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Evaluation and Assessment
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THE NATIONAL ORGANIZATION FOR RARE DISORDERS AND THE EXPERIENCES OF THE RARE DISORDER COMMUNITY

The National Organization for Rare Disorders, Inc. (NORD) is a federation of approximately 124 voluntary health organizations and 5,000 patients, healthcare providers and individuals. NORD is dedicated to helping people with rare "orphan" diseases and to assisting the organizations that serve them. NORD is committed to improving the identification, treatment and cure of rare disorders through programs of education, advocacy, research and service. The organization is headquartered in Danbury, Connecticut and celebrated its twentieth anniversary this year.

The federal government defines a rare disease as one which affects fewer than 200,000 people in the United States.[1] It is estimated that approximately 6,000 rare disorders collectively affect more than 25 million people in the United States[2]. NORD's premise is that because only small numbers of patients suffer from any one rare disease, no single disease-specific voluntary health organization can assemble the resources required to effectively address, on a national and international basis, the common issues which face rare disease patients.

1. ORGANIZATIONAL DESCRIPTION

A. History

NORD began in 1983 as an outgrowth of a unified effort by rare disease support groups to solve the problem of the "orphan drug dilemma". At that time, treatments for rare disorders were not being developed by the pharmaceutical industry because they were considered to be

drugs of limited commercial value. This motivated voluntary health agencies and support groups to join in a coalition to advocate the passage of federal legislation to provide incentives for orphan drug development, including marketing exclusivity, tax incentives and research grants.[3] In 1983, when the Orphan Drug Act was enacted, largely due to the lobbying efforts of this coalition, NORD formalized into a national non-profit voluntary health agency dedicated to the welfare of individuals and families affected by rare disorders. In 2002, NORD was selected as one of America's 100 best charities by Worth magazine for the second consecutive year. Worth selects charities on the basis of how effectively they use donated funds.

B. Staff

The driving force behind NORD's activities is its president, Abbey Meyers. Meyers was instrumental in assembling the original coalition which advocated for the passage of the Orphan Drug Act, and it is Meyer's vision and passion which appears to have mapped the organization's direction. NORD employs 33 full-time employees, 4 part-time employees and a number of volunteers. There is little attrition among NORD's staff – there has been virtually no turnover in middle and senior management in the past 5 years. NORD has a formal organizational structure, consisting of three distinct levels of professional staff, and a less linear web of support staff.

The professional staff consists of:

- The President,
- Four Vice Presidents: VP Patient Services, VP Public Policy, VP Development, and VP Communications, and
- Three Directors: Director Patient Services, Director Bookkeeping, and Director Human Resources.

Most staff members are females over the age of 30. The volunteers are senior citizens and students, both high school students with community service obligations and student interns from nearby Western Connecticut State University. While NORD's staff is not very ethnically

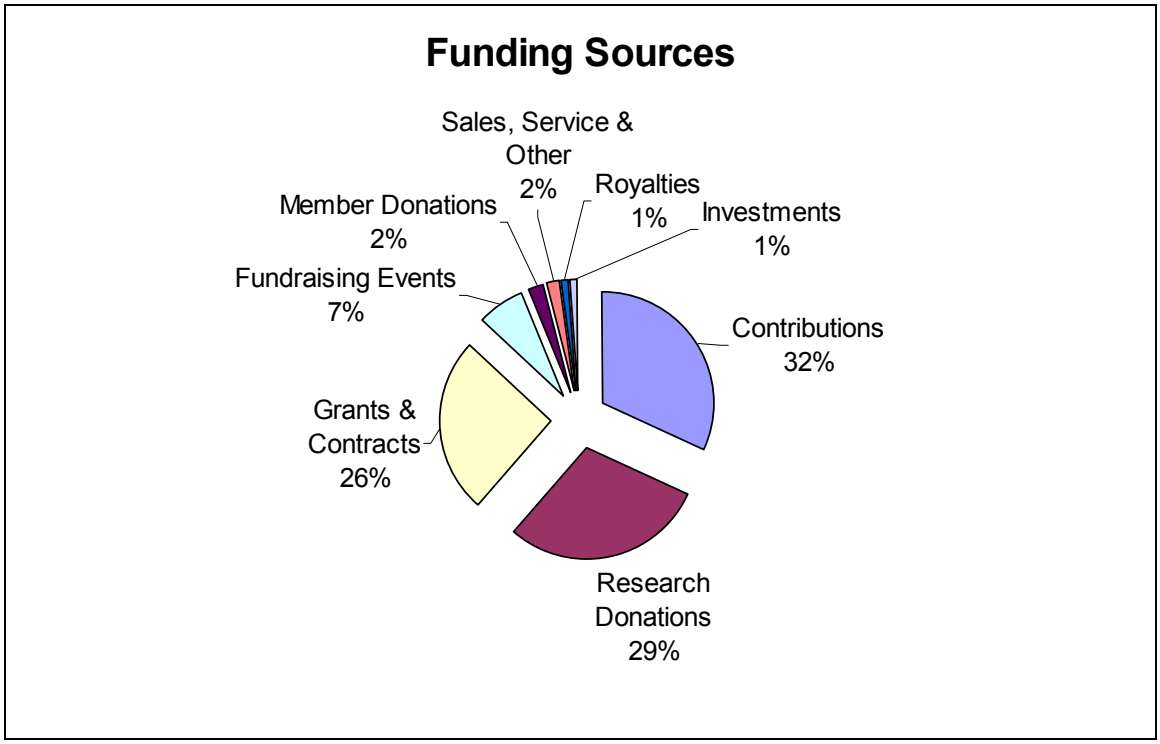
diverse, this lack of diversity does not seem to be a material factor since NORD is basically a "virtual" organization which performs most of its functions impersonally (i.e., by email, internet, telephone, mail, etc.). A few of NORD's staff members speak a second language, which aids with interpretation when dealing with non-English-speaking callers. When NORD receives correspondence in a language which is not spoken by a staff member, it relies on the services of outside sources (such as friends, volunteers or high school language teachers) to assist with translation.

C. Membership

NORD offers membership to both individuals and organizations. Voluntary health organizations may qualify for membership under either of two categories: National Members or Associate Members. Associate Members are organizations that do not yet meet all the criteria for national membership, that are based outside the U.S., or that are local rather than national.

