

## Human Factors Design of an AIDS Prevention Pamphlet

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### ABSTRACT

Acquired Immune Deficiency Syndrome (AIDS) can be contracted by persons who are transfused with blood that contains by HIV the AIDS virus. As a result, in addition to testing all blood for the AIDS virus, blood collection organizations have sought ways to prevent individuals from giving blood if they (1) know that they carry the virus or (2) are at high risk of carrying the virus by virtue of their behavior. In this paper, we discuss how we followed a human factors approach to the design of a pamphlet that uses plain English and pictographs to encourage high-risk individuals to exclude themselves from the donation process. To develop the pictographs, we followed an iterative design process that involved user testing of 69 alternative designs, leading to a final set of 13 pictographs. Twenty subjects participated in the tests from which we concluded that subjects preferred the more representational pictographs; pictographs employing a cartoon or line drawing style.

### THE NEED FOR A GRAPHICS-BASED INTERVENTION TO BLOOD DONATION

AIDS can be contracted by persons who are transfused with blood that contains the AIDS virus. Although all blood is tested for AIDS, there is a window of time between when a person contracts AIDS and when his or her blood tests positive for AIDS. Therefore, there remains a small chance that contaminated blood will find its way into the nation's blood supply. As a result, blood collection organizations have sought ways to prevent donations by persons who either (1) know they carry the virus or (2) are at high risk of carrying the virus. In this paper, we discuss the human factors design of one intervention to the donation of infected blood - a pamphlet that uses plain English and pictographs to prompt individuals to exclude themselves from donating.

The U.S. Food & Drug Administration sponsored the pamphlet design effort. To begin our work, we studied dozens of existing pamphlets. One typical pamphlet included information about the donation process and the uses for donated blood. It also listed high risk groups for contracting AIDS, and indicated that persons in those groups should not donate blood. However, the information was presented in text form only, creating a barrier for communication to persons with low literacy or persons who were disinclined to read lengthy passages of text. We hypothesized that much of the text could be replaced by pictographs, the goals being to:

- attract the potential blood donor's attention
- motivate the donor to study the material closely
- increase comprehension of the health-related messages
- reduce the time required to communicate health-related messages
- address the reader on a more personal level
- improve communication to non-readers.

### A HUMAN FACTORS APPROACH

The human factors design challenge was to develop pictographs that would reliably communicate the specified messages to a mass audience. The messages were as complex and provocative as

"Do not give blood if you are a man who has had sex with another man, even once, since 1977."

and

"Do not give blood if you are a woman who has taken money or drugs for sex at any time since 1977."

We wanted the graphics to be clear in meaning, but also to be as inoffensive as possible, so that suitable donors would not be so offended that they would hesitate to donate blood again.

To develop the graphics, we followed an iterative design process that included the following steps:

- define the messages to be conveyed by pictographs
- design at least 5 alternative pictographs, ranging in style from abstract to representational, for each message
- conduct tests to determine how people interpret the alternative pictographs after an initial, short duration exposure akin to a "glance"
- identify a set of pictographs that people prefer and refine them to be effective and consistent
- design and test a pamphlet constructed around the pictographs.

#### DEFINING THE AUDIENCE AND PICTOGRAPH MESSAGES

In recent years, government organizations have determined that individuals at a greater risk of carrying the AIDS virus include:

- persons with clinical or laboratory evidence of HIV (AIDS virus) infection
- men who have had sex with another man even one time since 1977
- past or present intravenous drug users
- persons with hemophilia or related clotting disorders who have received clotting factor concentrates
- persons born in or emigrating from countries where heterosexual activity is thought to play a major role in the transmission of HIV-1 or HIV-2 infection (i.e. Haiti, sub-Saharan Africa and islands located near these areas of Africa)
- persons who have had sex with any person meeting the above descriptions
- men and women who have engaged in sex for money or drugs since 1977 and persons who have engaged in sex with such people during the preceding six months.

Our goal was to design an intervention that would communicate to individuals within these population segments and dissuade them from donating blood. We designed pictographs that depicted the behaviors of individuals in the high risk population segments.

#### EXPLORING DESIGN ALTERNATIVES

Our early pictograph designs varied from abstract (an approach used on many international traffic signs) to representational (an approach used in many airline safety cards). Abstract pictographs are symbolic and lack detail, except for a few key elements. Representational pictographs include more detail, appearing to be a line drawing of the real object. Cartoons are examples of representational pictographs. Examples of each style are shown in Figure 1.

