

Universal Symbols in Health Care

Technical Report: Testing Universal Symbols to Support Implementation in Health Facilities Signage

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Overview

Hablamos Juntos, in an ongoing partnership with the Society for Environmental and Graphic Design (SEGD) promotes adoption of the Universal Health Care Symbols (UHCS) as an effective alternative to costly multilingual signs. Universal symbols, pictograms or images that consistently enable logical associations are found effective to enable communication across languages and cultures. With funding from the Robert Wood Johnson Foundation's Pioneer portfolio, which supports innovative ideas that may lead to significant breakthroughs in the future of health and health care, testing was conducted on symbol use for signage projects in four Innovator facilities serving populations with Limited English Proficiency (LEP). Participating health facilities were selected through an open call for Requests for Applications (RFA) issued May 2008 by Hablamos Juntos.

The facilities selected serve a multi-lingual consumer base with growing local LEP populations, demonstrated advance readiness to launch an approved signage initiative and desire to develop award-winning wayfinding programs using graphic symbols. The leadership of these facilities committed the staff and financial resources needed to participate in the project, without compensation. This included engaging a local designer for the project and supporting activities related to two site visits to conduct Pre Design Audits and Post Design Evaluations. In return, the innovator facilities received technical assistance and evaluation support from a project team of leading national experts in symbols and wayfinding signage. The facilities selected are recognized as innovator sites with best practice application of symbols in health care signage effective for multilingual and literacy challenged populations.

The two one-day site visits (Pre Design Audit and Post Design Evaluations) required facilities to make available key staff and interpreters, provide translation of select testing materials, offer support services to enable and incentives to encourage, diverse language users to participate in paper and pencil tests and wayfinding tasks. This technical report is concerned with tests conducted during the Post Design Evaluation site visits of the four innovator health facilities.

These include two Paper and Pencil Tests (Referent Assignment/Symbol Comprehension Test and Number of Symbols at a Facility Test) and Wayfinding Tasks which consisted of observed and timed directed search for three interior hospital destinations specified by the research team. The paths to the destinations were blazed with experimental wayfinding signs. The overarching aims of the Post Design Evaluation testing included:

- ~ An analysis of the wayfinding experience designed to experimentally evaluate the effectiveness of various wayfinding treatments using universal symbols across four diverse healthcare types. This systematic evaluation would provide a strong scientific basis for future wayfinding design and implementation.
- ~ A measured analysis of specific design issues surrounding symbol utilization in healthcare facilities.

This report describes methodology, results, recommendations and conclusions arising from the testing conducted to address three specific issues related to three discrete tasks:

- The number of symbols that can be used effectively. Many hospitals have found it difficult to develop a clear symbol palette because of a concern that including too many symbols would make it difficult for visitors to learn the symbol set and to differentiate between the various symbols in the healthcare environment. One goal of the analysis was to determine the number of symbols in a set or array that a person can easily understand, differentiate, and utilize. In this report this is called the: Number of Symbols at a Facility Test.
- The effectiveness of various referent names for symbols. Most healthcare facilities have used various destination nomenclatures that at times have differed from the ones developed as part of the Hablamos Juntos symbol design process. A goal of the analysis was to observe the effectiveness of alternative referent terminology and the reasons for their effectiveness. In this report this is called the: Referent Assignment/Symbol Comprehension Test.

- Symbols as part of a designed wayfinding program. In previous research projects, symbols were found to be effective when used on signs and in handouts, but additional investigation needed to be developed on the effectiveness of symbols in specific wayfinding environments, where size, location, wayfinding methodology, and use of directories could play a significant role. In this report this is called the: Wayfinding Task.

Methodology

Facilities Descriptions

Four health facilities were selected to participate as pilot sites for the research projects based on three primary criteria:

- ~ Matching one of the four facility types being sought: community hospital; large multi-floor urban hospital; medium sized urban hospital; and specialty suburban healthcare facility.
- ~ Ability of the facility to undertake the project tasks including designing and implementing a prototype sign system, supporting on-site research and participating in design and implementation discussions.
- ~ Language diversity of the community.

Woman and Infants Hospital

A mid-size healthcare facility in Providence, Rhode Island dedicated to providing women's health and neonatal services. A new lobby space links two distinct sections of the hospital, one dedicated to administration, education and testing, and the original facility dedicated to specific health services, including inpatient facilities. The constituency of the hospital is diverse and encompasses many language and cultural groups, but the dominant groups are English and Spanish.

Wayfinding System Design - The wayfinding system was designed around the two wings of the building. Two large directory signs in the lobby space point visitors to the two separate wings of the building where wayfinding signs take them to destination identification signs. Fifteen destinations are included in the symbols vocabulary.

International Health Community Services (ICHS)

A small community clinic in the International District of Seattle where the main demographic of the facility is Mandarin Chinese and very few people in the facility can read or speak English. The facility has a small number of destinations (nine) all on one floor and few people that can provide interpretive support for wayfinding.

Wayfinding System Design - A small lobby directory provides definitions for each of the symbol destinations. Individual wayfinding signs direct visitors to destinations on one floor, but the system is mainly supported by multiple identification signs. All wayfinding and identification signs are based on a single 11 inch x 17 inch module. Eight destinations are included in the symbol vocabulary.

