RISK PERCEPTION OF PRESCRIPTION DRUGS:

REPORT ON A SURVEY IN SWEDEN

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SUMMARY

1 Perceptions of risks from prescription drugs are likely to influence patients' treatment choices, their compliance with treatment regimens, their views on the acceptability of adverse reactions, and their attitudes towards government regulation of medicines.

2 Understanding perceptions of drug risks is a prerequisite for designing better communication materials for patients and the public.

3 This article presents the results of a survey that examined the attitudes and perceptions of a representative sample of the Swedish adult population during February and March, 1988.

4 Respondents characterized themselves as persons who disliked taking risks and who resisted taking medicines unless forced to do so. They were also concerned about chemicals, perceiving substances such as food additives and pesticides to be very high in risk and low in benefit.

5 Prescription drugs, with the exception of sleeping pills and antidepressants, were perceived to be high in benefit and low in risk. They appeared to be sharply differentiated from other chemicals and from illicit drugs.

6 High perceived risks associated with sleeping pills and antidepressants seem to be derived from concerns about overdose, addiction, and abuse.

7 Evidence for safety and efficacy, in combination with warning information, appeared to make people much more tolerant of the risks for a drug suspected of causing fatal reactions in some patients.

8 Replication of this type of survey in other countries and with patients as well as the general public would help pharmaceutical companies understand the influence of perceptions on the sociopolitical environment in which they must operate.

INTRODUCTION

Knowledge of perception has been demonstrated to be vitally important in understanding how individuals and societies manage the risks of daily life.[1, 2] In medicine, perceptions of drug risks are likely to influence patients' treatment choices, their compliance with treatment regimens, their views on the acceptability of adverse reactions, and their attitudes toward government regulation of drugs.[3] Understanding perceptions is a prerequisite for designing better communication materials for patients and the public. Yet most work on perception of risk has focused on nuclear power, industrial chemicals, and other nonmedical hazards. Few, if any, studies have examined perceptions of pharmaceutical risks. The present study attempts to remedy this deficiency. It reports the first of a series of surveys designed to do the following:

1. Describe precisely and quantitatively the public's perceptions of risk and benefit from the use of various kinds of prescription drugs.

2. Place perceptions of prescription drugs within a broader context of risk perceptions regarding many other activities (e.g., driving, smoking) and technologies (e.g., air travel,

pesticides), including other medical technologies (X rays, surgery).

3. Allow comparisons to be made across populations from different nations and, within national samples, across important personal and demographic characteristics (e.g., health status, age).

4. Provide baseline data that will allow the impact of new drug problems and controversies to be monitored and allow trends in relevant attitudes and perceptions to be followed over time.

5. Contribute to basic knowledge and understanding of the influence of public perceptions on the sociopolitical environment in which pharmaceutical companies operate.

The data presented in this paper come from a survey that examined the attitudes and perceptions of a representative sample of the adult population of Sweden during February and March, 1988.

DESIGN AND ADMINISTRATION OF THE SURVEY

Part I: General Attitudinal and Demographic Questionnaire

The survey had two separate components. Part I employed a traditional survey format in which respondents are asked to indicate their attitudes, perceptions, and opinions in response to specific questions. In addition, Part I included a nontraditional task in which respondents were asked to read the words 'prescription drugs' which were printed six times on a card. Each time they read these words, they were instructed to write down the first association that came to their minds. This technique, called 'the method of continued associations,' has been shown by Szalay and Deese[4] to be a sensitive indicator of the imagery and meaning associated with people's mental representations for a wide variety of concepts. Of particular interest in the present context is the frequency and nature of negative associations and the ratio of positive to negative responses.

In addition to the imagery task, other questions in Part I asked about the following:

- Perceptions of risk today as compared to risks in the past.
- Perceived frequency of side effects.
- The adequacy of performance by government regulators, drug manufacturers, doctors, and pharmacists in ensuring drug safety and efficacy.

- The respondent's personal experiences with drug side effects.
- Perceived causes of side effects.
- Opinions in response to a vignette describing a drug controversy.

Part I concluded with a series of demographic questions pertaining to the patient's age, sex. health status, cigarette smoking, occupation, income, marital status, medicine usage, health consciousness, attitude toward risk taking, attitude toward fate, and attitude toward using medicines.