D. Funding

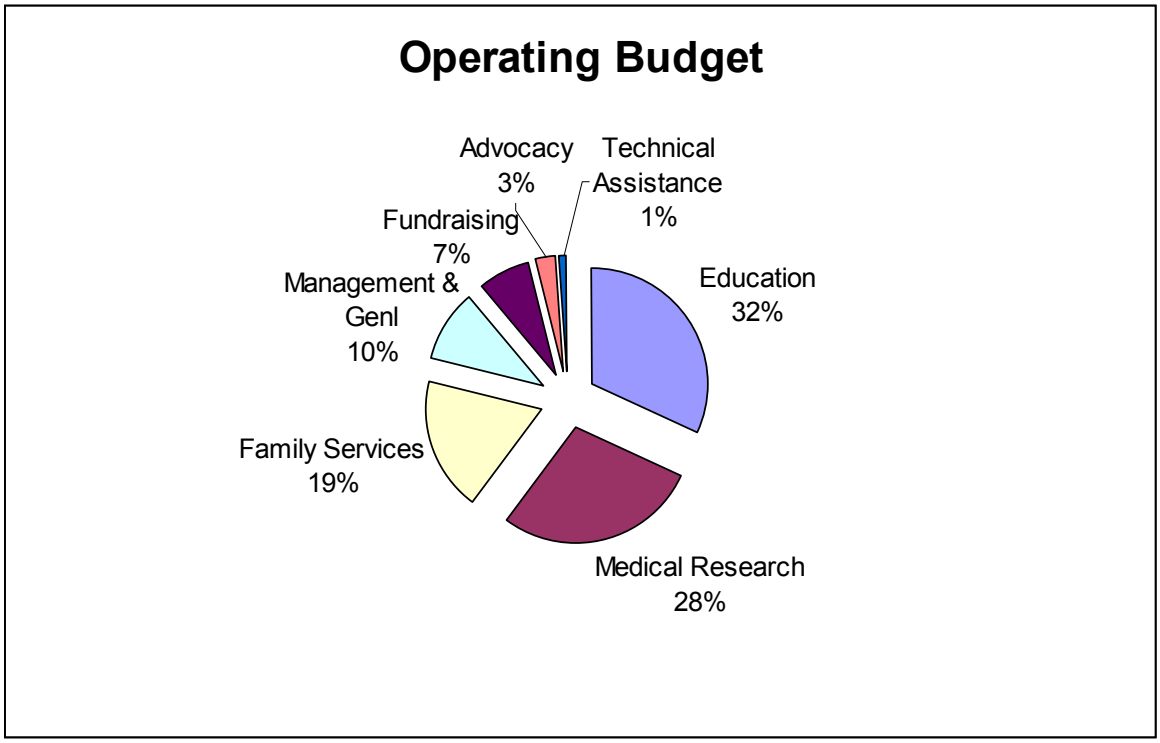
NORD derives its funding from the following sources:



The "Contributions" funding source represents unrestricted donations from individuals, including bequests and other planned giving. The "Research Donations" funding source represents donations that are specially earmarked for research purposes. Research donations are made by both individuals and corporations, and may be earmarked for specific diseases or for general research purposes. Individual donations earmarked for specific diseases are pooled under the Restricted Research Grant Program. Large corporate donations have enabled NORD to fund the NORD/Roscoe Brady Lysosomal Storage Diseases Fellowships. (More information on NORD's research activities is provided in section 2.B.) The "Grants and Contracts" funding source represents revenue which accrues to NORD by virtue of its program administration and grant recipient activities. NORD's contract activities include NORD's administration of Medication Assistance Programs for various pharmaceutical companies, and of regional

meetings and a clearinghouse database for the NIH. NORD's grant funding sources include the NIH and the Metronics Foundation (the charitable arm of a pharmaceutical company).

NORD's Operating Budget is expended as follows:



2. PROGRAMS

NORD has implemented a wide array of programs that are designed to address the barriers to diagnosis and treatment encountered by patients with rare diseases. NORD's Operating Budget is distributed among its programs as follows: 32% to Education, 28% to Medical Research, 19% to Family Services and 3% to Advocacy.

A. Education

NORD considers one of its most important missions is to act as a clearinghouse to disseminate reliable and understandable information about rare disorders to patients, providers and its member organizations. NORD's success, and the need for NORD's information services,

are illustrated by the fact that each month NORD responds to an average of 6,500 telephone calls, 600 letters and 2,500 E-mails from patients, providers, teachers, social workers, librarians and genetic counselors. Additionally, NORD's website receives more than 100,000 hits in a typical month.

Perhaps the greatest barrier to the timely and effective treatment of rare diseases is the lack of knowledge among both patients and providers. Medical students are taught, as a diagnostic rule of thumb, that when they hear hoof beats, they should assume the animal is a horse, rather than a zebra. Rare diseases are the zebras, however, and many doctors are unfamiliar with their symptoms. Consequently, rare diseases often go undiagnosed, or misdiagnosed, for long periods. A 1989 Congressional Report indicated that slightly more than half (52%) of rare disease patients who went undiagnosed for three months or longer felt that the delay in receiving a diagnosis was due to insufficient physician knowledge to make a correct diagnosis. Patients also cited confusing symptoms (27%) and improper or incorrect initial diagnoses (18%) as additional reasons for delays in diagnosis. The inability of medical professionals to interpret patient symptoms correctly appears to be a major impediment to prompt diagnosis and treatment.

Patients also reported a need for understandable information about rare disorders. When faced with a rare disease diagnosis, patients are often scared and confused – they are anxious to obtain understandable information about their condition and about the resources which are available to them.

Recognizing these dual needs, NORD has targeted its extensive educational programs to both patients and providers. NORD's patient educational program begins with its very robust website, which contains links to information on all of NORD's programs and resources,

including access to three databases NORD maintains. NORD's Rare Disease Database provides information written in lay language on over 1,100 rare disorders. This database is made available on a subscription basis to libraries, schools, universities and hospitals. Individuals can order disease report reprints from the database; the first reprint is free and NORD charges $7.50 for each additional reprint (which includes postage and handling).

NORD's Organizational Database provides information on more than 2,000 disease-specific and umbrella organizations, support groups, clearinghouses, registries and government agencies that serve the needs of the rare disorders community. There is no charge for access to this database, which is also available in a printed version at the cost of $45. NORD's Orphan Drug Designation Database provides information about the more than 1,000 pharmaceuticals that have been designated as "orphan products" under the Orphan Drug Act.

NORD targets its educational efforts towards providers by publishing a *Guide to Rare Disorders for Physicians,* a medical text for physicians which covers 800 rare diseases with entries written by over 600 expert physicians. NORD also publishes a series of free disease-specific booklets which it widely distributes to physicians and other medical professionals throughout the country. NORD participates and presents at medical conferences nationally and internationally. These educational efforts, which are targeted at providers, are intended to help patients obtain earlier diagnoses and speedy referrals to appropriate sources of assistance.

NORD publishes a thrice yearly newsletter, *The Orphan Disease Update*, which is distributed to approximately 50,000 readers. NORD also publishes NORD On-Line, a newsletter available on NORD's website to member organizations, informing them of updates on health-related government activities. Finally, NORD hosts an annual conference that provides an

educational forum for patients and their families, as well as leaders of voluntary health agencies.

B. Research

NORD supports and promotes biomedical research on rare disorders to encourage the development of new treatments and cures. NORD funded 22 research grants and fellowships in 2002, up from 11 in the previous year and an average of just three to four per year before that. In 2003, 24 research grants have been awarded to provide seed money for studies related to the diagnosis or treatment of rare diseases. NORD's Medical and Advisory Board provides guidance and assistance in administering this research program. NORD also assists researchers in recruiting volunteers, and assists patients in locating relevant research studies.

NORD's typical research grants provide seed money in the range of $30,000 per year to support small clinical studies on new treatments for rare diseases. Donors can donate to NORD's Restricted Research Grant Program and designate a specific disorder to which their donation should be applied; requests for proposals are issued when the funds exceed $35,000. In addition to these seed money research grants, NORD has funded research fellowship projects (five in the U.S. and six in other countries) through the NORD/Roscoe Brady Lysosomal Storage Diseases Fellowships. These fellowships were launched in the spring of 2001 by a $1million donation made to NORD by Transkaryotic Therapies, a Massachusetts biotechnology company, and supported by two other biotechnology companies, Genzyme and BioMarin. These fellowships provide up to $70,000 annually to physicians who have graduated medical school within the previous ten years and are interested in studying and treating lysosomal storage disorders.