Children's Mercy Hospital

A renovated children's hospital with a distinct identity integrated into the fabric of the building. Located on the edge of an urban area and part of a large hospital campus, Children's Mercy serves mainly English speakers, along with a diverse population from Africa and Asia. The hospital facility is geared toward parents with children utilizing the inpatient facilities and has extensive support services.

Wayfinding System Design - Large wall mounted wayfinding signs direct visitors to multiple destinations at key decision points in the facility, which is identified by large symbol signs. The sections of the hospital are also color-coded and incorporated into the sign identity. At least 30 destinations are included in the symbol vocabulary.

Grady Memorial Hospital

A large multi-story urban hospital that serves a diverse low income population in a facility 20 stories tall with three elevator banks and most of the destinations on the first six floors. The building is also separated into four distinct sections, though most visitors arrive in the same location, a large atrium lobby space.

Wayfinding System Design - A directory and map introduces visitors to a color-coded wayfinding system built around the three elevator cores of the building. Large symbol directory signs at the elevator cores point visitors to the correct floor where wall mounted directional signs, and ceiling mounted signs, guide visitors to their destination marked by small identification signs. The symbols vocabulary contains 21 destinations.

Participants

With the help of the hospital administrations, participants from the three largest language groups in each of the four communities were recruited to take part in the research. While testing was not dependent on English speaking ability, but rather cross-cultural interpretation of symbols and signs, of those participants, approximately half had English as their primary language; one quarter had LEP and spoke Spanish as their primary language; and one quarter had LEP and spoke an Asian language as their primary language. The Asian language groups were selected by the hospital administration based on local demographics and the languages spoken by patients served. English and Spanish were constant across sites, while Asian languages varied.

LEP is defined as those who speak English “well,” “less than very well,” or “not at all.” An attempt was made to test only individuals in the middle “less than very well” category, however some of the participants (particularly the Spanish

speakers) spoke English “well.” Subject age, gender, and primary language for each of the four healthcare sites are shown in Table 1; the question marks indicate cases where the subjects did not indicate their gender on the information sheet.

Healthcare Center	Age Mean	Age Range	Gender	English	Spanish	Khmer	Mandarin	Vietnamese	Somali	Totals
Rhode Island (W&I)	36	17-70	34 - F	18	12	0	0	0	14	44
			8 - M							
			2 - ?							
Kansas City (CMH)	40	18-82	30 - F	16	9	14	0	0	0	39
			7 - M							
			2 - ?							
Seattle (IChS)	39	18-73	16 - F	15	0	0	8	5	0	28
			10 - M							
			2 - ?							
Atlanta (Grady)	44	19-81	19 - F	18	6	9	0	0	0	33
			13 - M							
			1 - ?							
Totals	40	17-82	99 - F 38 - M 7 - ?	67	27	23	8	5	14	144

Table 1.
Participant Characteristics

Paper And Pencil Tests

Referent Assignment/Symbol Comprehension Test. To assess the effectiveness of various referent names for symbols, the participants completed a ten-minute paper and pencil test. That test was used to evaluate how well the participants thought that certain healthcare symbols characterized a set of referents. A symbol was shown on a piece of paper with a set of four to seven healthcare facility referents or terms to describe the symbol. Separate cultural/language based referents were developed for English, Spanish, and Mandarin language groups. The subjects were asked to assign each referent a ranking from 0-5 as to how well they thought it matched the symbol, with 0 being “not at all” and 5 being “perfectly.” Twelve symbols were tested (Appendix A).

Number of Symbols at a Facility Test. To determine the number of symbols that could be used effectively in a single healthcare setting, the participants completed a short, timed, paper and pencil test that evaluated the effect that the number of symbols in an array has on how quickly the participants could

find target symbols. The test consisted of three sheets of paper. All three sheets had two target symbols and an array of possible matching symbols, two of which matched the target symbols. The symbols were not associated with any textual referents. The first sheet had an array of eight symbols; the second 16 symbols, and the third 24 symbols (Appendix B).

The participants were shown the target symbols and were told to draw a line as fast as they could between the target symbols and the symbols in the array that matched them (e.g., Figure 1). The array of symbols was covered until the participant was ready to begin the matching task. The experimenter then uncovered the array, started a stopwatch, and the participant began the test. When the participants made the two matches, the experimenter stopped the watch and recorded the time. The procedure was repeated for pages two and three. The target symbols associated with the three arrays and the order in which the arrays were presented were counterbalanced across participants to avoid biasing the results due to practice or fatigue.

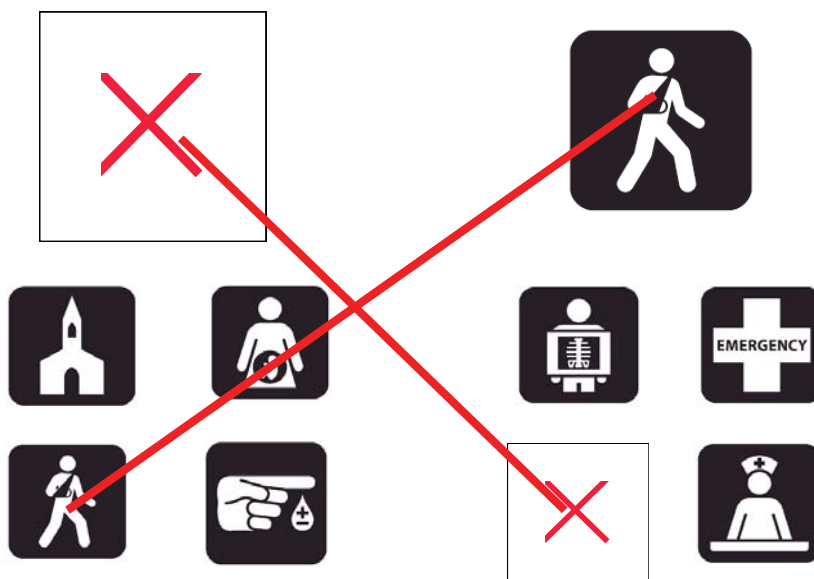


Figure 1.
Example of matching task with eight possible matches.

