



MPS I Disease Management Patient Survey

A collaboration of Genzyme and the National MPS Society

January 2007

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- ☐ Objectives & Methodology
- ☐ Current Health
- ☐ Transplantation
- ☐ Enzyme Replacement Therapy
- ☐ Support & Services
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Objectives

Ask MPS I patients about their current health, both physical and emotional
 Examine their experience of transplantation and enzyme replacement therapy, and how well these therapies lived up to patient expectations
 Ensure optimal treatment across patient groups, i.e., the spectrum of MPS I disease (Severe and Attenuated), and organ systems
 Obtain input on patient support services provided by Genzyme

and the National MPS Society in order to plan programs that

encourage optimal treatment

Methodology

- □ 8-page questionnaire designed by Genzyme in collaboration with National MPS Society
- Society mailed survey package
 - Questionnaire, cover letter from Society director, stamped reply envelope to 136 households with 149 patients
- □ Survey period
 - September-October 2006
- **☐** Survey response
 - 61 completed questionnaires returned (41% response rate)

RESPONDENT DEMOGRAPHICS

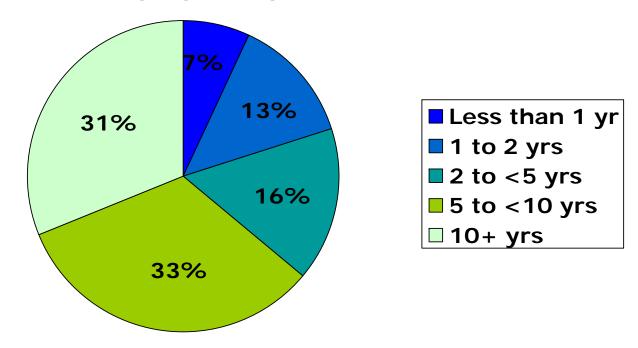
The survey achieved good representation across patient segments

Respondent is: patient (18%), parent/guardian (82%)
Patient gender: male (50%), female (50%)
Patient age: <6 years (25%), 6<18 (53%), 18+ (22%)
<u>Disease severity</u> : Severe (66%), Attenuated (34%)
<u>Transplantation</u> recipient (54%)
Enzyme Replacement Therapy recipient: (49%) including current (36% including 15% on for <3 yrs and 21% on for 3+ yrs) and past (13%, e.g. short-term during/after transplantation)
Insurance: all have health insurance; 80% have private insurance and 38% have Medicaid (indicating that many privately insured also have Medicaid assistance)
Geography: 40% South, 25% West, 23% Midwest, 12% Northeast

RESPONDENT DEMOGRAPHICS

Respondents include newly diagnosed patients, as well as patients diagnosed many years ago before new therapies were available

How Long Ago Diagnosed





1/3 of primary managers of MPS I disease are geneticists and transplant specialists, while many are non-experts

Specialty of "Primary Manager" of MPS I

"Expert" specialties

Geneticist 25% Transplant specialist 11%

Non-experts

Pediatrician 20%
Hem/onc 13%
GP, internal, PCP 12%
Don't have "primary manager" 7%
Other/Multiple specialties 12%



Many patients see multiple physician specialists for symptom management

Other Physicians Seen Regularly (at least once a year)

Cardiologist	80%
Ophthalmologist	76%
Dentist	68%
Orthopedic surgeon	63%
Ear-nose-throat (ENT)	61%
Pediatrician	51%
Physical therapist	49%
Geneticist	46%
Occupational therapist	44%
Neurologist	42%
Hematologist/oncologist	39%
Pulmonologist	37%
GP, internal medicine, PCP	32%
Speech therapist	16%
Endocrinologist	10%
Gastroenterologist	9%
Transplant specialist	3%
Rheumatologist	

Rheums may be diagnosers, but are not currently managing

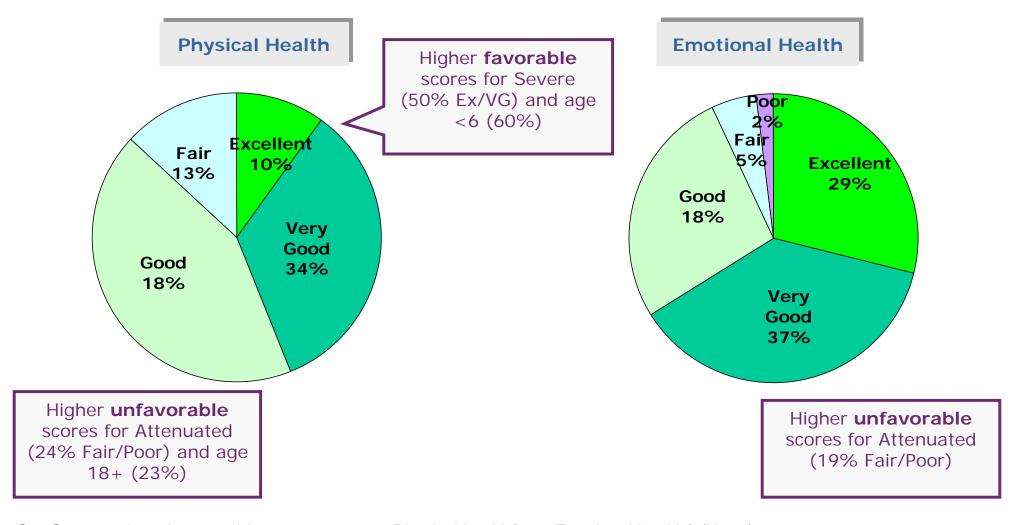
Q7. Which of the following other physicians/medical professionals are you seeing on a regular basis, that is, at least once a year, for the management of MPS I? (N=61)

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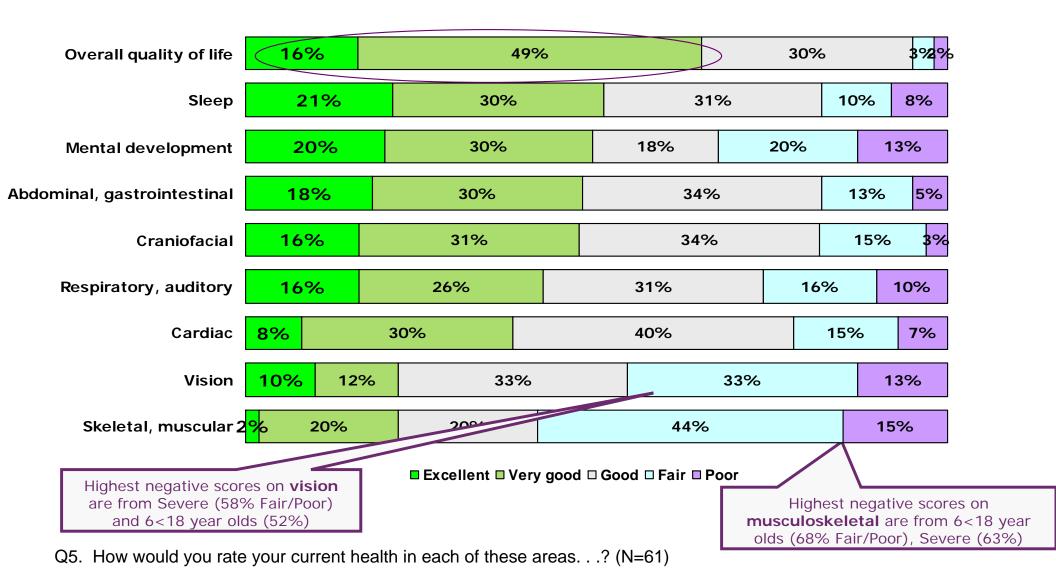
Self-assessment of most MPS I patients' health is positive on overall physical and emotional measures

