20 line at 20 feet. Both have pattern elements that subtend one arc minute. Most visual acuity charts consist of lines of symbols such as letters. The different lines have different sizes. Perception of pattern detail is approximately logarithmic. Most eye charts have their "lines" spaced in steps of approximately 0.1 of a log unit.[5] For example, the lines labeled 20/20, 20/25, 20/30, and 20/40 have patterns whose elements have visual angles at 20 ft. which subtend 1, 1.25, 1.5 and 2.0 arc minutes, respectively, and are each about 0.1 log unit from their neighbors.

Because of the structure of the eye charts, one would expect that small variations in the test distance would have minimal effect on the recorded visual acuity. To equal a change equivalent to one line on the chart the test distance would have to be about 0.1 log unit different from its standard. In the case of a 40-foot standard, to be equivalent to a line difference on the chart, the distance would have to be 50 ft or 31.6 ft.

Normal variation of visual acuity measurements is usually considered to be plus or minus one line. Therefore, to be clinically significant a change in visual acuity must be greater than one line on an acuity chart (i.e., two lines or more).5 Similarly, to be clinically significant the difference in performance between two eye charts would have to be greater than one line.

Figure 1. Snellen chart (left) and chalkboard letters (right) copied exactly as possible on a green, classroom-type chalkboard.



Snellen chart-determined visual acuity is determining the contrast* of the two types of letters under the test lighting conditions. To determine the contrast of different type letters, a standard General Electric light meter was used with the sensor surface partially occluded to 3 mm in width in the shortest dimension. Two measurements of each set of letters were made. The contrast for the Snellen chart was 59% and for the chalkboard 49% with 60-foot-candle illumination. The formula used to calculate contrast was:

$$C=\frac{T_L}{B_L}$$

where C is contrast, T_L is the target luminance, and B_L is the background luminance.

Chalkboard writing samples. Chalkboard writing specimens from 97 different teachers from grades 3-12 at various schools in Apache County, Arizona, and Kanawha County, West Virginia, were the sources of chalkboard writing. The total side-to-side width of lower case letters was measured in millimeters. Initially, the height and width were measured; since the width was nearly always less than the height of the letters, and the width varied less than height, width was taken as the more precise, single measure of letter size. Five samples were taken from each classroom and the average of the five samples was used as the estimate of size of chalkboard writing for that classroom. No effort was made to determine if writing size varied with grade level.

Distance of seat farthest from chalkboard. In 83 of the 97 classrooms in which writing samples were collected, the distance of the farthest seat in the room from the chalkboard was measured.

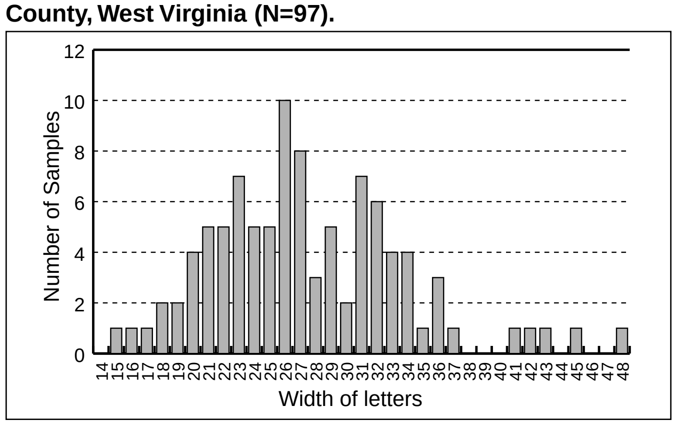
If chalkboard writing is to be equally visible at the farthest seat in different classrooms, the size of the letters should increase as the distance to the farthest seat increases. Another way of stating this is that for the visual angle subtended by the letters in different sized classrooms to be equivalent, the size of the letters must increase as the classroom becomes larger. Therefore, we calculated the correlation coefficient of the distance to the last seat in these 83 classrooms to the width of letter samples taken from the teachers in these classrooms to determine if teachers tended to write smaller in shorter classrooms and larger in longer classrooms. An analogous calculation was to calculate the correlation of the visual angles subtended by the letters and the distance to the last seat.

Results

Visual acuity measured with Snellen and chalkboard writing. Comparing the overall percent correct on reading the Snellen chart with the chalkboard letters, volunteers read 8.3% more letters correctly on the Snellen chart (P=0.05). However, there was no significant difference on reading the 40/40 line at 42 feet (equivalent 20/20 line).