Wayfinding Task

A wayfinding task was developed to assess the effectiveness of symbols in specific wayfinding environments that varied in size, location, wayfinding methodology, and use of directories. The task consisted of the participants individually following a directed search for three interior hospital destinations specified by the research team for each healthcare facility. The paths to the destinations were blazed with experimental wayfinding signs. The wayfinding signs for each of the three destinations displayed either symbols only; symbols plus English textual referents; or symbols plus both English and either Spanish or Mandarin textual referents.

Figure 2.
Example of Wayfinding
Test Questionnaire.

<i>Read each statement to the subject and place a mark in the box that most closely matches their experience – one mark for each destination.</i>	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
You could easily find the room.					
The signs were easy to understand.					
The signs were well placed and easy to find.					
When it makes sense, ask the following questions.					
Having the word in English helped me find the room.					
Having the word in English and Spanish or Mandarin helped me find the room.					
Not having a word made it more difficult to find the room.					

All symbols were displayed monochromatically as a dark figure on a white background. The measures of effectiveness consisted of time-to-destination and the responses to a short subjective Likert-style questionnaire measuring the participants' perception of how helpful the signs were in leading them to each destination (Figure 1). Time-to-destination was recorded in seconds and later converted to ft/sec based on the route length of each destination.

All participants were exposed to all three wayfinding sign conditions. The participants were taken individually to a main hospital lobby area and asked to find a specific hospital location. They were told to find the destination by using the experimental wayfinding signs temporarily installed in the hospital corridors while an experimenter followed them and recorded the time it took them to

reach the destination. When they reached the destination, the participants were given the short Likert questionnaire.

The participants were then escorted back to the lobby, given a second destination to find and were asked to repeat the procedure. The entire procedure was in turn repeated until all three destinations were found. If the participants could not find a specific destination, or if they got lost, the experimenter recorded this, escorted them back to the starting point, and the session continued from there. Each session lasted approximately 40 minutes. All the data for each of the four hospitals were collected within single 8-hour days.

Results

Referent Assignment/Symbol Comprehension Test. The results of this test are displayed separately for the three primary language groups in Appendix C (i.e., English speakers, Spanish speakers, and Mandarin speakers). For each symbol, the referents are shown in order of participant preference; beginning with the one they thought best matched the symbol. Beside each referent in Appendix C are three numbers: the “n,” or number of participants who responded; the median, or central point of the data showing where half of the participants ranked the referent above and half ranked it below; and the mode, which shows the response given most often.

Medians and modes are standard descriptive statistics of central tendency used when data are of a ranked or ordinal variety, that is, when, although there is a logical ordering of the numbers, there is no absolute zero point and the differences between the numerical responses may be uneven. For example, one cannot assume that a rank of “4” on this test means that the participant thought that that referent matched the symbol twice as well as one given a rank of “2.” This type of data can be compared to ratio data, where the mean or arithmetic average can be used, such as time in the wayfinding task and the number of symbols in a facility paper and pencil matching test, where, for example, a time of 10 seconds is twice as slow as a time of 5 seconds.

Number of Symbols at a Facility Test.

When healthcare institutions decide to use a symbol signing system to help their patients find their way around their facilities, they often wonder what would be the maximum or optimal number of symbols to use. There is concern that using too many symbols might confuse their patients or slow them down when they are scanning an array of healthcare symbols looking for their destination. The simple paper and pencil test described above was given to the subjects in this study to see if increasing array size (a surrogate for the number of symbols in a healthcare symbol signing system) would indeed result in slower matching times. The results of this test are shown in Table 2.

Table 2.
Mean results Number of
Symbols at a Facility Tes
(in seconds).

Primary Language	English	Spanish	Khmer	Somali	Chinese	Vietnamese	Total
Number of Possible Matches	n=65	n=27	n=22	n=9	n=8	n=4	n=135
8	8	12.14	12.9	14.92	5.81	15.75	10.19
16	9.51	12.21	16.26	15.44	10.76	18.75	11.9
20	13.39	15.82	20.67	14	13.55	20.2	15.31

The table shows that for the most part, very small reductions in mean speed resulted when going from arrays with eight to eighteen symbols, with a much larger speed reduction occurring when the array had 20 symbols. An analysis of variance (ANOVA) conducted on the data confirmed that there was an overall significant main effect of the “number of symbols” variable ($F(2,402) = 11.42$, $p < .001$). The post-hoc comparisons with Bonferroni correction, revealed what might be expected from viewing the table, that while it took subjects

significantly longer to match the 20 symbol array than it did for them to match either the eight or 16 symbol arrays ($t(402) = 4.694, p < .05$; and $t(402) = 3.131, p < .05$, respectively), the difference between the time it took the participants to match the eight symbol array compared to the time it took them to match the 16 symbol array was not statistically significant ($t(402) = 1.563, p > .05$).