Overall Health Assessment



Patients' highest health rating is on quality of life; on physical symptoms there are significant negative ratings, especially musculoskeletal and vision

Health Parameter Ratings



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Transplantation Experience

Patients who have received transplantation

- □ Phenotype: 80% of Severe patients in this survey have received transplantation; 5% of Attenuated
- ☐ Age at transplantation: 1/3 before age 1; 2/3 at 1-2 years old
- ☐ <u>Type</u> of transplantation: 59% bone marrow, 38% umbilical cord blood,
 3% peripheral blood
- 72% report having side effects/complications
- □ 22% report having <u>transplantation repeated</u>

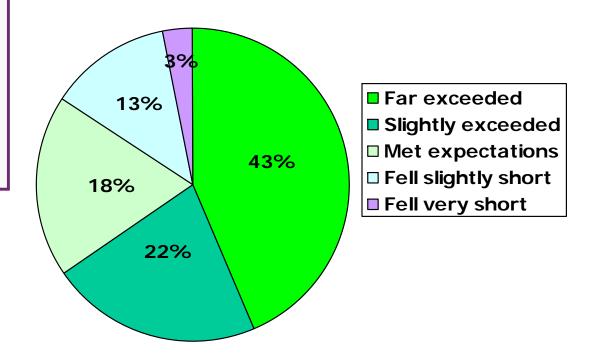
Q8. Have you received a stem cell (bone marrow) transplant as treatment for MPS I? Q9. How old were you when the transplant occurred? Q10. Was the source of the stem cell transplant . . . Q11. Were there side effects or complications? Q12. Was the procedure repeated? (N=32)

Transplantation has met or exceeded most recipients' expectations; in many cases, far exceeding

How Has Transplantation Met Expectations?

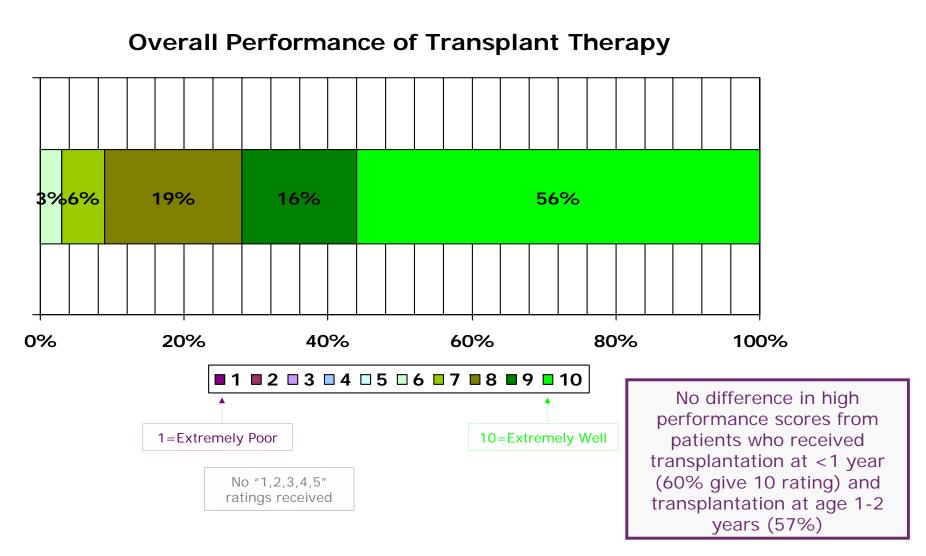
Far exceeding expectations reported by:

- 100% (1 patient) who received peripheral stem cell transplant
- 58% (7 of 12) of umbilical cord transplant patients
- 32% (6 of 19) of bone marrow transplant patients



More disappointment for age 6<18 (25% fell short)

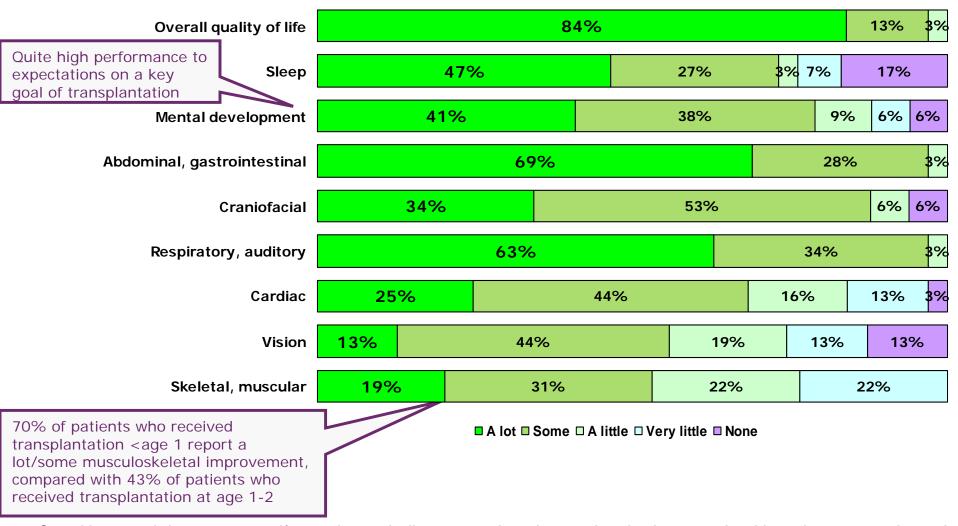
A majority of recipients rate transplantation performance a "10" on a 10-point scale



Q14. Based on your experience to date, how would you rate the <u>overall</u> performance of transplant therapy as a treatment for MPS I? (N=32)

Transplantation patients report "a lot" or "some" improvement on many parameters (including mental development), especially QoL, abdominal, respiratory; less on vision, musculoskeletal

Transplant Improvement on Health & Symptoms



Q15. How much <u>improvement</u>, if any, do you believe transplant therapy has had on your health and symptoms in each of these areas? (N=32)