Part II: The Psychometric Questionnaire

During the past decade, standard questionnaires such as that used in Part I above have been supplemented by more quantitative studies in what has come to be known as the psychometric paradigm for studying risk perception.[2, 5] Within this paradigm people are asked to make quantitative judgments about the riskiness of various hazards. Perceptions of risk are then related statistically to quantitative judgments of other properties of the hazards being studied, such as the degree to which the risks are known to those persons exposed to them, or the seriousness of harm in the event of an accident or mishap.

In the present survey, quantitative judgments were made for each of the 29 items shown in Table 1. These items included 15 pharmaceutical products (e.g., vaccines, antibiotics, etc.), 5 medical devices or procedures (e.g., X-rays, heart surgery), and 9

medical devices or procedures (e.g., X-rays, heart surgery), and 9 non-medical items (e.g., automobiles, nuclear power) included to provide a broad context against which to compare and contrast the medical and pharmaceutical items. The pharmaceutical items were carefully selected according to several criteria, including importance, familiarity to the general public, and diversity.

Insert Table 1 about here

Each of the 29 items was rated by each respondent on 7 characteristics of risk similar to those found to be important in prior studies of perceived risk.[2] In addition to rating the perceived risk and perceived benefit for each item, respondents rated the extent to which the risks are known to those exposed to them, the likelihood that people exposed to the risk would experience any degree of personal harm, the extent to which the risk associated with each item was new or old, the seriousness of harmful effects in the event of an accident or mishap, and the degree to which a mishap would serve as a warning sign indicating that the risk from this item might be greater than was thought before the problem occurred. The full set of rating scales for these seven characteristics is shown in Table 2. All 29 hazard items were rated on one scale before the next scale was

considered. Before starting this task, respondents were asked to examine a glossary which defined each term (e.g., insulin - a drug used to treat diabetes).

Insert Table 2 about here

A primary contribution of previous risk-perception research has been to show that qualities of risk such as those surveyed in the present study determine important societal responses to hazards. For example, acceptability of risk usually relates positively to perceived benefit and negatively to perceived risk. Hazards posing risks that are judged to be new, not well known, and serious, such as chemical manufacturing or nuclear power, also tend to be judged most in need of strict governmental regulation. And when these 'worrisome' technologies experience an accident, the mishap is likely to be interpreted as a 'warning signal' (Scale 7) indicating that the responsible company, and perhaps also the industry, is not managing the risks properly.[2] Such signals may trigger strong societal reactions or 'ripple effects' (public opposition, liability suits, stricter government regulation, product withdrawals) that can inflict massive costs on a company or industry.[6, 7] A dramatic example of ripple effects followed the accident at the Three Mile Island nuclear reactor.

billions of dollars as a result of reduced output from nuclear reactors worldwide, costs of using more expensive alternative fuels, stricter regulation of the industry, etc.[8, 9] The Ford Pinto, the gas tank of which was prone to explode in a collision, is an obvious example of an extremely serious and costly defect for the automobile industry, both in terms of the monetary costs of litigation and intangible losses of good will and public regard for the manufacturer. The problems that occurred with Thalidomide provide a similar example of a high-signal event within the pharmaceutical industry.

The scales included in this survey were selected with the intent of assessing the potential for costly ripple effects in the event of mishaps involving specific pharmaceutical products. In addition, the quantitative judgments of risk and benefit (along with the imagery data from Part I) can serve as sensitive baseline data against which to monitor changes in perceptions over time.

Administration of the Survey

A representative sample of the Swedish adult population between the ages of 16 and 74 was interviewed in their own homes by personnel from SIFO, a leading survey and market research firm in Sweden. The interviews took place from February 24 through

March 19, 1988. From 1234 persons contacted, 961 completed interviews were obtained, for a completion rate of 78%.

RESULTS

Characteristics of the Sample

The sample was about equally split between females (50.4%) and males (49.6%). About 28% of the respondents resided in Stockholm or Gothenberg; 17% resided in small villages (less than 3000 inhabitants) or rural areas; the remaining 55% came from towns and cities of intermediate size. Most of the respondents were between the ages of 16 and 39 (47.3%), 34.8% were between the ages of 40 and 59, and 17.9% were between 60 and 74 years of age. In these respects, the sample items closely matched the characteristics of the Swedish adult population.