Table 2 also seems to show that there were language, or perhaps cultural, differences in overall matching speed. An ANOVA was conducted to compare the possibility of a statistically significant difference in overall matching speed among the English, Spanish, and Khmer groups (there were too few subjects in the other three groups to do this type of analysis). The ANOVA found a significant main effect ($F(2,339) = 12.72, p < .001$). The post-hoc analysis (again with Bonferroni correction for multiple comparisons) revealed that the English group was faster than the Spanish ($t(339) = 2.573, p < .05$) and the Khmer groups ($t(339) = 4.18, p < .05$), but there was no statistically significant difference between the Spanish and the Khmer groups ($t(339) = 2.136, p > .05$).

Likert Scale Opinion Survey.

As described above, during the course of the wayfinding task, the subjects were asked to respond to short, subjective, Likert-style questionnaires to see how helpful they thought the three sign types were (i.e., Symbol only; Symbol and English referent; and Symbol, English and either Spanish or Mandarin referent). The results of that survey are shown in detail for three language or cultural groups in Appendix D.

As with the referent assignment/symbol comprehension task described above, Likert tests result in ordinal data. Medians and modes can be used to describe these results; however in the current study, the distribution of the responses yielded mainly “4” for median and “5” for mode, which did not allow for ready differentiation of the subject responses. Therefore, for this analysis, the responses were treated as dichotomous data (i.e., those participants who “agreed” with the statements and those who “disagreed”). The far right columns

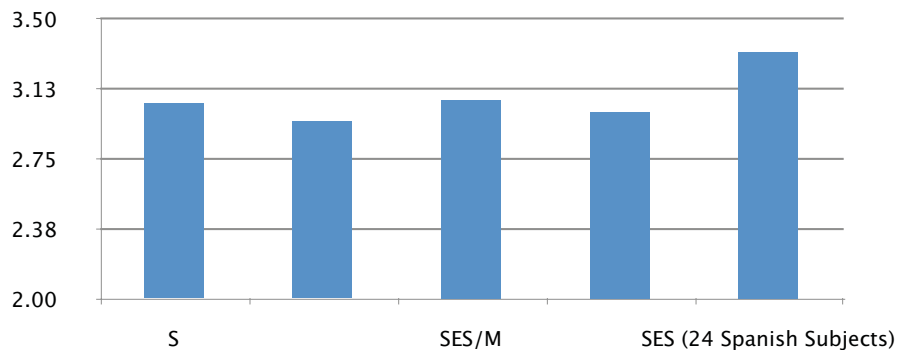
in Appendix D summarize the data by combining the percent of respondents that either agreed or strongly agreed with the statements.

Wayfinding Task.

The results of the wayfinding task are shown in Figure 3. The three columns on the left are for all subjects combined, totaling 131 responses in the Symbol only condition; 128 responses in the Symbol and English referent condition; and 132 responses in the Symbol, English, and either Spanish or Mandarin referent condition. As the figure shows, the differences in walking speed were very small. For the full group of subjects (first three columns), there was only a 0.1135 ft/sec spread between any of the conditions. Not surprisingly, an ANOVA conducted on the data revealed that these differences were not statistically significant ($F(2,388) = 0.1255, p = 0.88$).

Figure 3.
Mean walking speed (ft/sec) to find all destinations using three sign types

(S=Symbol;
SE=Symbol + English;
SES/M=Symbol + English + Spanish or Mandarin).



The two columns on the right are data separated from the full set to isolate the effect of adding Spanish to the wayfinding signs for participants whose first language was Spanish. Column-4 shows the performance of 106 non-Spanish subjects on signs that had Symbols, English referents, and either Spanish or Mandarin referents. Column-5 holds the data for the 26 Spanish subjects on signs that had Symbols and both English and Spanish referents. The small mean increase in walking speed for the Spanish participants seen in Figure 3 (0.32 ft/sec) was shown by a Student’s t-test to not be statistically significant ($t(130) = -1.52, p = 0.13$).

Summary

The Referent Assignment/Symbol Comprehension Test designed to test the effectiveness of various referent names for symbols demonstrated that participants could link a variety of destination referents to a single symbol. On most of symbols studied, participants gave high scores to a number of referents that they felt most corresponded with the symbols. In many cases (e.g., Care Staff Station and Medical Records) the base referent did not receive the highest score. Also, participants across all four facilities seemed to read the symbols based on what they directly saw being symbolized; participants gave low scores to referent names that augmented the core referent with additional information. For example, Surgical Unit received high scores while Pediatric Surgery and Emergency Surgery received low scores. Participants also gave low marks to destination names that were not clearly understood, like Orthopedics as opposed to Physical Therapy.

The Number of Symbols at a Facility test aimed to address the number of symbols that can be used effectively. Results showed that participants across all the facilities could differentiate up to 16 symbols with relative ease. The time elapsed for a participant to find 16 symbols were not significantly greater than finding 8 symbols in the test. Yet there was a significant increase from 16 to 24 symbols. These results were consistent across all facilities.