When asked to comment on ways transplantation fell short or to suggest improvements, many patients focused on musculoskeletal & joint problems, followed by cognitive development, poor vision

Transplantation Shortcomings/Improvements Needed

Volunteered (multiple responses accepted)

Orthopedic/skeletal issues/kyphosis/bone structure 25% Stiffness/joint pain/carpal tunnel/wanted to be more flexible 13% Cognitive development/learning delay/mental retardation/speech 13% 13% Cloudy corneas/poor vision/want clearer corneas **Growth delay** 9% Brain damage/brain disease 6% 6% Longer recovery time than anticipated Did not work as well as we hoped/fell short as a treatment 6% Long term complications (unspecified) 3% 3% Cannot correct damage already occurred/does not repair Unexplainable drop in enzyme levels 3% None 3% All other 6%

None, N/A, No comment

Musculoskeletal issues widely mentioned for: Male & <age 6

Cognitive issues mentioned widely for: Female & age 6<18

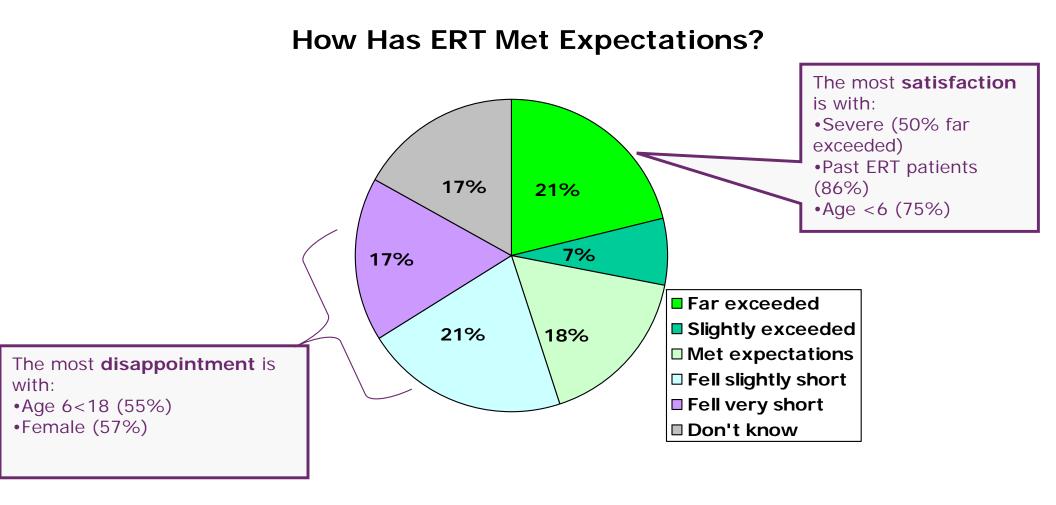
34%

Q16. In what ways, if any, did transplant therapy fall short as a treatment, or what additional improvements would you want/expect the transplant to provide? (N=32)

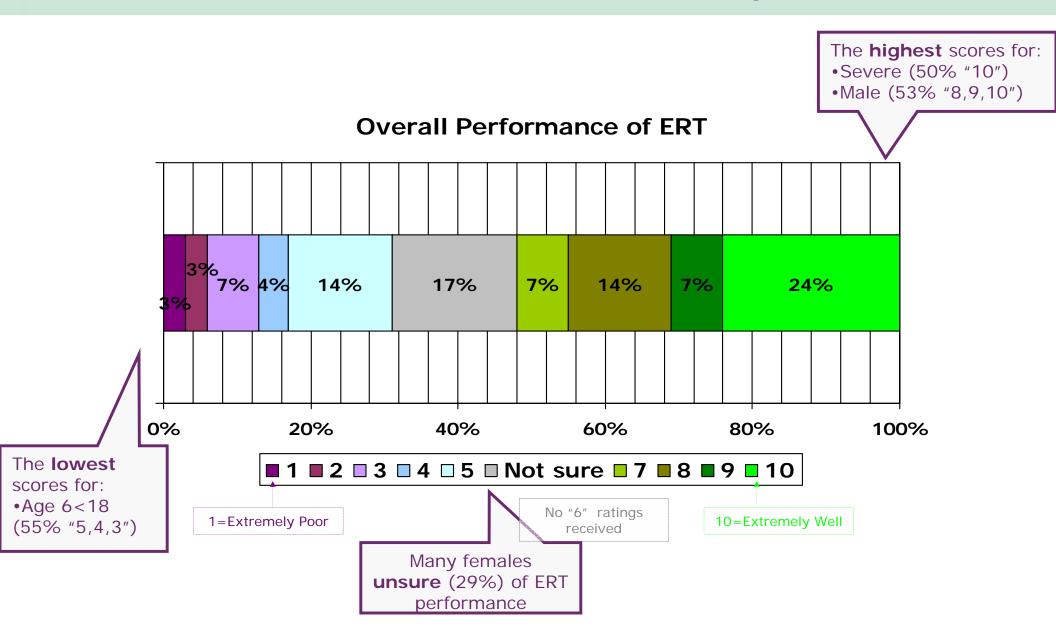
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Patients vary in their assessment of whether Enzyme Replacement Therapy has met or exceeded expectations



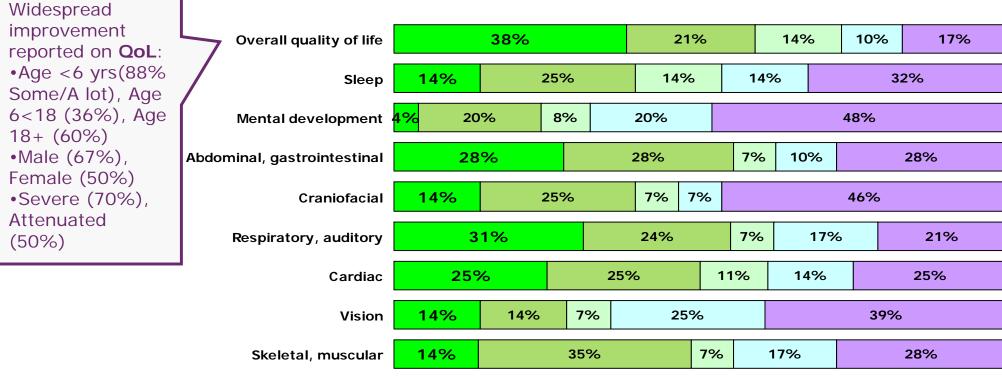
A 52% majority rate Enzyme Replacement Therapy performance favorably, while 1/3 give relatively low scores, and another 17% are unsure how to rate its performance



Q24. Based on your experience to date, how would you rate the <u>overall</u> performance of ERT as a treatment for MPS I? (N=29)