The majority of respondents rated their health as either excellent (34.6%) or very good (28.4%); 30.2% rated their health as fair and 6.6% as poor. When asked if they had a chronic illness or condition, 12.7% answered yes; 25.4% said they smoked more than 5 cigarettes per day.

Some 20.9% of the sample said that they saw their doctor regularly; 40.2% replied that they had taken prescription drugs during the past 4 months, and 27.0% had bought a nonprescription medicine within the previous four months; 62.5% said they had benefited significantly during the last five years from taking a prescription drug. As expected, a much higher percentage of the patients who described themselves as chronically ill had received

a prescription drug during the past 4 months (68%) than those who had no chronic illness (37%).

Respondents were asked to indicate the degree to which various statements about risk taking, health consciousness, fatalism, and medicine taking described them personally. The results, shown in Figure 1, indicate that most of these individuals characterized themselves as not liking to take risks, being health conscious, not feeling comfortable about taking medicines, and resisting the use of medicine until they are absolutely forced to do so (92.2% said they were very or somewhat well characterized by this last statement). There was more divergence of views regarding fate. About 38% said they believed most mishaps in life are predetermined by fate and unavoidable; 61% said that such beliefs did not describe their personal view.

Insert Figure 1 about here

Images of Prescription Drugs

More than 3000 associations were produced in response to the stimulus concept 'prescription drugs.' The major types of associations are listed in Table 3 in order of their frequency. Names of drugs headed the list, followed closely by states and

names of illnesses and types of drugs. Strong positive images (helpful, recovery, healing, effective, reliable) accounted for 259 responses. Strong negative imagery was somewhat more frequent and took two general forms: one form had to do with side effects, dangerousness, warning, allergic and other reactions, and death (total frequency of this form, 253); the other had to do with abuse, addiction, dependency, overdose, and overconsumption (total frequency, 152). Natural and herbal medicines were mentioned 92 times. Cost was mentioned rather infrequently.

Insert Table 3 about here

Surveys of limited samples of young adults in the United States have shown that associations to the word 'chemicals' are dominated by negative imagery (death, toxic, dangerous). The Swedish data show that responses to one class of chemicals, prescription drugs, are much more neutral and positive. Overall, the data in Table 3 seem to provide a useful baseline against which to compare responses over time in Sweden and responses from other nations.

Present and Past Risk

Respondents were asked to indicate whether they believed that there is more risk, less risk, or about the same risk today than

there was 20 years ago for each of several types of hazard. The results, shown in Figure 2, indicate that the risks from chemicals were perceived to be greater today by 80% of the respondents. Other percentages for the 'more risk' response were heart disease (75%), cancer (74%), climate changes (69%), energy sources (67%), food (62%), quality of drinking water (60%), methods of travel (54%), infectious diseases excluding AIDS (35%), and prescription drugs (34%). Looking at the other side of the coin, the proportion of responses in the 'less risk today' category was highest for prescription drugs (35.8%) and infectious diseases (30.4%) and lowest for climate changes (2.7%).

Insert Figure 2 about here

We thus see a strong differentiation in the perceived trend in risk between prescription drugs and other chemicals as well as between drugs and other technologies. Although about one-third of the Swedish sample believes that drug risks have increased, this is far smaller than the percentage perceiving increased risk from the other hazards, with the exception of infectious disease, which may be seen as closely linked to drug efficacy.

Drug Efficacy and Side Effects

Several questions asked about drug efficacy and the frequency, severity, and causes of side effects. When asked to rate the job that various health-care agents were doing to make sure that prescription drugs are safe and effective, pharmacists received the highest marks (70% excellent or good), followed at quite a distance by doctors (56%), government regulatory agencies (50%) and drug manufacturers (40%), as shown in Figure 3. The small percentage of excellent ratings for every group suggests that, in the public mind, there is room for improvement in this matter.

Insert Figure 3 about here

When asked how often patients taking prescription drugs experience serious side effects, 23.5% replied always, very often, or often. When asked whether they personally had suffered a side effect from taking a prescription drug during the past five years 19.9% replied yes (see Figure 4); of these people, 26.5% considered the side effect serious. Multiplying these two proportions indicates that only 5.3% of the total sample claimed to have suffered a serious side effect, a proportion far smaller

than that attributed to other patients who take prescription drugs.