The Wayfinding Task, designed to examine symbol use as part of a designed wayfinding program, showed that facility size and distances to destinations within the facility had little determining role in symbols utilization. Facilities which required greater walking distances and multiple decision points did not result in noticeably slower speeds or lower ratings for effectiveness. This task also demonstrated that adding textual references to wayfinding signs (in addition to symbols) did not significantly change the time it took the participants to find the destinations. This was true for all the language groups.

Design decisions in each of the four facilities were also a major factor in performance. Participants utilized symbols more in facilities where the

symbols were larger and consistent in size. At Children’s Mercy Hospital and International Community Health Services (ICHS) participants generally felt most comfortable using just the symbols without additional information after the initial directory. These two locations had both the largest symbols used and the most consistently sized symbols throughout the wayfinding system. Also, initial directory information was found to be crucial to wayfinding success. While all participants had difficulties with preliminary directory information at all four facilities, faster speeds and higher positive survey results were seen at ICHS and Children’s Mercy Hospital, which had the clearest initial directory information.

Recommendations

The following design recommendations are based on the goals of the research and interpretation of specific results.

DESTINATION NOMENCLATURE HIERARCHY

Develop destination names based on the visual link between the symbol and destinations and try to avoid unnecessarily complex or difficult words. In the Referent Assignment/Symbol Comprehension Test, a number of destination names performed as well as the destination name originally chosen. One element these names had in common was a strong link between the terminology and the visual attributes of the symbol. For example, three destination names tied for first place for the symbol defining “Social Services” (Figure 4). All



Figure 4.

Social Services Symbol and Subject Referent Preferences.

Referent	n	median	mode
Social Services	65	4	5
Family Practice Clinic	63	4	5
Marriage and Family Counseling	63	4	5
Woman Infant Children's Clinic (WIC)	62	2	0

three included terms that share some link to elements in the symbol. Terms like “social” “family” and “marriage” are linked to the visual image of the family group.

Adding complex terms that are either not inherent in the symbol or are just difficult or unfamiliar to many participants also brought comprehension down. The results of the “Physical Therapy” symbol display both phenomena (Figure 5).

Referent	n	median	mode
Physical Therapy	62	3	5
Walk in Clinic	66	3	0
Ambulatory Clinic	62	2	0
Radiation Oncology Center	63	0	0
Chemotherapy	62	0	0



Figure 5. Physical Therapy Symbol and Subject Referent Preferences.

Symbols Vocabulary

Be wary of utilizing more than 16 symbols in a single group. Divide symbols by district or group for numbers larger than 16 symbols. The matching test provided very clear results about the effectiveness of symbols set size. Symbols sets of larger than 16 symbols become harder to differentiate and locate in the environment. This does not mean that a healthcare facility should not use more than a defined group of symbols, but that design decisions should be made for separating symbols into groupings or sets when they reach the 16 symbol range. Two test facilities including Grady Memorial Hospital and Woman and Infants Hospital divided the symbol groups by sections of the hospital so that the entire set of symbols would not be used at the same time, but in the designated section of the facility. Children’s Mercy Hospital was advised to follow this design recommendation as well.

Symbol Design And Location

Use large and consistent symbol sizes on signs. Size and consistency play key roles in the effectiveness of symbols programs. At the two facilities that achieved the strongest testing results with symbols, Children’s Mercy Hospital and International Community Health Services (ICHS), participants generally felt most comfortable using just the symbols without additional information after the initial directory. These two locations had both the largest symbols and the most consistent in size throughout the wayfinding system.

Symbol Size – Symbols on wayfinding signs are more effective when they are 3 in or greater in height on directional signs and 6 in or greater in height on identification signs. On directory signs, larger symbols also were more effective.

Symbol Consistency – Wayfinding systems utilizing symbols also appeared to be easier to navigate when the symbols were in a narrow size range. At Grady Memorial Hospital symbols varied in size from ½ inch on map directories to 2 inches on elevator directories to 3–6 inches on identification signs to 3-12 inches on wayfinding signs. This variety of symbol sizes made the symbols less effective than destinations like ICHS and Children’s Mercy Hospital that only used two symbol sizes.

Location plays in key role in symbol legibility. In Phase One Hablamos Juntos research, it was discovered that two identification signs, one perpendicular and overhead, and one wall mounted and at eye level, were more effective than one sign. In the present research it was discovered that additional location issues also play a key role in legibility.

Location of directories at landmarks. Directories that were located in conjunction with key landmarks, like information desks and elevator cores were more effective. At Woman and Infants Hospital the directory signs were more difficult to find because they were located beyond the main information desk. At ICHS the directory was difficult to find because it was not associated with any landmark.

Location of wayfinding signs consistently at decision points – At Children’s Mercy Hospital, the same size wayfinding sign was located at the same sign height at every major destination point, increasing their effectiveness.

Multiple signs for complex locations – At ICHS, the use of multiple identification signs for complex destinations like registration and billing stations room proved to increase wayfinding effectiveness.

User Testing

Simple prototype wayfinding tests should be incorporated into all wayfinding programs. Interviews and research results made it clear that simple prototype tests improved the efficiency and legibility of designed sign systems. While general conclusions could be drawn from the four facilities, the design of each facility had unique elements that required design solutions tailored to the facility. Using the wayfinding testing procedure defined in this report can provide specific guidance on design decisions from the use of directories or print support to the location and size of specific signs.