The most improvement from ERT reported on quality of life, abdominal, respiratory & cardiac parameters; least improvement reported on mental development, vision





The **most** improvements across parameters reported:

- •Age <6 yrs
- Male
- •Currently on ERT & been on 3+ yrs

■ A lot ■ Some ■ A little ■ Very little ■ None

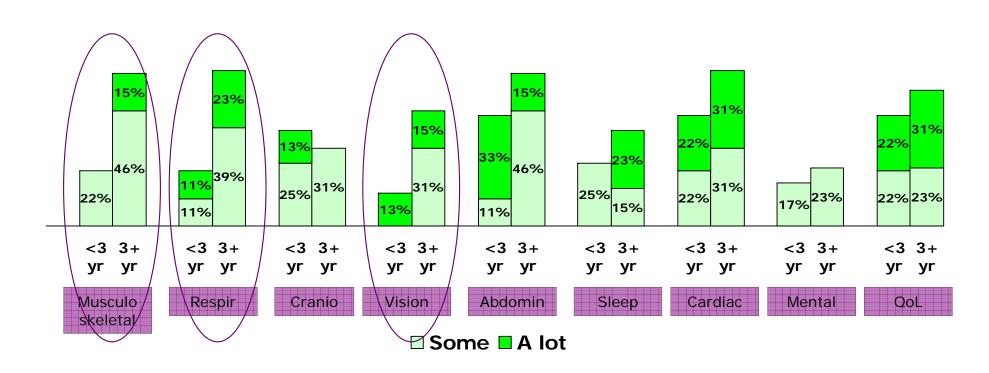
The **least** improvements reported:

- Attenuated
- •Age 6<18
- •Female

Q25. How much improvement, if any, do you believe ERT has had on your health and symptoms in each of these areas? (N=29)

The longer that patients have been on Enzyme Replacement Therapy, the better their reported outcomes, especially for respiratory, musculoskeletal and vision

Perceived Improvements from ERT, by Length of Time on ERT (Current ERT patients)



Patients are looking for greater improvements in musculoskeletal health, and reassurance that Enzyme Replacement Therapy at least stops disease progression; there is some understanding that therapy should start early

These parallel shortcomings mentioned regarding transplantation

Enzyme Replacement Therapy Shortcomings/ Improvements Needed

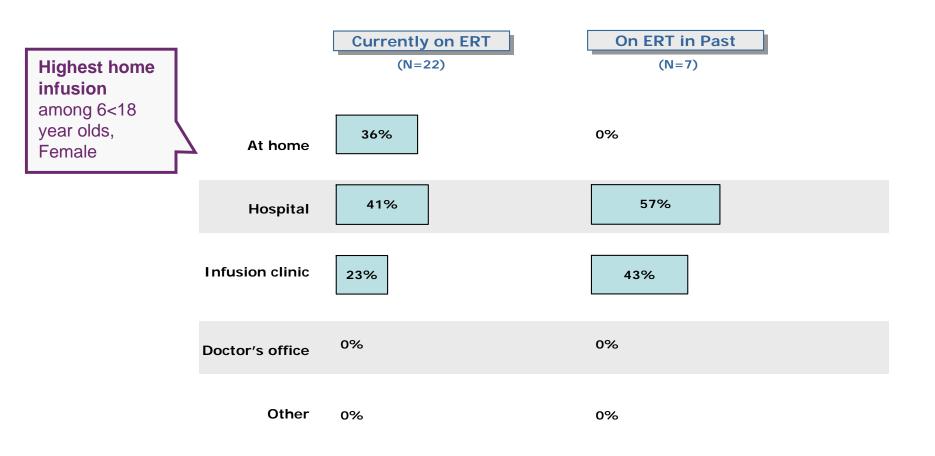
Volunteered (multiple response accepted)

Skeletal issues	13%
Carpal tunnel/stiffness in joints/would like lessening of	7%
Growth	3%
Muscular symptoms	3%
Progression	
Not seeing any help/have not noticed any changes/don't see any difference	10%
Has not stopped/slowed disease progression	7%
Does not reverse the disease/damage already caused	3%
Needs to be started younger	3%
Other	
Pulmonary/problems with airway	3%
Wish it could break the brain barrier	3%
Fatigue/would like to improve stamina	3%
All other	7 %
None, N/A, no comment	50%

Q26. And in what ways, if any, did ERT fall short as a treatment, or what additional improvements would you want/expect ERT to provide? (N=30)

ERT LOCATION

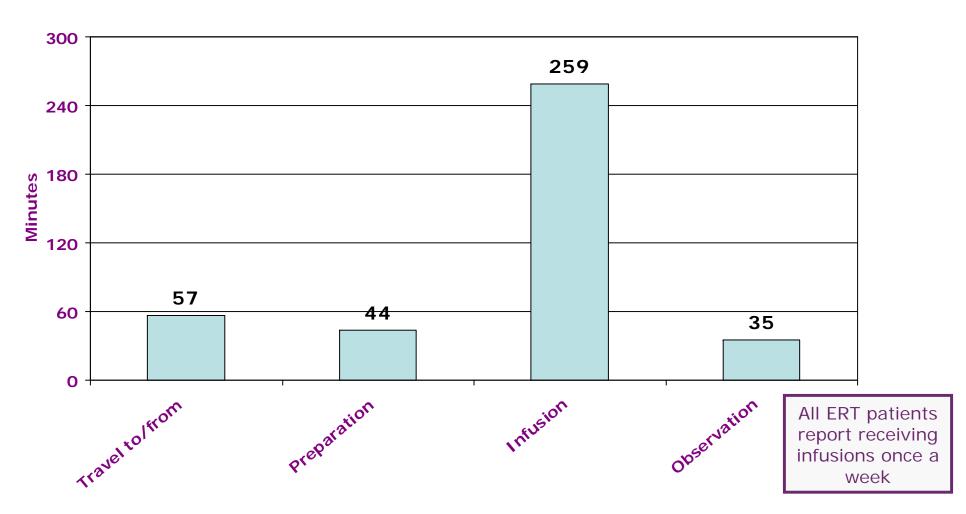
Many MPS I patients have adopted home infusion therapy, especially those age 6<18 and females, probably to lessen disruption to school/ work/home



ERT TIME COMMITMENT

On average, patients devote more than 6 ½ hours to each weekly infusion (including 4 ½ hours of infusion time)

Time of Steps in Infusion Process (minutes)