Insert Figure 4 about here

Respondents were also asked to indicate their opinions about the main cause of a drug side effect. Their spontaneous responses, shown in Table 4, named patient sensitivity, improper drug prescription or wrong diagnosis, and non-compliance as the major causes. Following this question was a structured question that asked people to indicate how frequently each of eight specified factors is the cause of a side effect. The results, shown in Figure 5, indicate that patient sensitivity was again singled out as one of the most frequent causal factors (44.5% rated it always, very often, or often a cause). Improper monitoring of the patient by the doctor was also rated as a frequent cause (45% always, very often, or often). Slightly less frequent attributions of causality were assigned to failure to adequately inform the patient (41%), lack of patient compliance (38%), and inadequate health and safety testing by the manufacturer (38%). Again, pharmacist's mistakes were seen as the least likely causes (2%).

Insert Figure 5 about here

A Drug Crisis Scenario

The following hypothetical scenario was posed to each respondent, indicating a possible link between a drug and some fatalities among its users.

'Imagine that a new prescription drug becomes available in this country for treating a serious disease. Other drugs are also available for treating this disease. A study reveals that some people may have died from taking this drug. What do you think the government should do in this case?'

-- Leave the drug on the market.

-- Take the drug off the market.

-- Leave the drug on the market but warn the doctors and patients.

-- Not sure.

As Figure 6 indicates, 75% of the respondents wanted the government to take the drug off the market, 1.8% wanted the drug left on the market, and another 21.8% wanted it left on the market with a warning.

Insert Figures 6 and 7 about here

Those who wanted the drug removed from the market or who were not sure (76.7% of the total sample) were asked to reconsider their answers, taking into account each of six possible extenuating circumstances. The results, shown in Figure 7, indicated that there is no circumstance that, by itself, would convince more than 16% of these people to leave the drug on the market as it was before. However, in combination with information warning doctors and patients about the possible problem, these circumstances led to considerable change in opinions. Knowledge that the risk affected only certain types of patients convinced 5.4% of these respondents to leave the drug on the market and another 52.6% to leave it on the market with a warning. Changes such as this also occurred when respondents were told that the drug is more effective than other, similar drugs, or that the drug has fewer side effects for most patients than other, similar drugs. Being told that the drug has been used safely and effectively for many years in another country produced somewhat less change of opinions. The two circumstances that produced the least opinion change were the fact that the government and manufacturer are actively gathering more information about the problem, and the fact that the respondent had taken the drug for many months and was very satisfied with it.

Analysis of sample subgroups indicated that those who were not comfortable taking medicines, those who had suffered side effects during the past 5 years, those who do not like taking risks, and those in the younger age groups were most likely to want the drug withdrawn from the market upon hearing of possible deaths from taking it. The age factor had the largest effect. About 76% of respondents age 59 or younger wanted to have the drug withdrawn after hearing about the study report, while only 66% of persons in the 60-74 age bracket wanted it withdrawn. In the second part of the question, older people were much more tolerant about leaving the drug on the market while the government and manufacturer gathered more information about the problem. One exception to this tolerance occurred when the risk of death was said to affect only certain types of patients, such as elderly persons with liver problems. In this case only 34.5% and 39.8%, respectively, of those in the 16-39 and 40-59 age ranges wanted the drug withdrawn, but 45.2% of those in the oldest age group wanted it withdrawn, consistent with the suggestion that older patients were the ones most at risk.

The greater tolerance for risk demonstrated by older persons on most of the other scenario questions may be due to the fact that older people are more dependent upon medicines. This, in turn, suggests that a sample of patients might respond differently

from our predominantly healthy sample to questions about drug withdrawals.

The Psychometric Questionnaire

Ratings of each hazard item were averaged across all 961 respondents for each scale. The mean ratings for perceived risk, ordered from high to low, are shown in Figure 8. Three nondrug chemicals--cigarette smoking, pesticides, and alcohol--stand out as highest in perceived risk, followed by two drug items--antidepressants and sleeping pills--which, surprisingly, are judged more risky than nuclear power. Vitamin pills, acupuncture, and herbal medicines were judged lowest in risk.