Size of chalkboard writing samples. Figure 2 shows the distribution of widths of chalkboard letters in our sample. Statistical analysis of the specimens from 97 different teachers revealed that the mean is 27.38mm with a standard deviation of 6.32mm. Two standard deviations below the mean is 14.8mm (0.58 inches) which would then include 97.7% of the specimens of chalkboard writing. This value may be defined as the lower limit of the average teacher's writing.

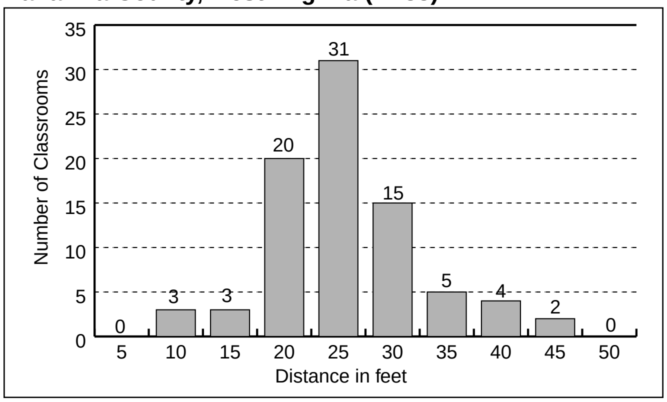
Figure 2. Distribution of width of letters, in millimeters, of chalkboard writing samples taken from grades 3-12 at various schools in Apache County, Arizona and Kanawha County, West Virginia (N=97).



* Contrast is a ratio of light and dark areas which can vary from 0 to 1.0. Typically contrast is multiplied by 100 to yield percent contrast. As a ratio, contrast reflects the relative light levels present in a pattern and is invariant with viewing distance. Contrast is only minimally affected by changes in absolute light level. Contrast is one of the basic stimulus features for the visual system because the eye is not very good at encoding absolute light levels. In general, the eye responds to relative changes in light level. The higher the contrast the more easily a figure is seen. The typical contrast threshold for detecting a pattern is less than 1%. Depending on the type of stimulus there are several methods for calculating contrast. In the case of figures on a background, such as Snellen charts, the most frequent formula is the absolute value of the target luminance divided by the background luminance.

Distance of farthest seat. The distance from the chalkboard to the last seat in 83 of the 97 classrooms was measured and the distribution shown in Figure 3. The mean distance was 23.73 feet with a standard deviation of 6.60 feet. The range was from 6 to 42 feet. There was no statistically significant correlation between the width of teachers letters and the distance to the last seat in the classroom (r= -0.02). Therefore, as the distance from the chalkboard to the last seat increased, the visual angle of the letters as seen from the last seat decreased (r= -0.72; P<0.01).

Figure 3. Distribution of distances from rear seat to chalkboard, in feet, as measured in classrooms for grades 3-12 at various schools in Apache County, Arizona, and Kanawha County, West Virginia (N=38).



Discussion

In general, the differences in visual acuity between the two charts were smaller than what is typically considered clinically significant, i.e., one line difference in visual acuity. Both thickness of component parts of letters and contrast probably contributed to the differences observed. Because the differences in visual acuity are not clinically significant, as an approximation, it is reasonable to equate the letters on the Snellen chart to those on the chalkboard for sizes from 20/200 to 20/20 inclusive.

The smallest sample of chalkboard writing that fell within two standard deviations of the mean was 14.8 mm in width. To ensure that students can see this size letter in a classroom where the farthest seat from the chalkboard is 20 feet, a student would have to have a visual acuity of 20/33.25 at 20 feet (rounded off to 20/30) or better. This differs from the 20/40 threshold previously suggested.[1,2]

A student with 20/40 vision sitting 20 feet from the chalkboard would be seeing chalkboard writing with a size equivalent to the 20/40 line on the chart approximately as well as a student with 20/20 vision would see letters the size of the 20/20 line at 20 feet. However, many of the students sit more than 20 feet from the board (Figure 3), and this must be considered since a 20/40 threshold would be applicable only if students were sitting within 20 feet of the board.

There was no correlation between the size of the chalkboard letters and the distance of the last seat from the board. This indicated that the teachers did not vary the size of their writing with the size of the classroom; they do not write larger for a longer classroom or smaller for a shorter classroom.