C. Advocacy

People with specific rare diseases, by definition, do not have the critical mass required to create large, influential advocacy organizations. As an umbrella organization, NORD aggregates

the smaller numbers of its member organizations to create such a critical mass. NORD has its roots in advocacy – the organization was born out of the efforts of its founder and President, Abbey Meyers, to lobby for the passage of the Orphan Drug Act (the "Act"), which was signed into law in January of 1983.

Since the passage of the Act, NORD has actively lobbied on behalf of legislative issues affecting the rare disorders community, including amendments and extensions of the Act and research funding issues. NORD's Vice President for Public Policy, who is located in Washington, spearheads NORD's lobbying efforts and provides frequent briefings and updates to member organizations.

NORD successfully lobbied for the passage of two bills which were signed into law by President Bush last fall: the Rare Diseases Act of 2002, which established the Office of Rare Diseases as a permanent entity within the National Institutes of Health and establishes centers of excellence for rare disease research, and the Orphan Product Development Act of 2002, which authorizes appropriations under the Act through FY 2006. Currently, NORD is focusing its advocacy efforts on legislation to preserve access for Medicare recipients to injectable and intravenous orphan drugs through the Hospital Outpatient Prospective System.

D. Medication Assistance Programs

NORD administers 20 Medication Assistance Programs (MAPs) and Expanded Access Programs (EAPs) for 13 pharmaceutical companies. The parameters of these programs (i.e., amount of drugs allotted, income requirements) are determined by the pharmaceutical companies, which pay NORD for the cost of administering these programs. MAPs provide medications to uninsured and underinsured people who could not otherwise afford them; these drugs are generally life-sustaining drugs that treat chronic conditions. Drug manufacturers are

not permitted to disburse drugs for off-label use under MAPs, but NORD, as a charity, is not similarly restricted, provided that medical justification is demonstrated. NORD feels that this advantage, together with their thoughtful and thorough vetting of applications, make their ability to administer MAPs superior to that of the drug companies.

NORD also administers EAPs for certain investigational drugs that have not yet been approved by the FDA for sale to the public, as well as limited and emergency access programs for certain medications that are in limited supply.

E. Networking and Support

NORD's Family Networking Program puts patients and families who are affected by the same disorder in touch with each other. In addition to promoting mutual support and the exchange of information, such networking promotes the formation of new voluntary health agencies for specific rare diseases. Patients wishing to participate in the Family Networking Program must (a) register with NORD, (b) authorize NORD to forward their name to any NORD member organization that relates to their specific disorder, (c) enroll as a NORD member, and (d) agree to respond to all correspondence received from other Network members. This registration mechanism enables NORD to build a network of patients and families and match those with similar diagnoses.

F. Patient Services

NORD's Patient Services Department counsels patients and family members who need assistance in accessing benefits and services in their local communities.

G. Access

Individuals with rare disorder or their families or friends can access NORD's services through a variety of methods. Computer literate individuals with internet access can learn about

NORD's programs through its robust website, and can contact NORD by E-mail. Individuals can also contact NORD by telephone or by mail. NORD's programs can also be accessed by using NORD's databases at libraries or by attending NORD's conferences. Many individuals are indirect recipients of the benefits of NORD's programs as well. Individual members of disease-specific voluntary health organizations, which are themselves NORD members, receive the benefit of the information which NORD disseminates to their organization, and patients receive the benefit of the information NORD provides to their physicians and of the research advances NORD helps to bring about.

3. ORGANIZATIONAL GOALS

NORD's overarching goal is to provide the rare disorders community with services designed to improve the identification, treatment and cure of rare disorders. In order to achieve this overarching goal, NORD has established the following goals:

- To educate the public as well as the medical community by serving as an international clearinghouse of information on rare disorders.
- To promote public awareness of rare disorders.
- To promote the development of new treatments and cures by supporting biomedical research on rare disorders.
- To connect researchers with potential research subjects in the rare disorder population.
- To advocate in favor of legislation that would benefit the rare disorder community.
- To increase accessibility to necessary medications for patients with rare disorders.
- To provide patients with rare disorders and their families with the information, contacts, advice and services necessary to permit them to effectively "work the system" to access the most effective health care.
- To promote mutual support, information exchange and networking among patients with rare disorders.

4. RESEARCH PLAN

In 1989, the National Commission on Orphan Diseases of the Department of Health and Human Services issued a report to Congress (previously referred to as the "1989 Report")[4] which summarized the needs of individuals with rare disorders, and of the providers and researchers who service this community. The 1989 Report was based on information obtained by surveying these patients, providers and researchers. While obviously very dated, the 1989 Report remains the single most comprehensive source of national data regarding the needs of the rare disorders community.

The purpose of the current evaluation study is to determine what, if any, changes have occurred in the needs of the rare disorders community, and in the way those needs are being met, since the time of the 1989 Report. Consequently, this evaluation is fundamentally a needs assessment study to determine if the needs of the rare disorders community have increased, decreased, or remained constant over time.

A. The Survey

The 1989 Report. The 1989 Report was based on a telephone survey (the "Telephone Survey"), conducted in June of 1988, of 801 individuals with rare disorders. The 1,609 respondent sample consisted of (1) a probability sample of 1,289 systematically selected telephone numbers of individuals who had contacted NORD since late 1985, and (2) 320 telephone numbers, representing a proportionate supplement of randomly generated "decoy" telephone numbers for each telephone prefix in the foregoing sample (1). This "decoy" method was used to forestall expectations by the interviewers that the households they contacted contained a person with a rare disorder, and to give respondents the opportunity to keep information about their disorder private. An independent professional research firm conducted

the telephone surveys, and a separate independent research firm developed the survey instrument and analyzed the resulting data.

The Telephone Survey elicited information about the following topics as they relate to individuals with rare disorders:

1. Illness Diagnosis,
2. Hardships Posed by Illness,
3. Availability of Information on Illness,
4. Support Group Participation,
5. Federal Government Contact,
6. Experimental Drugs/Devices,
7. Rare Disease Research Problems/Solutions, and
8. Positions on Proposals.

The Survey. We chose a mailed questionnaire as our evaluation tool due to our limited survey administration resources. In composing our survey, we wished to generally adhere to the framework of the Telephone Survey so that our results would be comparable to those in the 1989 Report. The Telephone Survey was lengthy and complex. Due to the practical constraints posed by a written, mailed questionnaire, we decided to shorten, simplify and update the Telephone Survey instrument. In doing so, however, we were careful to preserve data comparability between our results and those of the Telephone Survey.

In order to shorten the Telephone Survey, we decided to delete the questions which requested opinions regarding research issues and problem solving proposals (topics number 7 and 8 above). We also decided to delete the questions regarding support group participation (topic number 4 above). We modified the survey to reflect the prominence of the internet as an information source, and we added a number of questions designed to evaluate the availability of insurance and the impact of managed care.