Insert Figure 8 about here

Analysis of means for specific subgroups of respondents showed that women perceived far higher risk from nuclear power than did men (mean rating, 4.86 for women and 3.53 for men; $p < .001$). This is a common finding in studies of perceived risk. However, no other differences between men and women exceeded .4. Those who claimed to have experienced any sort of side effect from a prescription drug showed slightly higher mean perceptions of risk than those without side effect experience (the largest mean difference was .57 for antibiotics; $p < .001$). Perceptions of

risk seemed unaffected by having experienced significant benefits from taking drugs.

Mean ratings of perceived benefit are shown in Figure 9. Unlike mean perceptions of risk, which exhibited a smooth, continuous decline from high to low values, benefits seem to fall into three categories. High benefits are associated with cancer drugs, heart surgery, insulin, AIDS drugs, appendectomy, antibiotics, vaccines, X-rays, airplanes, automobiles, and drugs to treat arthritis and hypertension. Moderate benefits are attributed to 11 items ranging from antidepressants to laxatives. Very low benefits are perceived for cigarettes, alcohol, food additives, pesticides, artificial sweeteners, and sleeping pills. The perceived benefit of various drug items was only slightly higher for those claiming to have experienced significant benefits in the past 5 years than for those not claiming such beneficial experiences.

Insert Figure 9 about here

The risk and benefit means are superimposed in Figure 10. It is obvious that perceived risks and benefits are not positively related (the correlation is actually -.23). Some items are low

risk and high benefit (e.g., appendectomy) and others the opposite (e.g., cigarettes).

Insert Figure 10 about here

Appendectomy, insulin, vaccines, and antibiotics stand out as being quite high in perceived benefit and low in perceived risk. Other drug items, with the notable exception of antidepressants and sleeping pills, show a similar, though less extreme, pattern. Four nondrug chemical hazards--cigarettes, alcohol, pesticides, and food additives, were judged extremely high in risk and low in benefit.

Although the scales are not strictly commensurable, it is instructive to create a net benefit score by subtracting the risk judgment from the benefit judgment for each item. Subgroup analysis on this measure showed that the perceived net benefits for antidepressants, birth control pills, sleeping pills and antihypertensives were higher for those persons claiming to be comfortable taking medicines than for those who are not comfortable doing so. However, these two groups of people did not differ in their net benefit ratings for such high benefit drugs as vaccines, antibiotics, and insulin. Older respondents (ages 60-74) showed slightly higher net benefit ratings than younger

respondents for antihypertensives, cancer drugs, antidepressants, and artificial sweeteners.

Figures 11-15 present the ordered means for the remaining five scales: likelihood of harm, seriousness of harm, knowledge of risk among those exposed to it, newness of the risk, and the strength of the warning signal that would be triggered by a mishap involving the hazard item. Likelihood of harm (Figure 11) was almost perfectly correlated with perceived risk (r = .996). Seriousness ratings (Figure 12) differed from likelihood ratings in that nuclear power, airplanes, and heart surgery moved to the highest ranks. Knowledge of risk (Figure 13) took an intermediate position for all items--there was rather little variation from the least well known risks (biotechnology drugs, food additives) to the best known (airplanes, automobiles, and cigarettes). There was much greater variation on the new vs. old scale (Figure 14) ranging from AIDS and biotechnology drugs (newest risks) to cigarettes and alcohol (oldest). The warning sign scale also showed rather small variation around the midpoint (Figure 15). Nuclear power and pesticides were highest on this scale, and automobiles and airplanes were lowest.

Insert Figures 11-15 about here

Correlation coefficients were calculated between the means of each pair of scales, across the 29 items. These correlations were subjected to a principal components factor analysis which uncovered two dominant, uncorrelated factors accounting for 71% of the variance in the scales. Factor I, which we shall label 'risk,' consisted of three scales: perceived risk, the likelihood of harm, and the seriousness of harm, given a mishap. Factor II, which we shall call 'warning,' consisted of the scales pertaining to newness, knowledge, and warning sign. Factor scores were computed for each hazard item by weighting the mean ratings on each scale proportionally to the importance of that scale for the factor and summing over all scales. The weighted sum gives each item a score that is an amalgamation of its ratings on the scales that define each factor. The factor scores for each item are plotted in Figure 16. As one moves from left to right in the factor space, the items are judged to have higher likelihood of causing harm, greater severity of harm in the event of a mishap, and, overall, greater perceived risk. As one goes from the bottom to the top of the space, the items are judged to have risks that are newer and less precisely known, and a mishap is judged as providing a stronger warning about the possibility that the risk is greater than was previously believed.