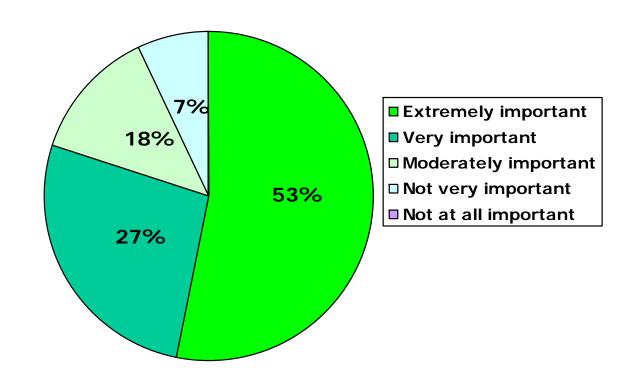


ERT COMPLIANCE

Compliance is nearly total, and ¾ say it is very/ extremely important not to miss any infusions

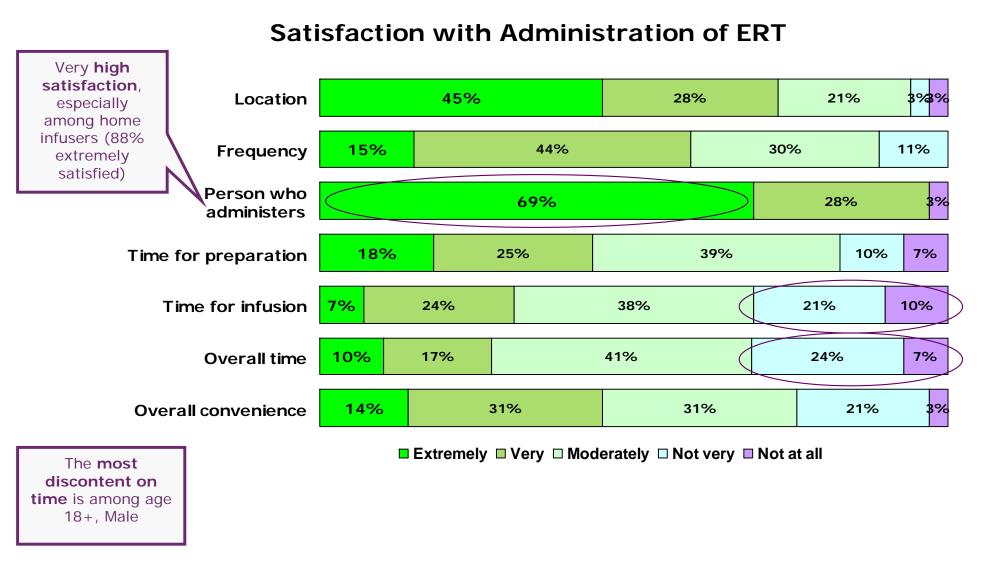
Importance of not missing any infusions

Only 1
respondent
reports missing
four or more
consecutive
infusions; the
reason given
was
hospitalization



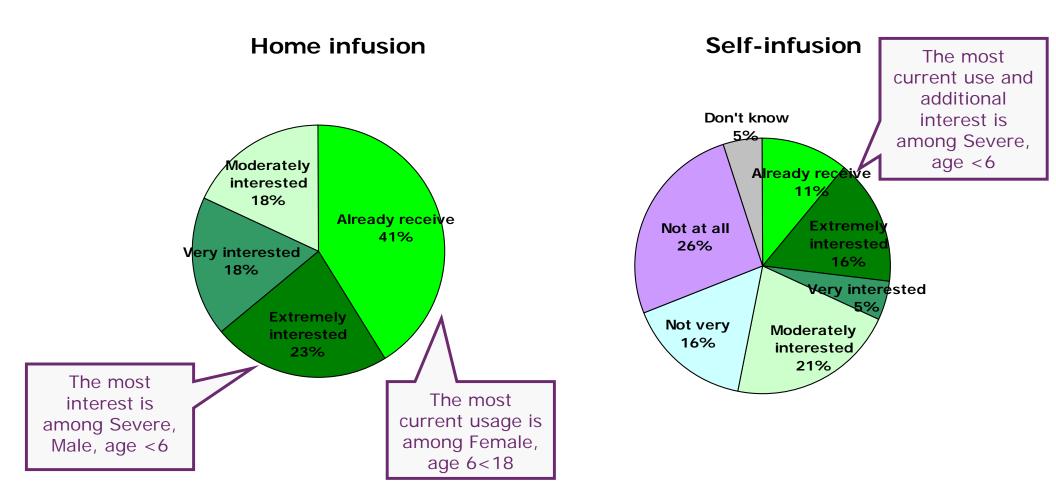
Q20. Have/had you ever missed 4 or more consecutive infusions? (N=29) Q21. Which of the following items, if any, describe the main reasons you missed or stopped ERT? (N=1) Q22. How <u>important</u> would you say it is to receive ERT without missing any infusions? (N=30)

There is general satisfaction with administration of Enzyme Replacement Therapy; however, 1 in 3 patients report dissatisfaction with overall time commitment and infusion time (there is less dissatisfaction with infusion frequency)



Q31. How satisfied are/were you with each of the following aspects of your ERT? (N=29)

Home infusion has been embraced by many MPS I patients, and many others express high interest; self-infusion also draws some interest



Q32. How <u>interested</u> would you be in each of the following types of ERT administration and infusion methods? **Home infusion**: *A nurse or clinician comes to your home to prepare the solution and administer the infusion*. **Self infusion**: You/Parent/Guardian . . . administer the infusion on your own. (N=22 currently on ERT)

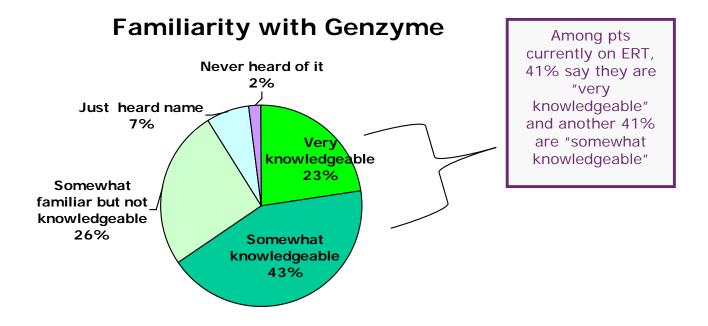
The main reasons given for not receiving Enzyme Replacement Therapy are lack of availability at the time & appropriateness of transplantation

Reasons for NOT receiving ERT Volunteered (multiple response accepted)	
volunteered (multiple response accepted)	
Opted for transplantation	
Not available to us/at time of transplant/not available when diagnosed/	
was not approved yet	38%
Had transplant/BMT/stem cell transplant/transplant was successful	31%
Enzyme level sufficient after transplant/no need for	10%
Chose transplant/more permanent	7 %
No wait for transplant/would have delayed transplant/went into transplant	
as soon as donor found	7 %
Afraid of transplant rejection if ERT given prior to	3%
Transplant worked well for first child	3%
Physician discouraged ERT	
Genetic doctor claimed only for more serious patients/did not qualify	7%
Doctors felt no benefit after transplant/we felt would be redundant	7%
Cost concerns	
Too expensive	3%
Concerns over insurance coverage	3%
Other	
Just diagnosed/will start treatment soon	3%
All other	3%
No comment	10%