Our completed questionnaire included the following areas of inquiry:

(a) Barriers that exist to the diagnosis and treatment of rare disorders,
(b) Ramifications of coping with a rare disorder, including effects on quality of life,
(c) Accessibility of treatment and insurance,
(d) Availability of information on rare disorders, and
(e) Willingness of patients to use experimental treatments.

The questionnaires were professionally printed on NORD stationery in a four-page booklet format. The questionnaires were mailed together with a cover letter, printed on NORD stationery and signed by the President of NORD. The cover letter explained the purpose of the survey and assured prospective respondents that their answers would be strictly anonymous, as the questionnaires contained no identifying information. A stamped, self-addressed envelope was included with the mailing. A copy of the cover letter is attached as Exhibit A and a copy of the questionnaire is attached as Exhibit B.

B. The Sampling Plan

Our population consisted of the 11,560 individual U.S. residents who contacted NORD between June 1, 2001 and June 2, 2002 and for whom NORD had mailing addresses on file. We chose this time frame in order to assure that the respondents would have some experience as patients, but that their point of contact with NORD would not be so remote in time so as to make them difficult to locate. We decided to send out between 1,000 and 1,500 questionnaires, depending on the response rate to our initial mailing of 1,000 questionnaires. From our population list, we drew a probability sample using systematic selection by selecting every seventh name for our sample. We mailed 1,000 questionnaires in mid-September and by mid-October had received slightly over 100 usable responses. Due to this low response rate, we mailed an additional 500 questionnaires in mid-October. All tolled, we received 128 usable

responses to our mailings, for a response rate of 9%. Due to this low response rate, we decided to administer additional questionnaires over the telephone to willing individuals who called NORD for information. We captured ten additional responses in this manner, for a total of 138 responses.

With a population of 11,560 at the 95% confidence level, a sample size of 145 would be needed to achieve a sampling error (confidence interval) of + or – 7%, and a sample size of 119 would be needed to achieve a sampling error of + or – 8%. The error rate may be compromised by the low response rate, however, which leads us to speculate whether the characteristics of the respondents are reflective of the population as a whole. Additionally, individuals with rare disorders who contact NORD may differ in certain characteristics (such as socioeconomic status or level of education) from the average individual with a rare disorder.

5. ANALYSIS OF DATA

A. Key Findings

According to our survey, the rare disorders community is underserved and burdened in a number of areas. Among our key findings are:

- It took 68% of respondents three months or longer to obtain a diagnosis after first visiting a doctor.
- 36% of patients remained undiagnosed for one year or longer.
- One-in-seven patients remained undiagnosed for six years or more.
- 42% of respondents are prevented from working by their rare disorder.
- 28% of respondents are prevented from attending school by their rare disorder.
- 77% of respondents report that their rare disorder has caused the patient or their family a financial burden - 32% characterize that burden as “extreme”.
- A majority of respondents find it difficult to locate information related to their disorder.

- The internet is the most common source of information on their disorder accessed by patients and families (81%).
- 88% of patients are covered by health insurance.
- 28% of patients had treatment denied or delayed due to insurer pre-approval requirements.
- 10% of respondents were denied a referral to a specialist by their insurer.
- 19% of patients have used experimental treatments.
- 45% of patients would be likely to use an experimental treatment in the future.

A copy of our questionnaire, annotated with the aggregate percentage results for all questions, is attached as Exhibit C.

B. Demographic Profile

Respondents. In the instructions included in our questionnaire, we requested that the questionnaire be completed by the person with the rare disorder, or by someone who is familiar with that person's health history. 56% of the respondents to our survey were themselves patients; 7% were spouses of patients; 18% were parents of patients; 7% were children of patients; 10% were "other relatives" of patients; and 2% listed their relationship to the patient as "other." Since we regarded the non-patient respondents as proxies for their patients, we use the terms "patient" and "respondent" interchangeably throughout this report.

Gender. The survey participation rate of female patients (64%) was greater than that of male patients (36%). This disparity closely tracks the 66% female/34% male split found in the Telephone Survey. The 1989 Report prepared in connection with the Telephone Survey speculated that this gender difference might be reflective of the NORD patient population.

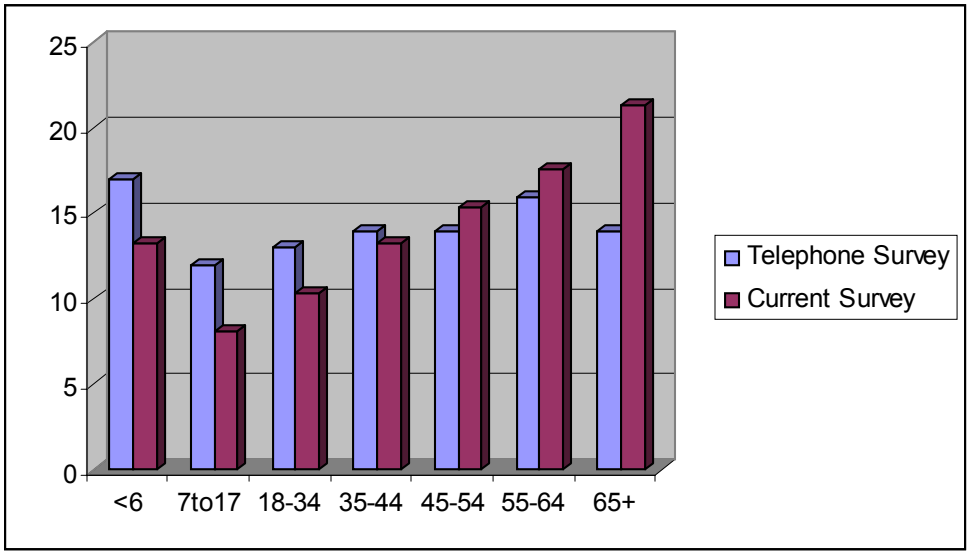
Age. Our survey showed a greater percentage of older patients in comparison to the results of the Telephone Survey. The mean age of the patients participating in

our survey was 44, while their median age was 49. The patient age results from both surveys are compared in Table 1 and Chart 1 below, which utilize the age categories from the Telephone Survey for comparison purposes.

TABLE 1 Patient Age

Patient Age (years)	Telephone Survey Percent	Current Survey Percent
≤6	17	13
7-17	12	8
18-34	13	10
35-44	14	13
45-54	14	15
55-64	16	18
65+	14	22

CHART 1 Patient Age



Income. Our survey shows that the percentage of patients in the higher family income brackets has grown substantially since the Telephone Survey. 53% of patients in our survey have annual (2002) family incomes exceeding $40,000, versus 24% of the

patients in the Telephone Survey. This increase in income would be an expected outcome of the national economic growth which has occurred in the 14 years since the Telephone Survey was conducted. Despite this growth trend, the percentage of patients with family incomes in the lowest income level (under $20,000) has only slightly declined, from 31% to 28%.

The intractability of the percentage of patients in the lowest income level, despite the ensuing economic growth, may be attributable to the financial hardship that the illness causes the families of patients who are most disabled by their disease. While 46% of patients with family incomes under $20,000 report that the illness prevents them from working, only 7% of patients with family incomes over $40,000 are prevented from working by their illness. Among all respondents, 32% report that their illness has caused their family an extreme financial burden, while 63% of respondents with family incomes under $20,000 report an extreme financial burden has been caused by their illness. Table 2 below compares the patient income results of our survey with the Telephone Survey.