Directories And Print Support

Directories cannot be too large or too simple. The Phase One Hablamos Juntos Research Report stressed the importance of handouts and print support for more effective wayfinding systems. In the current research, the size and effectiveness of the directory played a key role in the effectiveness of the system. In three of the four facilities, participants had difficulty with the size, placement and complexity of the directory signs. At more complex facilities like Grady Memorial Hospital, the small size and complexity of the directory was one of the key factors in the relative lack of effectiveness of the wayfinding program. At Children’s Mercy Hospital, the large size, simplicity, and redundancy of multiple directory signs made the wayfinding system more effective.

Final Summary

This workbook is meant to serve as a resource to help health care executives, designers, and facilities managers become acquainted with universal health care symbols and how they can be integrated into wayfinding systems and management strategies.

If you would like more information on developing a strategy for Limited English Proficient users in health care facilities, and how universal symbols can be involved in that strategy, visit www.hablamosjuntos.org. This Web site contains information on the efforts of Hablamos Juntos to create more accessible health care facilities using interpretive services, improved writing, wayfinding, and management.

For more information on technical issues related to symbols and wayfinding in health care facilities, visit the Society for Environmental Graphic Design at www.segd.org. Their web site contains information on best practices for health care wayfinding, case studies on specific programs, and educational programs and publications on health care wayfinding. For a CD containing all document reports and a tutorial on wayfinding in health care based on previous SEGD educational programs contact SEGD at 202-638-5555 or segd@segd.org.

Footnotes

SEGD is an international non-profit educational organization providing resources for design specialists in the field of environmental graphic design, architecture, and landscape, interior, and industrial design. Members are leading designers of directional and attraction sign systems, destination graphics, identity programs, exhibits, and themed environments.

This symbols system (posters and print ready art) are available at no cost from Hablamos Juntos and SEGD websites. (<http://www.hablamosjuntos.org/signage/default.index.asp>)

U.S. Census defines limited English proficient (LEP) population as anyone who answers less than “very well” to the question: “How well do you speak English?” [Possible answers: very well, well, not well, not at all].

<http://www.hablamosjuntos.org/signage/PDF/RFA-PilotSites-May08.pdf>

Appendix A: Referent Assignment/Symbol Comprehension Test

All individual test information will be kept confidential



- Surgical Unit
- OR
- Pediatric Surgery

On a scale of 0 to 5, with 0 being “not at all” and 5 being “perfectly,” how well do the following terms match the symbol above?

- Operating Room
- Emergency Surgical Unit
- Emergency Surgery



- Care Staff
- Nurses station

On a scale of 0 to 5, with 0 being “not at all” and 5 being “perfectly,” how well do the following terms match the symbol above?

- Counseling Services
- Shots



- Billing Department
- Financial Aid

On a scale of 0 to 5, with 0 being “not at all” and 5 being “perfectly,” how well do the following terms match the symbol above?

- Registration
- Financial Counseling Offices



On a scale of 0 to 5, with 0 being “not at all” and 5 being “perfectly,” how well do the following terms match the symbol above?

___ Medical Records

___ Patient Records

___ Health Information Management



On a scale of 0 to 5, with 0 being “not at all” and 5 being “perfectly,” how well do the following terms match the symbol above?

___ Critical Care

___ Intensive Care Unit

___ Pediatric Intensive Care

___ Neonatal Intensive Care Unit

___ Intensive Care

___ Cardiac Intensive Care



On a scale of 0 to 5, with 0 being “not at all” and 5 being “perfectly,” how well do the following terms match the symbol above?

___ Primary Care Services

___ Pediatric Care

___ Family Practice Clinic

___ Health Center

___ General Internal Medicine Clinic



On a scale of 0 to 5, with 0 being “not at all” and 5 being “perfectly,” how well do the following terms match the symbol above?

- Cardiology
- Cardio-Pulmonary services
- Cardiology Department

- Heart Disease & Disorders
- Cardiovascular Medicine



On a scale of 0 to 5, with 0 being “not at all” and 5 being “perfectly,” how well do the following terms match the symbol above?

- OB/GYN
- Women’s Health Center
- Gynecology Clinic

- Obstetrics & Gynecology
- Family Planning



On a scale of 0 to 5, with 0 being “not at all” and 5 being “perfectly,” how well do the following terms match the symbol above?

- Physical Therapy
- Ambulatory Clinic
- Walk in Clinic

- Radiation Oncology Center
- Chemotherapy



On a scale of 0 to 5, with 0 being “not at all” and 5 being “perfectly,” how well do the following terms match the symbol above?

___ Physical Therapy

___ Rehabilitation Therapy

___ Orthopedics

___ Physical Medicine

___ Physiotherapy



On a scale of 0 to 5, with 0 being “not at all” and 5 being “perfectly,” how well do the following terms match the symbol above?

___ Prenatal Clinic

___ Maternity

___ OB Clinic

___ Birthing Center

___ Labor and Delivery



On a scale of 0 to 5, with 0 being “not at all” and 5 being “perfectly,” how well do the following terms match the symbol above?

___ Social Services

___ Marriage and Family Counseling

___ Family Practice Clinic

___ Woman Infant Children’s Clinic (WIC)

Mandarin Only



___ 外科手術部

___ 小兒外科手術

在0至5的測量下, 0是“完全不”, 5是“絕對”, 下列的定義如何符合以上的標圖?