Insert Figure 16 about here

As we would expect from the mean ratings shown in Figures 13 (knowledge) and 15 (warning sign), most pharmaceutical products cluster together at an intermediate level on Factor II. However, there is great differentiation on the risk factor, with sleeping pills and antidepressant drugs seen as extremely high in risk. Nuclear power and pesticides are judged as new, unknown, and high-risk technologies and are located in the upper-right quadrant of the space, much as previous studies have shown. Drugs against AIDS and drugs made by means of biotechnology are seen as new and unknown risks, and relatively higher in perceived risk than most other pharmaceutical products.

DISCUSSION

A prior survey of risk attitudes in Sweden, conducted by SIFO in January 1988, demonstrated extremely great public concern about the risks from chemicals. Some 81% of those interviewed agreed with the statement that 'It can never be too expensive to reduce the risks from chemicals.' An even stronger anti-chemical statement--'All use of chemicals must be risk free'--drew agreement from 75% of the respondents. Such concerns were exhibited in the present survey in which 80% of the respondents stated that risks from chemicals are greater today than they were 20 years ago. In addition, chemical items such as food additives and pesticides were rated extremely high in risk and low in benefit. Besides being greatly concerned about chemical risks, the Swedish respondents in the present survey characterized themselves as persons who disliked taking risks,and who resisted taking medicines unless forced to do so.

Given these attitudes, we could expect to find rather harsh views in Sweden about the risks from another class of chemicals--prescription drugs. For the most part, this was not the case. Prescription drugs, with the exception of sleeping pills and antidepressants, were perceived as rather high in benefit and low in risk. They appeared to be sharply differentiated from other chemicals and from illicit drugs. The concerns about sleeping

pills and antidepressants perhaps can be traced to extensive media publicity in Sweden regarding the risks of addiction and overdose from these and similar drugs. A subgroup analysis was conducted in which perceived risks and benefits for those persons (N = 145) associating prescription drugs with 'overdose,' 'addiction,' or 'abuse' were compared with judgments of persons not having any negative associations (N = 776). These two groups did not differ in their ratings of nuclear power, pesticides, and other nonmedical hazards. Nor did they differ much in their ratings of vaccines, antibiotics, or cancer drugs. The group with these negative associations did, however, judge sleeping pills and antidepressants to have much greater risk and much lower benefits ($p < .01$) compared to persons without such associations. This evidence is congruent with the hypothesis that high levels of perceived risk associated with sleeping pills and antidepressants stem from concerns about overdose, addiction, and abuse.

Although mishaps involving prescription drugs were judged to produce only moderate warning signals, the scenario item from Part I of the survey showed the potential for a strong reaction to a report of a suspected but not proven link between a drug and some fatalities. At a hint of trouble in the scenario, 75% of those surveyed wanted the suspect drug removed from the market. However, one of the most intriguing findings in this study was the

indication that evidence of safety and efficacy, in combination with warning information, could reverse a high proportion of these initial demands for withdrawal of the drug.

The strategy of marketing a drug to a carefully targeted patient population, coupled with thorough warnings about its risks, is currently being pursued by the Alza Corporation in their marketing of the IUD, Progestasert[10] and by Hoffmann-LaRoche, Inc. in their marketing of the anti-acne drug Accutane. The response to the scenario item in the present survey suggests that appropriate use of warnings may be an important general strategy for communication with patients about prescription drugs. This suggestion should certainly be investigated in future studies.

The present study demonstrates the potential usefulness of survey research for describing and monitoring key attitudes and perceptions regarding drug risks. Replication of this type of study in other countries and with samples of patients as well as with members of the general public should prove valuable.

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Table 1.