TABLE 2 Patient Income

Patient Income	Telephone Survey Percent	Current Survey Percent
Under $20,000	31	28
$20,000 - $40,000	39	20
$40,000 - $60,000	24 (% above $40,000)*	10 (53% above $40,000)
$60,000 - $80,000		12
$80,000 - $100,000		7
Over $100,000		16
Don't Know	6	8

* The Telephone Survey did not categorize income levels in excess of $40,000.

Area. Our survey found the distribution of patients among the various types of population centers to be very consistent with the pattern evidenced by the Telephone Survey, with one exception: the percentage of patients living in rural areas declined by 7% and the percentage of patients living in suburban areas increased by an equal percentage. This may reflect a movement of people from rural to suburban areas, an expansion of suburban development to encompass formerly rural areas, or a combination of the two factors. Table 3 below sets forth the percentages of patients living in each population center, as determined by both the Telephone Survey and the current survey.

TABLE 3 Patient Area

Area	Telephone Survey Percent	Current Survey Percent
Urban	14	15
Suburban	23	30
Medium-sized city	18	17
Small town or city	28	28
Rural	17	10

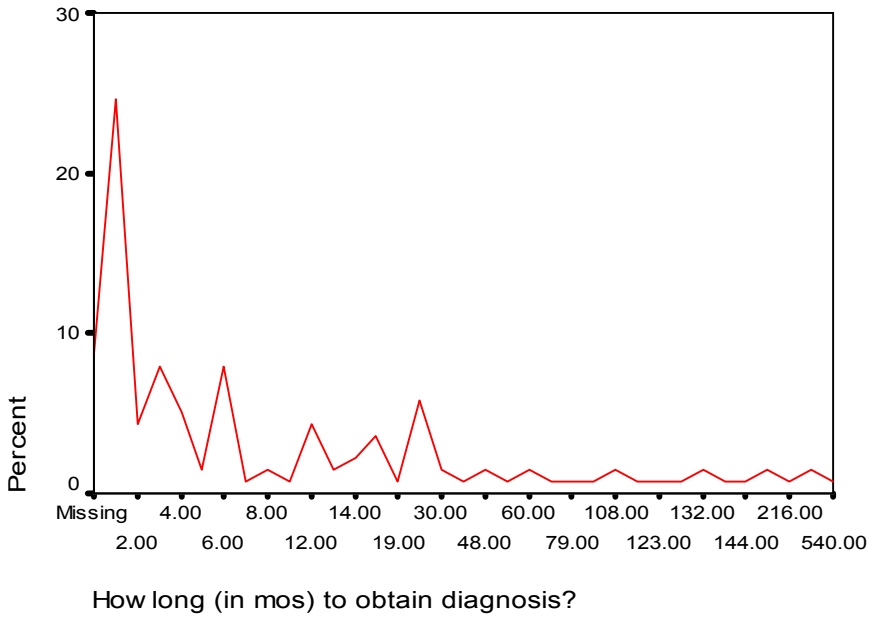
C. Diagnosis and Treatment

Diagnosis. 134 respondents to our survey reported the name of their main diagnosis. Of these 134 diagnoses, only twelve diagnoses were repeated twice, and four diagnoses were repeated three times. This is consistent with the large number and wide variety of rare disorders.

The median time-to-diagnosis for respondents to our survey was six months, while the mean time-to-diagnosis was 34 months. This indicates that a significant group of patients required an inordinate amount of time to obtain a diagnosis. In fact, 17% of patients remained

undiagnosed for four years or longer. This is illustrated in Chart 2 below, which shows the time-to-diagnosis under the current survey.

CHART 2 Diagnosis Distribution



Our survey showed a lower percentage of patients receiving diagnoses in less than three months after first visiting the doctor with symptoms (32%) than under the Telephone Survey (40%). However, in our survey 64% of patients were diagnosed within the first year, as opposed to only 51% in the Telephone Survey. The percentage of patients who remained undiagnosed at six years is similar in the current survey and Telephone Survey, at 14% and 15% respectively.

The overall 13% improvement in the percentage of patients diagnosed within the first year is encouraging, and can possibly be explained by more advanced diagnostic techniques and greater awareness of rare disease symptomatology. The decline in the percentage of patients diagnosed in the less-than-three-month timeframe might be attributable to the growth of managed care. Patients are often required to see their "gatekeeper" physician in order to obtain a referral to a specialist, or to obtain pre-approval for certain diagnostic procedures; these

restrictions were much less prevalent at the time of the Telephone Survey. Table 4 below compares the time-to-diagnosis as between the two surveys.

TABLE 4 Time-to-Diagnosis Comparison

Time-to-Diagnosis	Telephone Survey Percent	Current Survey Percent
< 3 months	40	32
3 months – 1 year	11	33
1 to 5 years	31	21
6+ years	15	14
Don't Know	3	

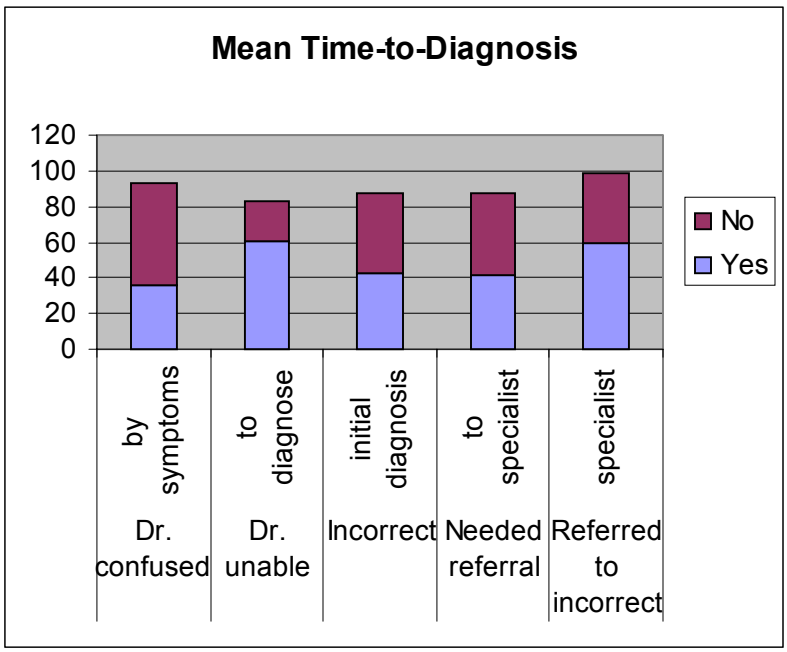
In order to determine why patients with rare disorders often encounter delays in obtaining diagnoses, our questionnaire requested patients who waited longer than three months for a diagnosis to specify one or more reasons for that delay. Table 5 below shows the percentage of these patients who designated each reason, and the mean time-to-diagnosis for the groups which designated the various reasons.