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Patient familiarity with Genzyme is quite high

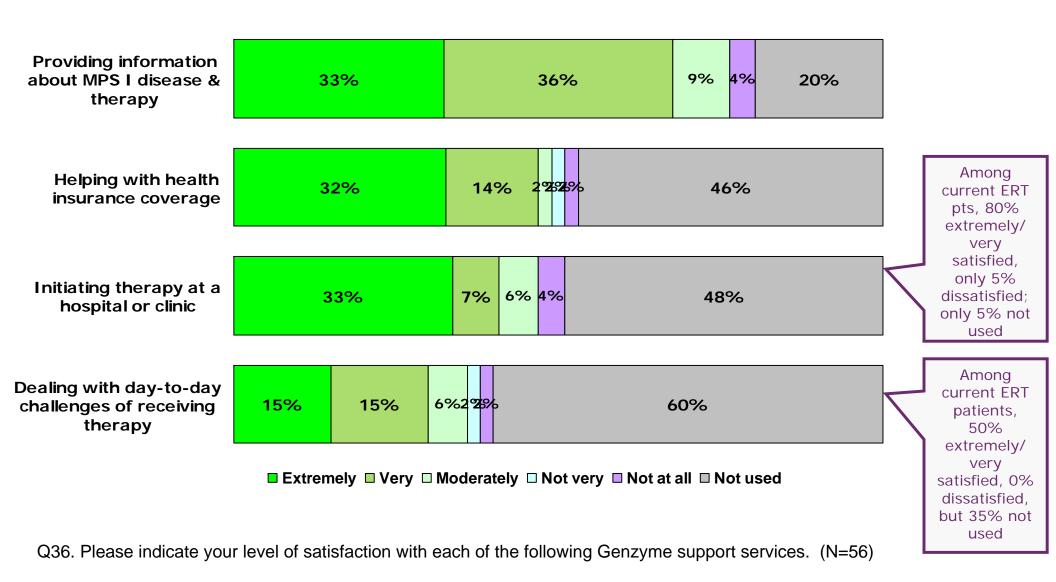


Patients express very positive attitudes toward Genzyme; appreciation focuses on the responsiveness of Genzyme support services; also on the comprehensiveness/ relevance of disease/treatment information

How Has Genzyme Helped?	
Volunteered (multiple response accepted)	
Support	
Help with insurance coverage/insurance problems	16%
Help us find local doctor/hospital for treatment/setting up infusion sites	13%
Excellent customer service/support/was there before, thru infusions/	
to answer questions	13%
Conferences/helped us attend/sponsored me	7%
Case Management Specialist/available for consultation/have good relationship	5%
Funding research/for new treatments/current therapies/FDA approval	3%
Getting hospital to add drug for treatment/training for hospital to do ERT	3%
Help with fundraising/ annual meetings	5%
Provided funding for website	2%
Drug has reduced several of my symptoms	2%
Information	
Mailings/resources/family resource guide/information sent out to families	13%
Knowledge/to hospital staff/myself on information regarding disease/	
to help answer my questions	7%
Website/resources online/very informative	5%
Notebook/Hurler/binder	2%
Given materials/options on treatments	2%
Provided materials about MPS I (unspecified)	2%
None/N/A/No comment	36%

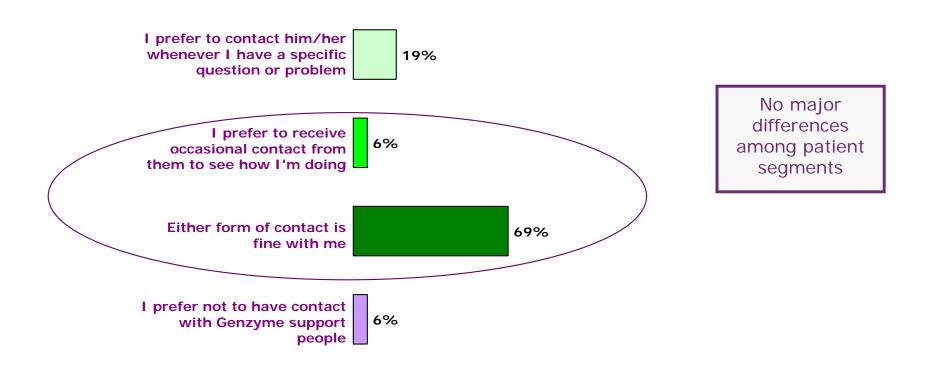
Patients indicate widespread use and satisfaction with Genzyme information; satisfaction is also very high on other support

Usage & Satisfaction with Genzyme Support Services



34 of patients are open to receiving proactive communications from Genzyme

Contact Preference with Genzyme Support People

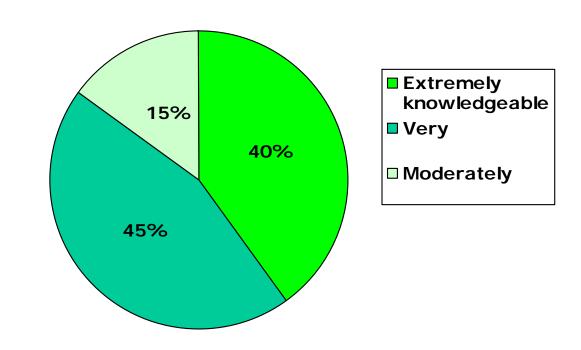


Additional information-sharing tops the list of suggestions for Genzyme service improvement, including holding more informational meetings with patients

How Can Genzyme Better Serve?		
Volunteered (multiple response accepted)		
Information		
Keep us informed/up to date on treatments/studies/medical trials/		
how they are going/next phases	7%	
Organize meetings/share information with other families/share experie	ences/	
problems with receiving ERT	5%	
Want more information (unspecified)	3%	
Keep website updated	3%	
Support		
Better contact/support/follow up from reps/case manager	3%	
Help with fundraising	3%	
Keep funding MPS Society	3%	
Help with insurance coverage	3%	
Other		
Lower cost	3%	
Improvements in treatments/ shorten times of infusions	3%	
Keep up the good work	3%	
None/do not need/can't think of anything/no comment	7 5%	