___ 手術室

___ 緊急手術



___ 醫護人員

___ 護士站

在0至5的測量下, 0是“完全不”, 5是“絕對”, 下列的定義如何符合以上的標圖?

___ 輔導服務

___ 注射



___ 結帳部門

___ 財政援助

在0至5的測量下, 0是“完全不”, 5是“絕對”, 下列的定義如何符合以上的標圖?

___ 登記

___ 財務諮詢處



在0至5的測量下, 0是“完全不”, 5是“絕對”, 下列的定義如何符合以上的標圖?

___ 病人記錄

___ 登記中心

___ 醫療資訊管理

___ 醫療記錄



在0至5的測量下, 0是“完全不”, 5是“絕對”, 下列的定義如何符合以上的標圖?

___ 緊急護理

___ 心臟科緊急護理

___ 緊急護理部

___ 兒科緊急護理

___ 新生兒緊急護理部



在0至5的測量下, 0是“完全不”, 5是“絕對”, 下列的定義如何符合以上的標圖?

___ 家庭醫療服務

___ 兒科護理

___ 家庭醫療診所

___ 醫療中心

___ 一般內科診所



在0至5的測量下, 0是“完全不”, 5是“絕對”, 下列的定義如何符合以上的標圖?

- ___ 心臟科
- ___ 心臟和肺部服務
- ___ 心臟科部門

- ___ 心臟病與疾病
- ___ 心血管醫學



在0至5的測量下, 0是“完全不”, 5是“絕對”, 下列的定義如何符合以上的標圖?

- ___ 婦產科 / 婦科
- ___ 婦女醫療中心
- ___ 婦科診所

- ___ 婦產科 & 婦科
- ___ 家庭生育計劃



在0至5的測量下, 0是“完全不”, 5是“絕對”, 下列的定義如何符合以上的標圖?

- ___ 物理治療
- ___ 流動診所
- ___ 步行診所 (無需預約)

- ___ 輻射腫瘤中心 / 電療中心
- ___ 化療 (腫瘤)



在0至5的測量下, 0是“完全不”, 5是“絕對”, 下列的定義如何符合以上的標圖?

- 物理治療(運動性或應用的方式)
 - 建設性康復治療
 - 骨科
 - 物理醫學
-



在0至5的測量下, 0是“完全不”, 5是“絕對”, 下列的定義如何符合以上的標圖?

- 產前護理診所
 - 產房
 - 婦產科診所
 - 分娩中心
 - 生娩和接生
-



在0至5的測量下, 0是“完全不”, 5是“絕對”, 下列的定義如何符合以上的標圖?

- 社工服務
- 婚姻及家庭輔導
- 家庭醫療診所
- 婦女, 嬰兒與幼兒營養規劃

Appendix B: Number of Symbols at a Facility Test

Draw a line between these two symbols and the ones that match in the set below.



Draw a line between these two symbols and the ones that match in the set below.



Appendix C: Results of Referent Assignment/Symbol Comprehension Test



n, median, mode

Operating Room	64	5	5
Surgical Unit	66	4	5
OR	46	4	5
Emergency Surgical Unit	51	3	0
Pediatric Surgery	66	2	0
Emergency Surgery	66	2	0



Nurses Station	67	5	5
Care Staff	65	3	3
Counseling Services	65	0	0
Shots	65	0	0



Billing Department	66	5	5
Financial Aid	66	4	3
Financial Counseling Offices	66	3	5
Registration	66	0	0



Patient Records	65	5	5
Medical Records	67	5	5
Health Information Management	65	3	3
Central Registration	16	0	0

English Only



Critical Care	66	4	5
Intensive Care Unit	65	4	5
Intensive Care	50	4	5
Cardiac Intensive Care	66	3	5
Neonatal Intensive Care Unit	65	1.5	0
Pediatric Intensive Care	66	1	0



Family Practice Clinic	66	5	5
Health Center	64	3	4
Primary Care Services	65	3	0
General Internal Medicine Clinic	65	3	0
Pediatric Care	64	3	0



Cardiology	64	5	5
Cardiology Department	65	5	5
Cardio-Pulmonary Services	64	4	5
Heart & Disease Disorders	64	4	5
Cardiovascular Medicine	64	3	0



OB/GYN	64	5	5
Women's Health Center	65	5	5
Gynecology Clinic	63	4	5
Obstetrics & Gynecology	63	4	5
Family Planning	63	3	0

English Only



Physical Therapy	62	3	5
Walk in Clinic	66	3	0
Ambulatory Clinic	62	2	0
Radiation Oncology Center	63	0	0
Chemotherapy	62	0	0



Physical Therapy	65	5	5
Rehabilitation Therapy	65	5	5
Orthopedics	62	3	3
Physiotherapy	62	2	0
Physical Medicine	63	2	0



Social Services	65	4	5
Family Practice Clinic	63	4	5
Marriage and Family Counseling	63	4	5
Woman Infant Children's Clinic (WIC)	62	2	0

Spanish Only



n, median, mode

Sala de operaciones	25	5	5
Cirujio	24	4	5
Cirujio Pediatria	24	3	3
Cirugia de emergencia	24	3	3
Sala de operaciones	25	5	5
Cirujio	24	4	5



Area de enfermeria	25	5	5
Estacion de enfermeria	25	5	5
Servicios de orientacion	24	3	3
Vacunas	25	0	0