TABLE 5 Diagnosis Delay

Reason	Percent	Mean (in months)
Doctor confused by symptoms	64	36
Doctor unable to diagnose	58	61
Incorrect initial diagnose	46	43
Needed referral to specialist(s)	54	42
Referred to incorrect specialist(s)	21	59

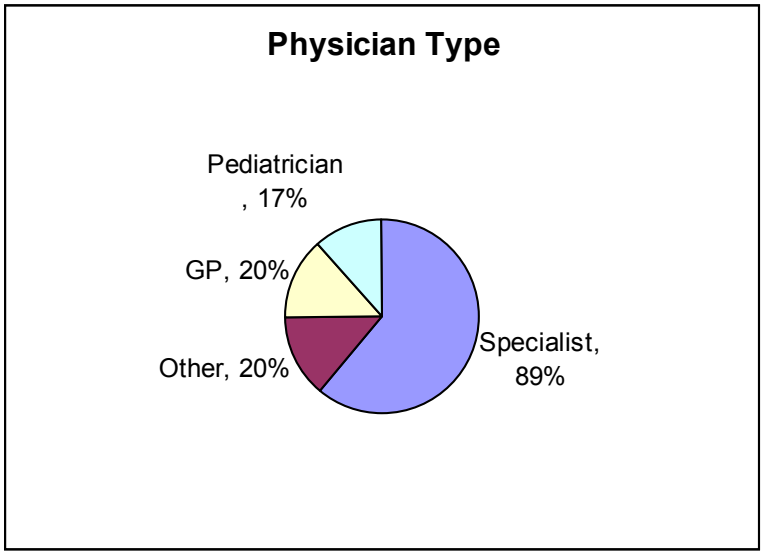
Chart 3 below compares the mean time-to-diagnosis between the patients who answered affirmatively and negatively with respect to each of these reasons being responsible for the delay in their diagnosis.

CHART 3 Mean Time-to-Diagnosis



Treatment. 82% of patients responding to our survey reported that they are currently being treated by a physician for their condition. This corresponds almost exactly with the results of the Telephone Survey, which reported that 81% of patients were currently under treatment. Of the 82% of patients in our survey who were currently under treatment, 20% were seeing a General Practitioner, 17% were seeing a Pediatrician, 89% were seeing a Specialist and 20% listed their practitioner as "other". (These percentages equal more than 100%, as we asked respondents to check all applicable categories.) Chart 4 below illustrates the distribution of patients among physician types.

CHART 4 Physician Type



D. Harships Caused by Illness

Our survey tested several kinds of hardships that rare disorder patients might suffer as a result of their illness:

- The effect of the illness on the patient's ability to work or attend school,
- The general financial burden the illness has caused the patient or the patient's family,
- Whether the patient ever had to change residence in order to access treatment, and
- The greatest distance the patient had to travel for diagnosis or treatment.

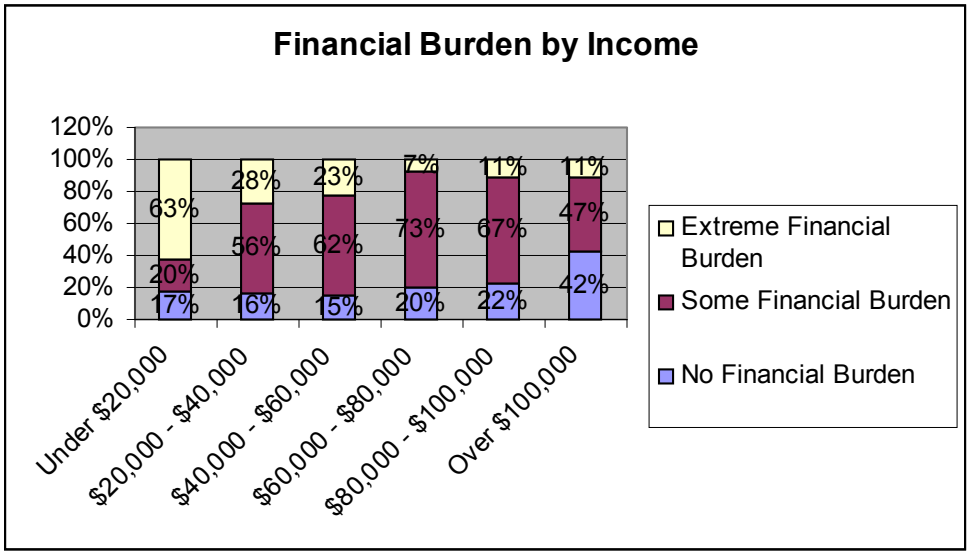
Work/School. Our survey found that 42% of patients were prevented from working by their illness, and 28% of patients were prevented from attending school. These percentages are a great deal higher than those reported in the Telephone Survey, which found that 23% of patients were prevented from working, and 5% from attending school. Our survey found an association between income levels and ability to work (chi square=15.506;p=.017). 46% of patients in the under $20,000 income bracket were unable to

work due to illness, as opposed to 17% in the $20,000 to $40,000 bracket, and 7% in all brackets over $40,000.

Financial Burden. In our questionnaire, we asked respondents how great a financial burden the rare disorder had created for the patient or their family. 23% of patients reported no financial burden, 45% reported some financial burden and 32% reported an extreme financial burden.

Our survey results showed a strong association between family income levels and categories of financial burden (chi square =33.5;p=.001). As might be expected, a majority of respondents (63%) in the lowest income bracket (under $20,000) reported an extreme financial burden. A small percentage of respondents (17%) in the lowest income bracket reported no financial burden, with this percentage rising with increasing income levels. A comparison of income levels and reported financial burden is illustrated in Chart 5 below.

CHART 5 Financial Burden by Income



The total percentage of patients reporting that their illness caused an extreme financial burden (32%) decreased from that reported by the Telephone Survey (43%). This finding is

somewhat inconsistent with the increase in the percentage of patients from the Telephone Survey to the current survey who were rendered incapable of working by their illness (from 23% to 42%). One possible explanation for this inconsistency is the fact that women have entered the workforce in greater numbers since the Telephone Survey. A percentage of female patients who were homemakers at the time of the Telephone Survey are probably now wage-earners. Since female patients constitute a majority (64%) of our survey patients, this may account for some or all of this increase. Table 6 below compares the percentages of patients who reported that their illness caused their families an extreme financial burden as between our survey and the Telephone Survey.

Table 6 Financial Burden Survey Comparison

	Percentage of Patients Reporting Extreme Financial Burden	
Income	Telephone Survey Percent	Current Survey Percent
Under $20,000	63%	63%
$20,000 - $40,000	39%	28%
Above $40,000	29%	

The Telephone Survey did not inquire into other categories of financial burden and did not categorize income levels above $40,000.

Residence/Travel. 6% of patients responding to our survey reported that they had to change residence in order to get access to treatment; this compares to 8% of patients who responded to the Telephone Survey.

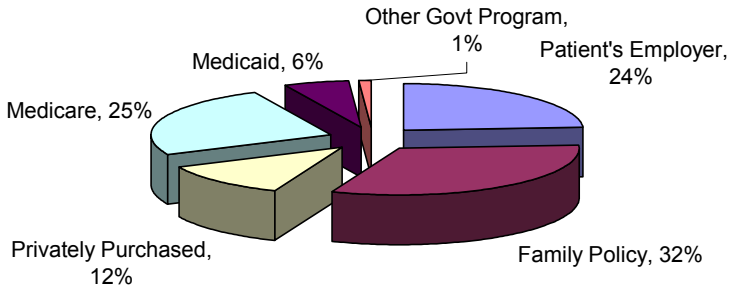
47% of patients responding to our survey reported that they had to travel more than 50 miles one-way to receive diagnosis or treatment; this compares to 56% of patients who

responded to the Telephone Survey. Some of this decline in the percentage of patients who have to travel long distances for diagnosis or treatment may be attributable to the (7%) shift of patients from rural to suburban settings.