A threshold of Snellen VA for requiring glasses must take into consideration the size of the chalkboard letters and the distance of the last seat from the board. Our data provide the approximate size of chalkboard writing and establish a relationship between Snellen letters and chalkboard writing. There is good evidence that academic performance is not impaired when students have poor, uncorrected vision up to and including 20/40 Snellen.[2]

Our direct optical data lead us to a 20/30 threshold in order to be able to read 97.7% of the chalkboard specimens. In our study, there was a very small minority of teachers whose writing is at the lower end of the size range. We feel it would be an undue economic burden, among other reasons, to recommend a 20/30 threshold in order to accommodate this small group. Therefore, we support the 20/40 threshold on two conditions: that the student be seated 20 feet or less from the chalkboard and that teachers write letters no smaller than 17.8 mm (0.70 inches; increased from 0.58 inches [14.8 mm] by less than 1/4 inch) in width (the size of a letter from the 20/40 line on the Snellen chart). The theoretical distance for clear visualization of 17.8 mm letters on the chalkboard was calculated for each level of VA (Table 1). Strictly speaking, this table applies only to students with simple nearsightedness and not to those with farsightedness or astigmatism. However, those with astigmatism usually read the chart better when uncorrected than those with simple nearsightedness. If the last seat is more than 20 ft from the chalkboard, appropriate calculations would be in order to determine the size of the chalkboard letters needed (Table 2).

In addition to using Tables 1 and 2 to assist in seating students with poor, uncorrected visual acuity worse than 20/40, one may use a subjective clinical method to find the distance at which the student should be seated from the chalkboard. Ask the student to approach the Snellen chart with both eyes open. When he or she can read the 20/40 line clearly, note the distance. This is the approximate distance from the chalkboard at which the child should be seated.

Summary

Formerly, students who did not have 20/20 vision were routinely prescribed corrective glasses. More recently, it has been suggested, based on academic performance, that students with a visual acuity of 20/40 or better do not necessarily require prescription glasses. Our data, based on the size of the material the student is obliged to see and the length of the classroom, reinforce the notion that glasses are not required for students with a VA of 20/40 or better.

Ideally, all students with poor, uncorrected vision (whether distant or near vision) should wear corrective glasses. Students

Table 1. Calculated maximum chalkboard distance, by acuity, for individuals whose uncorrected visual acuity is equal to or worse than 20/40, assuming chalkboard letters have a minimum width of 17.8 mm.

Visual Acuity	Distance meters	(feet)
20/200	1.20	3.94
20/100	2.40	7.87
20/70	3.42	11.20
20/50	4.80	15.74
20/40	6.00	19.69

* Calculations for Table 1 were derived as follows: We assumed the letter on the Snellen chart to be the opposite of a right angle triangle, and the distance from the observer's eye to be the adjacent side of the triangle. Thus, the angle subtended by the letter on the chart (e.g., 20/200 letter) would be approximately the Tangent of the angle. The Tangent of the angle (Tan Θ) of a 20/200 letter would be Tan Θ = 89mm/6000 mm or 0.01483. A student with uncorrected or best corrected vision should be able to see 20/40 letters or a letter of a 17.80 mm width or height. Knowing the angle a student with 20/200 vision subtends and knowing the size of the letter the student must be able to see, we can calculate the distance he or she must be from the chalkboard by trigonometric methods. Tan Θ = Opposite/adjacent or 0.01483 = 17.80/Distance, so Distance = 1200mm (1.20 meters or 3.94 feet) from the chalkboard.

Table 2. Required size of chalkboard letters, by distance, for individuals with 20/40 or better visual acuity, when the last seat in a classroom is greater than 20 feet from the chalkboard.

Distance of the Last Seat from the Chalkboard	Size of Smallest Letter in Side to Side Width
24 ft.	0.84 in.
26 ft.	0.91 in.
28 ft.	0.98 in.
30 ft.	1.05 in.
35 ft.	1.23 in.
40 ft.	1.40 in.

who prefer to wear glasses to correct vision maximally should be encouraged to do so.

Each student who does not wear his or her glasses, whether because of resistance, damage, or inability to pay for the glasses, should be evaluated in light of their poor, uncorrected vision. First, it should be decided if he or she can cope without glasses by sitting within 20 feet of the chalkboard. The student whose visual acuity is less than the threshold VA (20/40) should be placed at the appropriate distance from the board depending on the actual uncorrected visual acuity. This determination is best made subjectively, but an objective method may be adequate (Table 1).

All students who fail an eye screening test should be referred for a full eye examination. Those students who fail to obtain this examination, or those who have glasses prescribed as a result of the examination, but fail to acquire or use the glasses, should be treated in accordance with the guidelines suggested in this paper.

Obviously, students with symptoms such as asthenopia or headache, students with strabismus, one-eyed students, those with amblyopia, or those with other symptoms of ocular disease who do not wear their glasses are special situations and should not be managed in the above manner. These students need additional referral to an eye care specialist.