Most patients say they are knowledgeable about MPS I and treatment

Patient Knowledge of Disease & Treatment



No major differences among patient segments

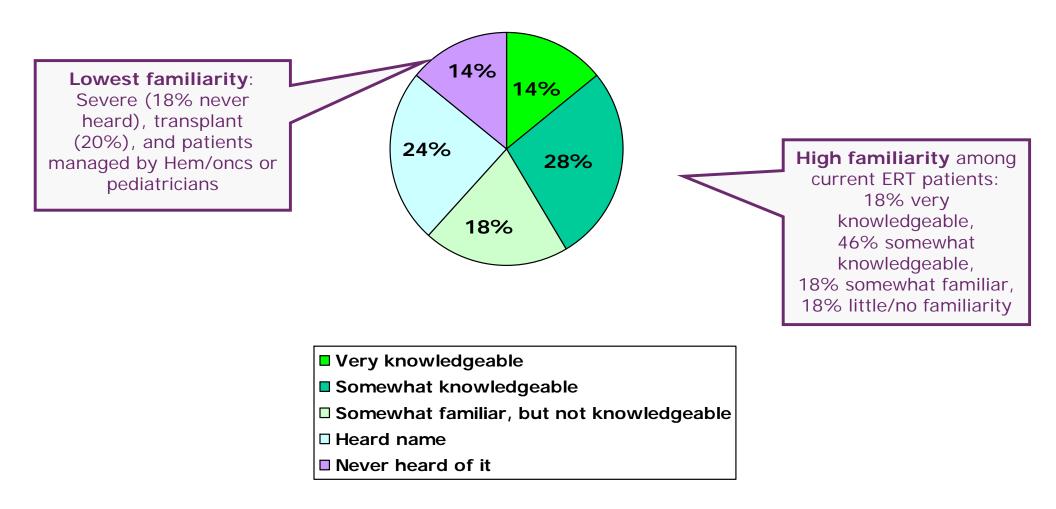
Disease information needs appear to be met; unmet information needs focus on what to expect from therapy plus recent advances in therapy

Additional Information Needs	
Volunteered (multiple response accepted)	
Effectiveness of therapy, outcomes Info/statistics regarding children with disease/had transplants/ what to expect/	
post transplant studies	10%
ERT information/what it corrects/stops/helps with	7 %
Concerns of skeletal/dental issues/post transplant	5%
Collect/share data/detailed reports/database on <u>patient outcomes</u> /after treatment Questions on side effects cause by treatments/medicine/weight gain/	5%
loss of appetite	5%
ERT after BMT or not?	3%
Information on MPS I long term effects/expectancies	2%
More information on BMT/bone marrow transplant	2%
What needs to be done after treatment/tests run/how often to see doctor etc.	2%
Advances in therapy	
On new advances being made/for after transplant/new treatments/hoping for cure	8%
Information on clinical trial reports	3%
Intrathecal infusion of Aldurazyme	2%
Would like to receive current information/not much available to me	2%
Cost of therapy	
Financial aid	2%
Cost of ERT/if problems arise with insurance coverage	2%
None, have everything, no comment	49%

Q44. What information—about MPS I disease, its treatments, and/or support services—would you like to receive that you don't already have? (N=61)

Although a significant number of patients know about the Registry, others need to learn about it

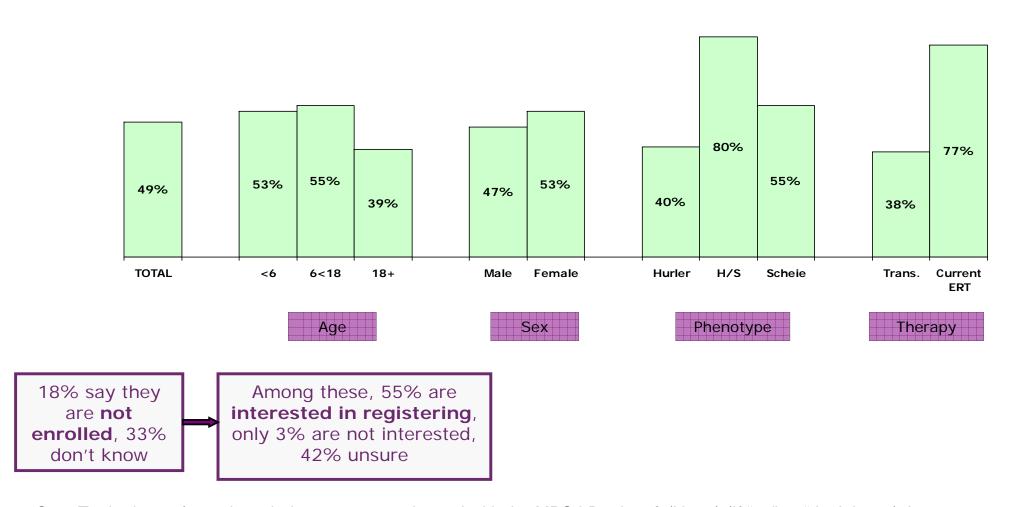
Familiarity with MPS I Registry



Q39. How familiar are you with the **MPS I Registry**, a clinical database of confidential patient care information that helps physicians monitor a patient's progress, determine which treatments lead to better patient outcomes, and provides a global resource for MPS I treatment advancement? (N=59)

1/2 of MPS I pts say they are enrolled in the Registry; among those not enrolled (or not sure) about 1/2 express interest in registering

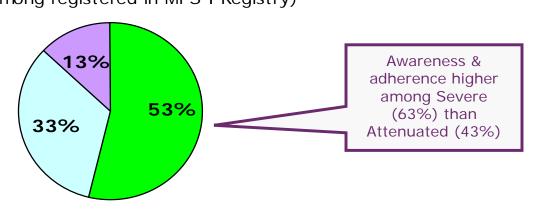
Patients Reporting They are Enrolled in the MPS I Registry



Q40. To the best of your knowledge, are you registered with the MPS I Registry? (N=61) (If "no" or "don't know) Are you interested in registering with the MPS I Registry? (N=31)

Just ½ of MPS I pts enrolled in the Registry adhere to the monitoring schedule; many say they don't receive the schedule



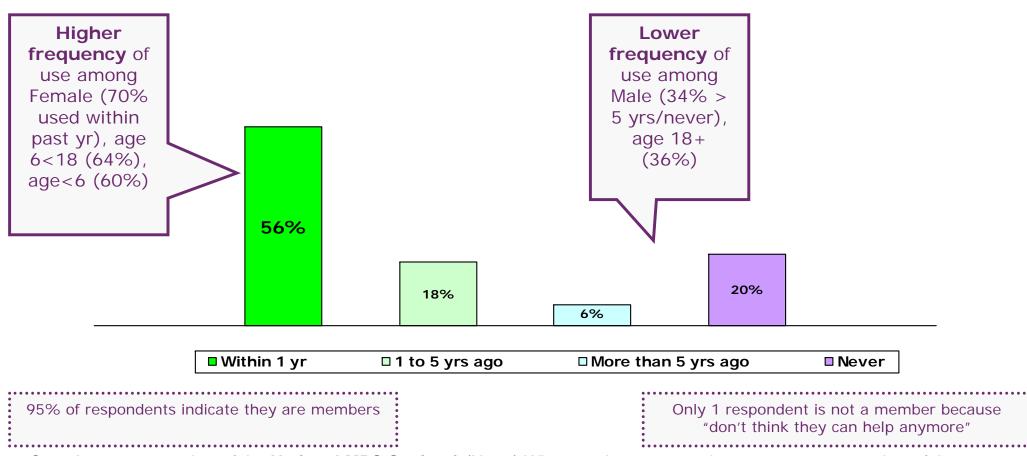


- Aware, and adhere to schedule
- ☐ Aware, but don't receive/don't know of schedule
- Not aware