E. Health Insurance

88% of patients responding to our survey reported that they have health insurance coverage. Chart 6 below illustrates the breakdown of the manner in which these patients obtained their health insurance.

CHART 6 Source of Health Insurance



The 12% of patients in our survey who were not covered by health insurance attributed their lack of coverage to a variety of reasons. 62% said that insurance was too costly; 17% said that it was unavailable; 39% said that they were excluded from coverage due to a pre-existing condition; and 50% cited "other" as the reason for their lack of insurance; the specific reasons

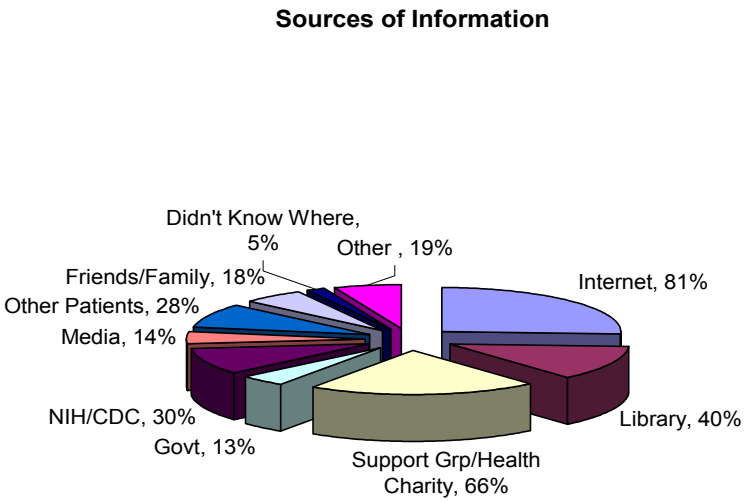
cited by respondents under the "other" category are listed in Exhibit D. (These percentages equal more than 100%, as we asked respondents to check all applicable reasons.)

When questioned about potential barriers to access imposed by managed care organizations, 28% of patients in our survey reported denials or delays in getting treatment that required pre-approval, and 10% reported being denied a referral to a specialist.

F. Availability of Information

Ours was a survey of patients or their family or friends who had attempted to obtain information about the patient's rare disorder (99%). The internet was by far the most frequent source of information, with 81% of respondents reporting it as a source of information. Support groups or health charities (e.g. NORD) were the second most frequent source of information, at 66%. This number may be higher than average for the rare disorders population since our sample population was drawn from NORD's data base. The distribution of information sources utilized by our respondents is set forth below in Chart 7.

CHART 7 Sources of Information



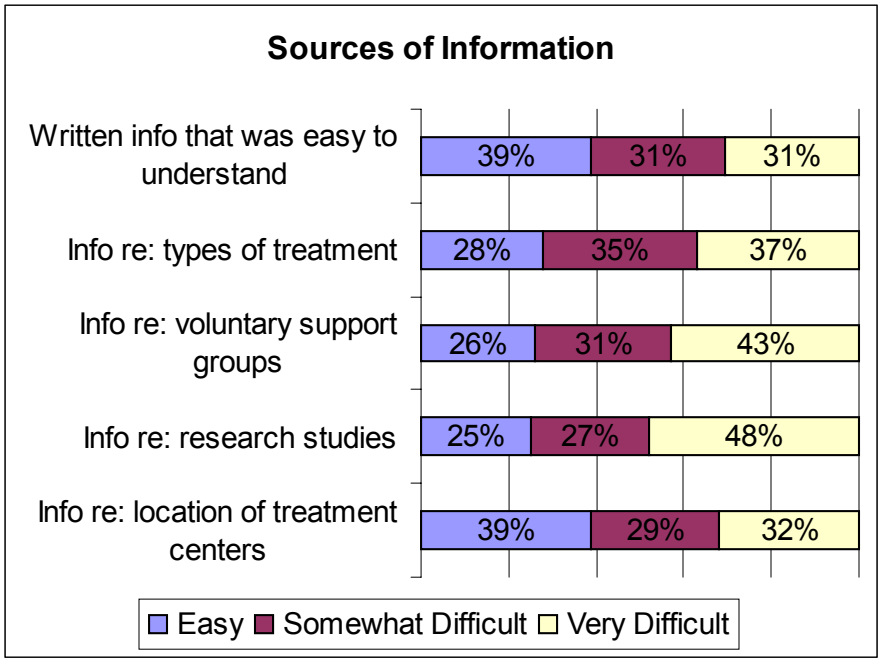
We found an association between family income level and use of the internet as a source of information on illness (chi square=16.08;p=.013). Only 66% of those in the under $20,000 income bracket used the internet, while for those who earned over $20,000, the percentage of internet use ranged from 85% to 100%. Table 7 below sets forth the percentage of internet usage for each income bracket.

Table 7 Percentage of Internet Usage

Family Income	Internet Usage (Percent)
$20,000 - $40,000	92
$40,000 - $60,000	100
$60,000 - $80,000	87
$80,000 - $100,000	100
Over $100,000	85

In our survey, we presented respondents with a list of five different types of information relating to their disorder. With respect to each type of information, we asked respondents to designate whether it was easy, somewhat difficult or very difficult to obtain this type of information before contacting NORD. 61% to 75% of respondents found it either somewhat difficult or very difficult to find information, depending on the particular type of information, with 27% to 35% finding it somewhat difficult and 31% to 48% finding it very difficult. Despite the emergence of the internet as a predominant information source, it remains at least somewhat difficult for the majority of respondents to access certain important information about their disorders. The relevant information categories and the survey responses indicating the difficulty of accessing such information are summarized in Chart 8 below.