Servicios financieros para pacientes	25	5	5
Oficina de asesoria financiera	25	4	4
Departamento de cobranzos	25	3.5	5
Facturacion	25	2	0



Archivos medicos	25	5	5
Historias de los pacientes	25	4	5
Administacion de informacion de salud	25	3	3
Centro de matriculacion	24	1	0

Spanish Only



Clinica de practica familiar	25	5	5
Centro de salud	24	4	4
Clinica de atencion primaria	24	3	3
Cuidados pediatricos	24	2	0
Clinica de medicina interna	24	1	0



Cardiologia	23	5	5
Departamento de cardiologia	24	5	5
Enfermedades y trastornos del Corazon	24	4	5
Clinica cardiopulmonar	23	2	0
Medicina cardiovascular	24	2	0



Centro de salud de la mujer	24	5	5
Clinica ginecologica	24	4	5
Obstetricia/Ginecologica	24	4	5
Planificacion familiar	24	3	0
Centro de salud de la mujer	24	5	5



Terapia fisica	24	5	5
Clinica ambulatoria	23	2	0
Departamento de Radacion Oncologica	23	1.5	0
Quimioterapia	23	0	0
Clinica no require citas	23	0	0

Spanish Only



Terapia fisica	25	5	5
Rehabilitacion fisica	25	5	5
Ortopedia	24	3	5
Medicina fisica	25	2.5	0
Fisioterapia	25	2	0



Prenatal Clinic	64	5	5
Maternity	63	5	5
OB Clinic	63	4.5	5
Birthing Center	64	4	5
Labor and Delivery	61	4	5



Unidad de cuidados intensivos de Cardiologia	25	5	5
Cuidados intensivos	25	4.5	5
Unidad de cuidados intensivos	25	4	5
Unidad pediatria de cuidados intensivos	24	3	5
Unidad de cuidados intensivos Neonatales	24	1	0
Unidad de cuidados intensivos de Cardiologia	25	5	5



Servicios sociales	25	5	5
Clinica de practica familiar	25	5	5
Orientacion matrimonial y familiar	25	4	5
Programa para mujeres, bebes y ninos	25	3	0

Appendix D: Results of the Likert Scale Opinion Survey

SYMBOL ONLY (all 133 subjects)

	Strongly agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Percent Agree
You could easily find the room.	64	56	6	4	1	92
The signs were easy to understand.	69	45	14	2	1	87
The signs were well placed and easy to find.	69	43	10	6	1	87
Not having a word made it more difficult to find the room.	20	25	4	50	33	34

SYMBOL AND ENGLISH (all 133 subjects)

	Strongly agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Percent Agree
You could easily find the room.	76	44	7	4	0	92
The signs were easy to understand.	82	38	8	3	0	92
The signs were well placed and easy to find.	72	42	7	5	0	91
Having the word in English helped me find the room.	52	52	7	3	12	83

SYMBOL AND ENGLISH AND EITHER SPANISH OR MANDARIN (all 133 subjects)

	Strongly agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Percent Agree
You could easily find the room.	82	42	6	3	0	93
The signs were easy to understand.	81	44	5	3	0	94
The signs were well placed and easy to find.	79	48	3	2	0	96
Having the word in English and another language helped me find the room.	47	38	14	14	14	67

SYMBOL ONLY (Spanish subjects, n=26)

	Strongly agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Percent Agree
You could easily find the room.	15	11	0	0	0	100
The signs were easy to understand.	12	11	1	2	0	89
The signs were well placed and easy to find.	17	7	1	1	0	92
Not having a word made it more difficult to find the room.	5	5	1	7	8	39

SYMBOL AND ENGLISH (Spanish subjects, n=26)

	Strongly agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Percent Agree
You could easily find the room.	18	7	0	1	0	96
The signs were easy to understand.	21	3	1	1	0	92
The signs were well placed and easy to find.	19	6	0	1	0	96
Having the word in English helped me find the room.	8	14	1	1	1	85

SYMBOL, ENGLISH, AND SPANISH (Spanish subjects, n=26)

	Strongly agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Percent Agree
You could easily find the room.	19	4	2	1	0	89
The signs were easy to understand.	17	8	0	1	0	96
The signs were well placed and easy to find.	16	10	0	0	0	100
Having the word in English and Spanish helped me find the room.	16	8	0	1	1	92

SYMBOL ONLY (Chinese subjects, n=8)

	Strongly agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Percent Agree
You could easily find the room.	0	3	2	3	0	38
The signs were easy to understand.	1	3	4	0	0	50
The signs were well placed and easy to find.	2	1	3	2	0	38
Not having a word made it more difficult to find the room.	0	4	1	3	0	50

SYMBOL AND ENGLISH (Chinese subjects, n=8)

	Strongly agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Percent Agree
You could easily find the room.	0	6	1	1	0	75
The signs were easy to understand.	2	4	2	0	0	75
The signs were well placed and easy to find.	0	6	2	0	0	75
Having the word in English helped me find the room.	2	4	1	1	0	75

SYMBOL, ENGLISH, AND MANDARIN (Chinese subjects, n=8)

	Strongly agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Percent Agree
You could easily find the room.	3	3	1	1	0	75
The signs were easy to understand.	3	2	2	1	0	63
The signs were well placed and easy to find.	3	4	1	0	0	88
Having the word in English and Mandarin helped me find the room.	2	2	2	2	0	50