Hazard items studied in Part II

1. Pharmaceutical items

Vaccines	Antidepressants
Laxatives	Anticancer Drugs
Antibiotic Drugs	Aspirin
Birth Control Pills	Herbal Medicines
Insulin	Vitamin Pills
Sleeping Pills	Antiarthritics
Antihypertensives	Biotechnology Drugs
	Drugs Against AIDS

2. Medical procedures, tests, and devices

Medical X-rays	Heart Surgery
IUDs	Acupuncture
	Appendectomy

3. Nonmedical hazards

Automobiles	Household Cleansers
Travel by Airplane	Artificial Sweeteners
Nuclear Power Plants	Food Additives
Pesticides	Alcoholic Beverages
	Cigarette Smoking

Table 2.

Scales on which the 29 items were rated

RISK TO THOSE EXPOSED
To what extent would you say that people (for instance you or someone you know) who are exposed to this item are at risk of experiencing personal harm from it? (1 = they are not at risk; 7 = they are very much at risk)
BENEFITS
In general, how beneficial do you consider this item to be for society as a whole? (1 = not at all beneficial; 7 = very beneficial)
LIKELIHOOD OF HARM
How likely would you say it is that people who are exposed to this item actually <u>will</u> <u>experience</u> any type of personal harm, mild or serious? (1 = very unlikely to experience harm; 7 = very likely to experience harm)
SERIOUSNESS OF HARM
If an accident or unfortunate event involving this item occurred, to what extent are the harmful effects to a person likely to be mild, or serious? (1 = very mild harm; 7 = very serious harm)
KNOWLEDGE OF THOSE EXPOSED
To what extent would you say that the risks associated with this item are known precisely to people who are exposed to those risks? (1 = risk level known; 7 = risk level not known)
OLD OR NEW RISK
To what extent is this item a new risk, or an old one that has been around for a long time? (1 = very old; 7 = very new)

(Table continues)

Table 2 (continued)

WARNING SIGN
If you read in the newspaper about an accident or an illness involving this item, in which people were seriously harmed, to what degree would this mishap serve as a warning sign, indicating that the risk of this item might be greater than was thought before the problem occurred? (1 = not a warning sign; 7 = very strong warning sign)

Table 3

Associations with 'prescription drugs'

Rank	Association	Count
1	All names of drugs (i.e., valium, etc.)	549
2	All states of illness	465
3	Types of drugs, e.g., antibiotics, vitamins	412
4	'Medicine,' i.e., liquid form, syrup	299
5	Pills	261
6	Hospital	258
7	Doctor	222
8	Helpful	188
9	Industry, research, company	161
10	Side effects	136
11	Pharmacy	132
12	Natural, herbal medicine	92
13	Abuse	81
14	Dangerous	78
15	Recovery, healing	60
16	Addiction, dependence	45
17	Prescriptions	42
18	Price, money, cost	33
19	Overdose, overconsumption	26
20	Hypodermic needle	24
21	Bottles, jars, boxes	23
22	Warning	22
23	Profit	21
24	Paraphernalia (general)	18
25	Allergy, reactions	10
26	Preservatives	9
27	Death	7
28	Effective	7
29	Reliable, guaranteed	4

Table 4

Reasons for side effects: spontaneous mentions

Reason	Frequency
Patient allergic	33.2%
Wrong drug, diagnosis	27.9%
Noncompliance	13.5%
Drug interaction	8.7%
New, untried drug	8.4%
Insufficient control	6.0%
Poor information	5.5%
No answer	5.3%

Basis: n = 1942 spontaneous mentions

FIGURE CAPTIONS

Figure 1. Attitudes toward health, risk, fate, and medicines.

Figure 2. Risk today versus 20 years ago.

Figure 3. Ensuring safety and efficacy: Confidence in selected health-care groups.

Figure 4. Side-effect experience within the past 5 years.

Figure 5. Reasons for side effects: prompted responses.

Figure 6. Reactions to a drug crisis scenario.

Figure 7. Reactions to a drug crisis: Modification of opinion in view of additional evidence.

Figure 8. Perceived risk.

Figure 9. Perceived benefit.

Figure 10. Risk and benefit.

Figure 11. Likelihood of harm.

Figure 12. Seriousness of harm.

Figure 13. Knowledge.

Figure 14. Old versus new risks.

Figure 15. Warning signal.

Figure 16. Perceptual map of risk factors.