Chart 8 Accessibility of Information



Percent Difficult

62%

72%

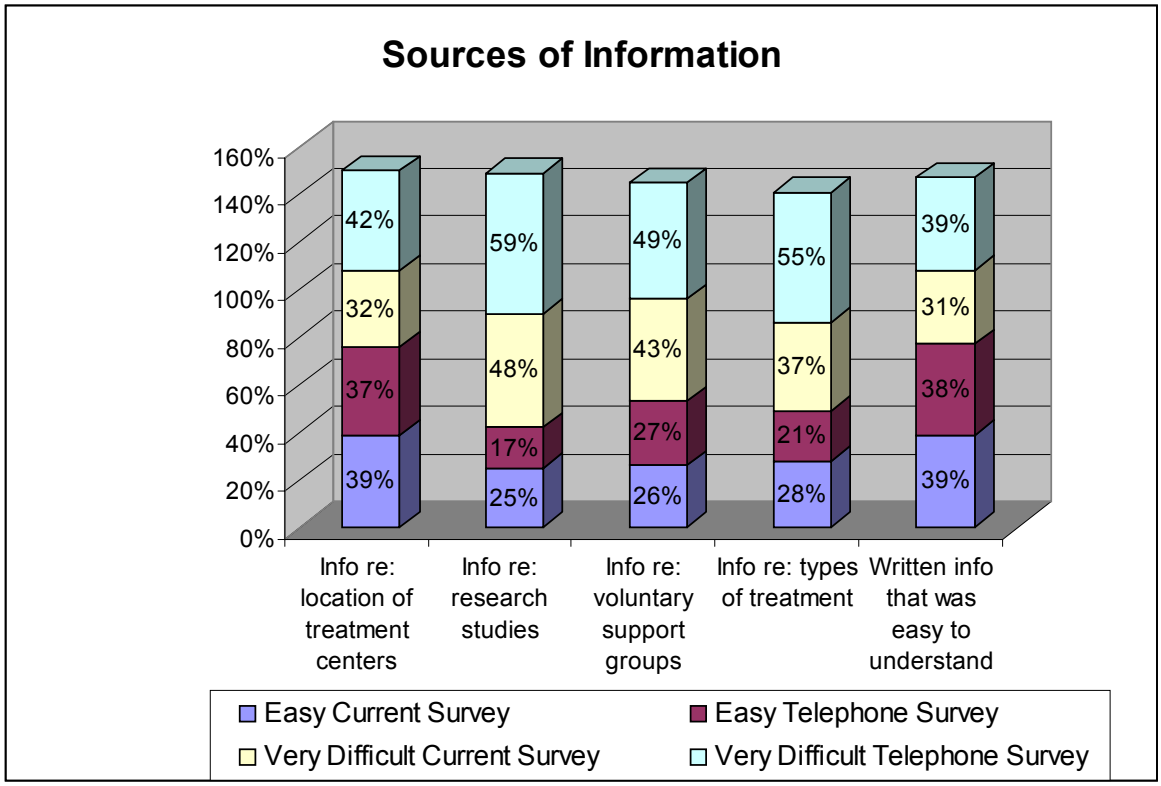
74%

75%

61%

When compared to the results of the Telephone Survey, the aggregate percentage of respondents who found information easy to access (with the percentages attributable to each item totaled) increased by 15%. The aggregate percentage of respondents who found information very difficult to access declined by 52%. While the decrease in the percentage of respondents finding information very difficult to access is certainly significant and encouraging, the increase in the percentage of respondents who found information easy to access is slight, particularly in light of the emergence of the internet as an information source. The comparison of the results of the current survey and the Telephone Survey are set forth in Chart 9 below.

Chart 9 Information Source Comparison



G. Experimental Treatments

19% of the patients responding to our survey indicated that they have used an experimental treatment in the past. This represents a 7% increase over the percentage (12%) of respondents in the Telephone Survey who had used an experimental treatment.

We asked the respondents to our survey how likely they would be to use an experimental treatment if one were to become available in the future. 45% of respondents indicated that they were very likely to do so; 38% indicated that they were somewhat likely to do so; and 17% indicated that they were not likely to do so.

6. SUMMARY OF FINDINGS

The rare disorders community remains underserved and burdened in a variety of ways. While progress has been made in some areas since 1989, this community has actually lost ground

in other areas. This is particularly unfortunate in light of the technological and medical advances and economic growth which has occurred in the ensuing years.

Timely diagnosis and treatment remain a major problem for patients with rare disorders. 68% of patients take three months or longer to obtain a diagnosis; 36% remain undiagnosed for one year or more; and one-in-seven remain undiagnosed for six or more years. Some progress in time-to-diagnosis has been made since 1989. 64% of patients are now diagnosed within the first year, as opposed to 51% in 1989. However, the percentage of patients who remain undiagnosed at six years has remained relatively constant. Moreover, the percentage of patients who receive a diagnosis in under three months has declined (from 40% to 32%). This decline in the percentage of patients who receive a rapid diagnosis may be attributable to the strictures of managed care organizations, such as gatekeeper referrals and diagnostic procedure pre-approvals. The growth of managed care creates other obstacles for rare disorder patients as well: pre-approval requirements caused treatment delays or denials for 28% of patients, and denials of specialist referrals for 10% of patients.

The percentages of patients who were rendered unable to work or attend school by their illness were surprisingly high in light of the findings of the 1989 Telephone Survey. 42% of patients were prevented from working, and 28% were prevented from attending school; this compares with 23% who were unable to work, and 5% who were unable to attend school in 1989. This high amount of employment and educational disability undoubtedly poses a significant hardship for rare disorder patients. Employment disability corresponds to both family income levels and the degree of reported financial burden. The percentage of patients whose illness cause them an extreme financial burden (32%) declined from 1989 (43%), however, an additional 45% of patients reported that their illness caused them some financial burden.

Patients experience this high level of financial burden despite the fact that 88% of them are covered by health insurance.

Rare disorder patients require an accessible source of understandable, reliable information on their disorders. Patients attempted to obtain information about their disorders, and the internet was the preferred source of information (81%). Despite the predominance of the internet as an information source, a majority of patients found it either somewhat difficult or very difficult to find information (from 61% to 75%, depending on the type of information). When compared to the results of the 1989 Telephone Survey, the aggregate percentage of patients (totaling five categories) who found information easy to access increased by 15%, and the aggregate percentage of patients who found information very difficult to access declined by 52%. In light of the information explosion brought about by the internet, and the high percentage of internet usage among our patients, this improvement seems very modest. Moreover, the internet is least available to patients in the lowest income bracket, and there is no assurance that the information obtained over the internet is from reliable sources.

The percentage of patients who have used an experimental treatment has increased since 1989; 19% of patients have used an experimental treatment, versus 12% in 1989. A substantial proportion of patients appear to be willing to participate in research trials: 45% of patients indicated that they were very likely to do so. Unfortunately, information about research studies was the category of information that patients found most difficult to access, with 48% finding it very difficult. Clearly, there is a need to improve the ability to match willing subjects with appropriate research trials.

The results of our survey indicate that the needs of the rare disorders community remain as acute as they were in 1989. While some gains have been made, these gains have been offset

by ground which has been lost in other areas. One might have expected that the ensuing medical and technological advancements would have ameliorated the needs of rare disorder patients. This expectation has not been realized.

While the rare disorders community shares in the needs of the general patient population (e.g., affordable health insurance), they have a distinctive subset of needs. The major, and interrelated, needs of this community are the same as they were in 1989: early, effective diagnosis and treatment; and ready access to reliable, understandable information. These are the needs that NORD's programs are designed to address. NORD targets its goal of early, effective diagnosis and treatment by educating providers, funding research, and advocating in favor of research and treatment initiatives. NORD improves patients' access to information by maintaining a robust website, information databases, newsletters and conferences. From the results of our survey, it appears that the need for these services remains acute in the rare disorders community.

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[1] U.S. Food and Drug Administration. http://www.fda.gov/orphan/taxcred.htm

[2] NORD Factsheet

[3] CRS Report for Congress. *Orphan Drug Act: Background and Proposed Legislation in the 107th Congress*. July 2001. <http://rxpolicy.com/studies/crs-orphandrugs-0701.pdf>

[4] United States, Department of Health and Human Services. Public Health Service. Office of the Assistant Secretary for Health. *Report of the National Commission on Orphan Diseases.* February 1989.