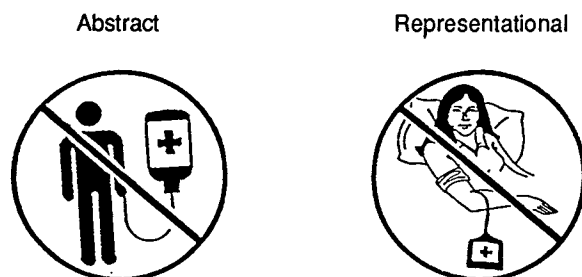


Figure 1: Abstract and Representational Alternatives for Conveying the Same Message

In Figures 2, 3 and 4, we show the alternative pictographs we developed to depict (a) a man who has had sex with another man, (b) someone who was born in or emigrated from Haiti, and (c) a woman who has taken money or drugs for sex. These are three of the 10 sets of graphics we developed. The alternatives vary from abstract to representational.

#### TESTING THE PICTOGRAPHS

Rather than selecting final pictograph designs based solely on our judgment, we conducted a limited usability test of the pictographs individually and when integrated in an overall pamphlet format intended to convey multiple messages.

We tested the pictographs with 20 adults in a laboratory setting. The individuals were gender balanced and recruited from the general population within our locality. We opted to draw on a general population of adults, rather than focusing on the high risk population segments. Future project activities included (1) focus groups including persons in high risk groups for the purpose of evaluating the effectiveness of the pamphlet, and (2) field testing at blood collection centers.