There are three methods of dealing with uncorrected decreased visual acuity in the classroom. The first is to increase the size of the material written on the chalkboard, the second is to move the student closer to the board, and the third would be to minimize the significance of the matter. The first is very practical, especially if it involves only increasing the size of the chalkboard letters a small amount by a minority of teachers. The second, offhand, appears best, but on scrutiny has a serious drawback. By focusing on the problem and indirectly encouraging students not to wear their glasses, we would be giving the inappropriate message to some students that glasses aren't essential. Instead, we might just downplay the issue when considering the student whose VA is 20/40 or better. In support of this third option, there is no evidence that academic performance is harmed by students' having their uncorrected vision of 20/40 or better left uncorrected. There is evidence to show that students with uncorrected vision up to about 20/40 perform just as well academically as those who wear glasses.[2] Which option to follow would depend on the makeup and circumstances of the student population under consideration.

We were able to establish a relationship between the size of the Snellen chart letters and chalkboard writing. Knowing the size of the letters on the board, it may be possible to place a student who has correctable or uncorrectable poor vision in the seating pattern so that their disability is minimized.

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HCFA Updates Medicare, Medicaid Reimbursement Rates for IHS Facilities

June 7, 1996. In an agreement between two agencies of the Department of Health and Human Services, the Health Care Financing Administration (HCFA) has updated the method it uses to reimburse the Indian Health Service (IHS) for health care services provided to American Indians and Alaska Natives eligible for Medicare and Medicaid. The new method, which is retroactive to January 1, 1996, is expected to produce a $65 million gain in annual third-party reimbursements for the IHS.

"These new rates bring the IHS closer to parity with the rates that HCFA uses to reimburse other federal health care providers for the same services," said Health and Human Services (HHS) Secretary Donna E. Shalala. "The rates are the result of HHS agencies working together to effectively discharge our responsibility to improve the quality of health care provided to American citizens."

Inpatient Medicaid rates for all states but Alaska are now $736 per day (51% increase). In Alaska, the inpatient Medicaid rate is $930 per day (63% increase). Inpatient Medicare rates vary, and are based on diagnostic-related groupings.

Outpatient Medicare and Medicaid rates for all states but Alaska are now $147 per visit (55% increase). In Alaska, the outpatient Medicare and Medicaid rate is $233 per visit (47% increase).

"I am pleased that HCFA staff, working closely with our IHS partners, have come up with a method that will more accurately reimburse IHS facilities for providing health care services," said HCFA Administrator Bruce C. Vladeck.

Dr. Michael Trujillo, Director of the Indian Health Service, said the new reimbursement rates "will cover more of the costs of providing health services to our Medicare and Medicaid beneficiaries, so we can redirect IHS' limited appropriated funds to address some other unmet health needs of Indian people."

Self-Governance Planning Grants Awarded to American Indian Tribes

June 7, 1996. Six American Indian tribes have been selected to receive health care delivery planning grants from the Indian Health Service (IHS). The grants, called Tribal Self-Governance Planning Cooperative Agreements, enable tribal groups to enter the planning stage of the Self-Governance Demonstration Project. The project is designed to provide tribes an opportunity to assume the management and control of health care delivery programs from federal authorities.

"These grants are the first step for tribes who make the choice to provide health services to their members based on local tribal priorities," said Donna E. Shalala, Secretary of Health and Human Services. "The health problems and needs of Indian people in different areas of the United States vary tremendously, and local management and control of health care delivery have proven to be just as effective in addressing public health needs as when those services are provided directly by the Indian Health Service."

The six tribes receiving the grants join 229 tribes already participating in the IHS Self-Governance Demonstration Project. Almost a third of American Indians and Alaska Natives eligible for IHS services are now receiving health care directly from tribal health programs as a result of Self-Governance compact agreements or Self-Determination contracts. Of the IHS 1996 budget authority of $2 billion, $282 million was transferred to tribes through 41 Self-Governance annual funding agreements and $332 million was transferred to tribes through Self-Determination contracts. IHS officials anticipate that in the next 3 to 5 years, almost half of American Indian and Alaska Native beneficiaries will receive health services directly from the IHS and the remainder of the IHS budget will be administered and managed by tribes through Self-Determination compacts and contracts.

The grants are each for about $50,000. The tribes receiving the awards include the Ho-Chunk Nation, Black River Falls, Wis.; the Redding Rancheria Tribe, Redding, Calif.; the Chitimacha Tribe of Louisiana, Charenton, La.; the Citizen Potawatomi Nation, Shawnee, Okla.; the Skokomish Tribe, Shelton, Wash.; and the Suquamish Tribe, Suquamish, Wash.