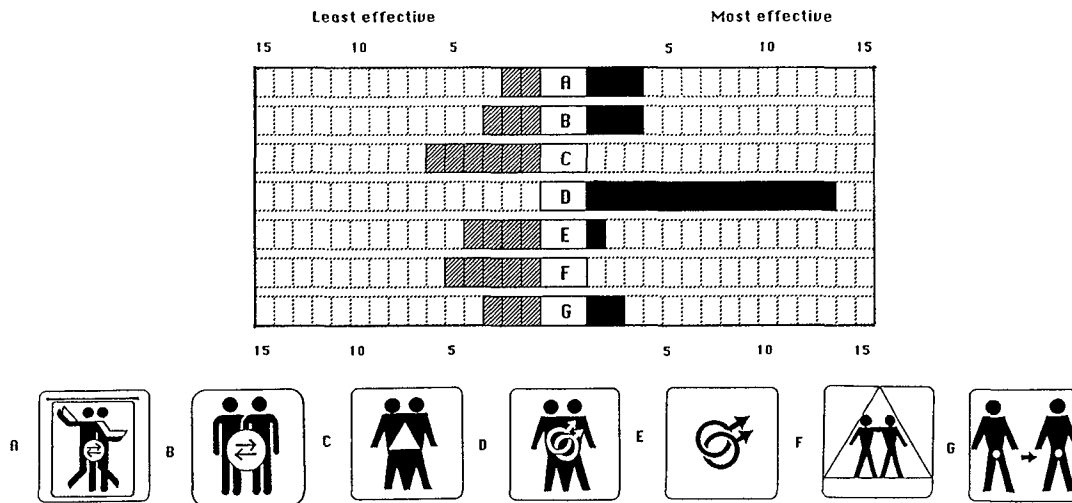


Figure 2: Alternative Pictographs for a Man Who Has Had Sex with Another Man

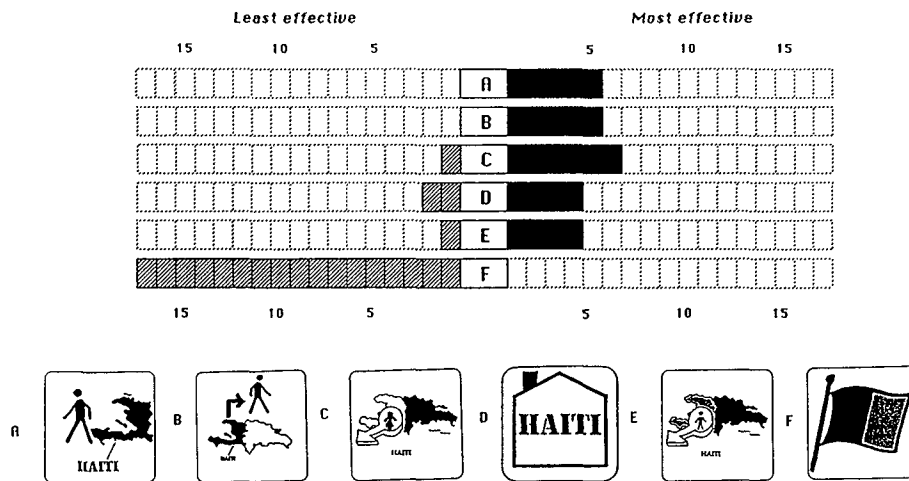


Figure 3: Alternative Pictographs for a Person Who Was Born in or Emigrated from Haiti

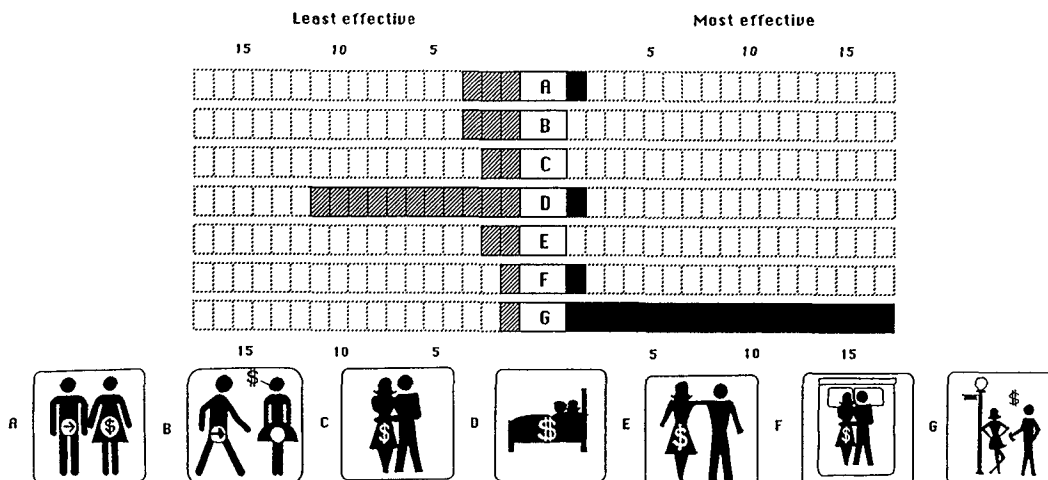


Figure 4: Alternative Pictographs for a Woman Who Has Taken Money or Drugs for Sex

In our laboratory, a room equipped with video recording equipment and a one-way mirror, we studied how well subjects could interpret each pictograph after looking at it for only 3 seconds. We chose an exposure time of 3 seconds to approximate an "at-a-glance" exposure that a person skimming the pamphlet might receive. After the 3 second exposure, we removed the pictograph from view and asked the question "What do you think this means?" We recorded the subjects' first impressions, longer-term impressions, and their comments about the designs.

We had mocked up a pamphlet that sought to communicate the wide range of behaviors associated with a higher risk of carrying the AIDS virus. We needed to communicate male high-risk behaviors, female high-risk behaviors, and the sexual relationships that could place males or females at high risk. We showed subjects the mock-up pamphlet having only pictographs and no text. Without time pressures, we asked the subjects to "read" the pamphlet aloud as we documented where comprehension was good versus poor.

Next, we showed subjects all of the alternative pictographs for each message and asked them to identify their most preferred and least preferred alternatives. Figures 2, 3 and 4 include the preference results for those three sets of pictograph alternatives.

Finally, we showed subjects a mock-up pamphlet that included a limited amount of text. At the beginning of our design effort, we expected that some text might be required to communicate all of the intended messages, although we wanted to achieve most of the communication goals through graphics. After showing subjects the pamphlet incorporating text, we asked the subjects for their comments on areas of confusion and suggestions for improvement. At this point, the subjects were able to compare their prior understanding of the pamphlet's messages to the actual messages as clarified by the accompanying text.

### PICTOGRAPH TEST RESULTS

Our tests yielded a consensus on the most effective pictographs. We also found that some pictographs depended on text for maximum comprehension.

We found, in general, that our subjects preferred the more representational pictographs - pictographs employing a cartoon or line drawing style. We received favorable responses to pictographs employing visual cliches such as a prostitute wearing provocative clothing and standing under a lamp post at a street corner.

From a review of the data and subjects comments, we found that the pictographs were very helpful to understanding the pamphlet's message, but that adding a limited amount of text increased subjects' understanding. We concluded that using pictographs with a limited amount of text had an advantage over using text alone.

### PRODUCING A PROTOTYPE PAMPHLET

Our next step was to develop a prototype pamphlet for use in field testing. We refined the preferred pictographs so that they appeared to share the same visual style, i.e., they looked like they were drawn by the same artist and were equally representational. In a few cases, we chose to use a pictograph alternative that was not the most highly rated.

A commercial artist retouched the pictographs for production purposes. The prototype pamphlet was produced as two separate pamphlets; one intended for women and one intended for men. The reason for this gender-based division was that we wanted the person reading the pamphlet to place him or herself in the scenes depicted. Also, we wanted to eliminate any ambiguity or confusion about how we depicted the potential behaviors of the reader and his or her relationships with others depicted. The pamphlet designed for men is shown in Figure 5. The figure is a scaled down image of the actual pamphlet which measures 3.75" wide by 8.5" high when folded, and 11" wide by 8.5" high when opened-up. Altogether, the pamphlet has six panels, five of which have graphics or text.

### TESTING THE PROTOTYPE PAMPHLET

Once we produced the prototype pamphlets, we sought additional feedback about the design through:

- focus groups
- written comprehension tests

CONCLUSIONS

- oral comprehension tests for participants with low literacy skills
- scales to rate the degree of difficulty and offensiveness of the intervention.

Our results suggest that a graphical approach can be a more effective method of communicating health risk information than a text-based approach. Further, they suggest that a human factors approach to pictograph design works; it will yield graphic designs that are appropriate to the audience and the message. We determined that pictographs can depict sensitive behaviors without seeming lewd or offensive to the general population. We found that pictographs should be representational, showing personal traits and relationships in a straightforward manner with a degree of caricaturization. Although abstract pictographs may be appreciated by some people for aesthetic reasons, they should be avoided where reliable communication of health-related information is important.

This work was conducted with members of the general population, as well as:

- gay and bisexual men
- the sexual partners of IV drug users
- individuals with low literacy skills
- individuals for whom English is a second language
- health historians from a blood center.

RESULTS OF PAMPHLET TESTING

In the series of focus groups, we asked people if they would be offended by any of the pictographs or text. Responses to our work were favorable, with participants stating that the graphical approach was a significant improvement over a text-only approach and that the images were not unduly offensive. We tested the pamphlets during a four-month-long field test at fixed and mobile blood donation locations in two cities with 6573 subjects.

REFERENCE

FDA. *Recommendations for the Prevention of Human Immunodeficiency Virus (HIV) Transmission by Blood and Blood Products*. Memorandum to ALL Registered Blood Establishments, Director, Center for Biologics Evaluation and Research, Food and Drug Administration, Feb 5, 1990.

**DO NOT GIVE BLOOD IF...**

- Hand icon:** If you have done any of these things, your blood could give someone the AIDS virus (HIV).
- Two men embracing:** DO NOT give blood if you are a man who...
  - Has had sex with another man, even once, since 1977
- Two people embracing:** DO NOT give blood if you have had sex with a woman who...
  - Has given money or drugs for sex in the last 6 months
  - Has taken money or drugs for sex at any time since 1977
- Person with needle:** Has ever taken illegal drugs with a needle
- Person with AIDS sign:** Has AIDS or ever had a positive test for the AIDS virus (HIV)
- Person with needle:** Has ever taken illegal drugs with a needle
- Map of Haiti:** Was born in or emigrated from Haiti
- Map of Africa:** Has taken clotting factor concentrates for a bleeding disorder, such as hemophilia
- Map of Africa:** Was born in or emigrated from the part of Africa below the Sahara desert or the islands close to that part of Africa
- Map of Africa:** Was born in or emigrated from the part of Africa below the Sahara desert or the islands close to that part of Africa

... if you have done something that means you might have the AIDS virus (HIV) in your blood. We will test your blood, but the test is not perfect. Your blood could give someone the AIDS virus (HIV).

Figure 5: Prototype Pamphlet for Men