The IHS, an agency within the Department of Health and Human Services, is responsible for providing federal health services to American Indians and Alaska Natives. The provision of health services to federally recognized Indians grew out of a special relationship between the federal government and Indian tribes. This government-to-government relationship is based on Article I, Section 8, of the United States Constitution, and has been given form and substance by numerous treaties, laws, Supreme Court decisions, and Executive Orders.

The IHS is the principle federal health care provider and health advocate for Indian people, and its goal is to raise their health status to the highest possible level. The IHS provides health services to approximately 1.4 million American Indians and Alaska Natives who belong to more than 550 federally recognized tribes in 34 states.

MEETINGS OF INTEREST ®

IHS Research Conference
August 28-30, 1996 Albuquerque, NM

The Eighth Annual IHS Research Conference will be held August 28-30, 1996, in Albuquerque, New Mexico. The Conference will feature "lessons learned from research over the years." For more information, contact Linda Arviso-Miller, Conference Coordinator, 5300 Homestead Road, N.E., Albuquerque, NM 87110 (phone: 505-837-4142).

NIDDM in Minority Youth
December 6-7, 1996 Tucson, AZ

The Native American Research and Training Center (NARTC) and Office of Minority Health are cosponsoring a conference on the problem of non-insulin dependent diabetes (NIDDM) in youth. Topics will include: epidemiology of NIDDM in children and adolescents of Native American, African American, and Hispanic heritage; diagnostic criteria for NIDDM in youth; risk factors for NIDDM in these populations; treatment protocols and the use of medications in the treatment of NIDDM in youth; research priorities; the economic impact of NIDDM in youth; and primary and secondary prevention of NIDDM in youth, with particular attention to sociocultural issues.

The meeting will be held at the Hotel Park in Tucson, Arizona. For further information, contact the program coordinator at NARTC, 1642 East Helen Street, Tucson, AZ 85719 (phone: 520-621-5075).

SPECIAL ANNOUNCEMENT ®

Video and Brochure on Breast Cancer Available

The Southcentral Foundation, an Alaska Native health corporation located in Anchorage, has developed a video and a brochure related to breast cancer screening specifically for Alaska Native women. These educational materials were developed through the Alaska Native Women's Wellness Project, a breast and cervical cancer early detection and screening program.

The fourteen-minute video is entitled "The Gift of Health: A Woman's Path to Wellness." It portrays Alaska Native women between 40 and 70 years of age discussing breast cancer and the importance of screening. The video revolves around a 50-year-old woman who has been referred for a mammogram but is reluctant to go because she is afraid that it will show that she has cancer. The video demonstrates and discusses breast self-examination, clinical breast examination, and mammography.

The eight-page brochure is entitled "Breast Cancer Screening: A Healthy Habit for Life." It discusses breast self-exams, clinical breast exams, mammography, early signs of breast cancer, risk factors for breast cancer, and follow-up for an abnormal breast exam or mammogram. The brochure has been illustrated by Alaska artist Barbara Lavallee and is written at a sixth grade literacy level.

The video and brochure can be used together or separately. They are useful in patient and community education programs. Within Alaska, we are requesting a $5.00 donation for the video and a 10¢ donation for the brochure. Outside Alaska, there is a $15.00 charge for the video and a 50¢ charge for the brochure, in addition to shipping and handling. To receive copies of the video or the brochure, please write or call: The American Cancer Society Alaska Division Inc., 1057 West Fireweed Lane, Anchorage, Alaska 99503 (phone: 907-277-8696).

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THE IHS PRIMARY CARE PROVIDER

The Provider is published monthly by the Indian Health Service Clinical Support Center (CSC). Telephone: (602) 640-2140; Fax: (602) 640-2138; e-mail: provide@ihs.ssw.dhhs.gov. Previous issues of *The Provider* (beginning with the December 1994 issue) can be found on the IHS health care provider home page (http://www.ihs.gov)

Opinions expressed in articles are those of the authors and do not necessarily reflect those of the Indian Health Service or the Editors.

Circulation: *The Provider* (ISSN 1063-4398) is distributed to more than 6,000 health care providers working for IHS and tribal health programs, to medical and nursing schools throughout the country, and to health professionals working with or interested in American Indian and Alaska Native health care. If you would like to receive *The Provider,* free of charge, send your name, address, professional title, and place of employment to the address listed below.

Publication of articles: Manuscripts, comments, and letters to the editor are welcome. Items submitted for publication should be no longer than 3,000 words in length, typed, double-spaced, and conform to manuscript standards. PC-compatible word processor files are preferred.

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