Q41. The MPS I Registry's recommends a "Minimum Schedule of Assessments for Monitoring Patients with MPS I", that is, periodic exams to monitor your health on a variety of symptoms. What is your level of awareness/use of these symptoms health assessments? (N=30)

Slightly more than ½ of members have used MPS Society services within the past year; usage appears less frequent among Attenuated and adult patients

When Last Used Services of National MPS Society



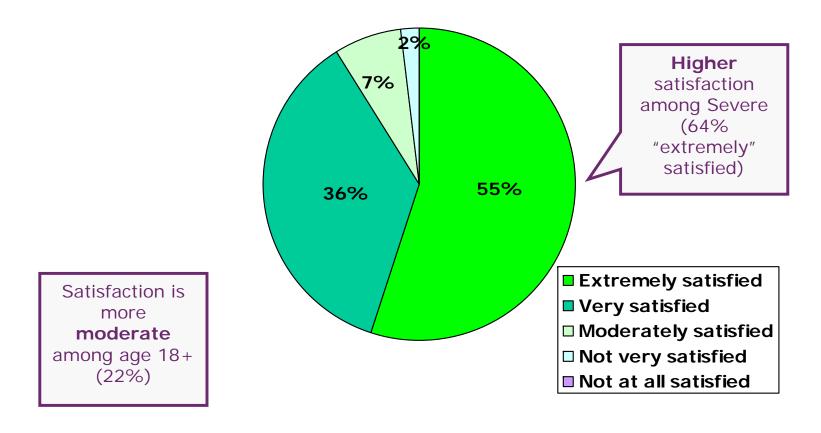
Q45. Are you a member of the **National MPS Society**? (N=61) What are the reasons why you are **not** a member of the National MPS Society? (N=2) Q47. When, if ever, did you last use the services of the National MPS Society? (N=55)

Members most often think of the Society's conferences, information resources, and family & physician referrals

Services Received from the National MPS Volunteered (multiple response accepted)	Society
Conferences/seminars/scholarship to/conference assistance	31%
Information/educational material/booklets/handbook/	
Courage Magazine/newsletter	21%
Information about disease	11%
Website resources	8%
Information on ERT	2%
Information package for our pediatrician/doctor	2%
Mailings (unspecified)	2%
Updates (unspecified)	2%
Support/contact information/advice	8%
Family references/family contacts/info on friends	5%
Referral to BMT	2%
Financial help with membership	3%
Fundraising	3%
Many/all that is needed (unspecified)	7%
No comment	33%

90% of active members are extremely/very satisfied with National MPS Society services

Satisfaction with National MPS Society



Q49. What is your overall satisfaction with the services provided by the National MPS Society? (N=42 pts who have used society services)

There were few recommendations for improvements in Society services; most comments focus on updated info

How can the National MPS Society Better Serve? Volunteered (multiple response accepted)	
Happy with MPS Society/ is wonderful/do a fantastic job/keep us informed well	10%
Updated information	
Keep website updated/more often	3%
Keep mailings updated	2%
Keep us updated on outcome of treatments/patient updates/how are they now?	2%
More transplant information/less ERT	2%
Parent/Child/Family	
Parent forum online/connect with other parents/families	2%
Better family support	2%
More resources for children	2%
Other	
Conference assistance	2%
List of doctors/familiar with MPS/by state	2%
Don't know, no comment	49%

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Patients' assessment of their health

- □ A large majority of MPS I patients give positive assessments to their overall physical and emotional health
 □ Highest ratings are on quality of life, with 2/3 rating it "excellent" or "very good"
 □ A significant minority of patients give negative ratings on physical symptoms, especially musculoskeletal (59% fair/poor) and vision (46%)
 - The most problems on these measures are reported for Severe patients, patients age 6<18, and Attenuated patients

Patient satisfaction with transplantation

Many transplantation recipients say they experienced complications (72%) and repeat procedures (22%)
However, most patients report high satisfaction with their transplantation, with many saying it "far exceeded" their expectations
Fully 84% of transplantation recipients say transplantation provided "a lot" of improvement to their quality of life
Majorities of transplantation recipients report "a lot" of improvement on respiratory and gastrointestinal symptoms, and most report at least "some" improvement on other symptoms
The lowest improvement scores are on vision and musculoskeletal where 26% and 22% report little/no improvement
The younger that patients receive a transplantation the better their reported outcome on musculoskeletal issues

Patient satisfaction with Enzyme Replacement Therapy

- □ Enzyme Replacement Therapy satisfaction varies widely; it has met or exceeded expectations for 46% of patients, fallen short for 38%
 - The most satisfaction is among Severe patients, age < 6 and former ERT patients (i.e., those who took ERT in combination with transplantation), suggesting that early treatment leads to the best outcomes
 - The most dissatisfaction is among Attenuated patients, females, and age 6<18
- □ The most improvement from Enzyme Replacement Therapy is reported on quality of life, abdominal, respiratory & cardiac parameters; least improvement reported on mental development & vision
 - The longer that patients receive Enzyme Replacement Therapy, the better their reported outcomes, especially dealing respiratory symptoms, plus musculoskeletal and vision

Compliance, Convenience

- □ Compliance is near total, and most patients say it is very important not to miss any infusions
- ☐ There is general satisfaction with administration of Enzyme Replacement Therapy
 - Very high satisfaction with home care nurses
 - However, 1 in 3 respondents report dissatisfaction with infusion time and overall time commitment (there is less dissatisfaction voiced regarding frequency of infusion)
- □ Fully 41% of current Enzyme Replacement Therapy patients report they receive home infusion; all the rest are at least somewhat interested including 23% "extremely interested" in adopting home infusion

Support, Information Needs

Nine out of 10 active members say they are extremely/very satisfied with the National MPS Society
Patients express very positive attitudes toward Genzyme
 Appreciation focuses on the responsiveness of Genzyme support ("excellent customer service")
 Also on the comprehensiveness/relevance of disease/treatment information ("very informative")
The top request for more information regards "what to expect" of treatment
 Patients welcome detailed, statistical information, "statistics regarding children with disease," "Collect/share data/detailed reports/database on patient outcomes/after," "What needs to be done after treatment/tests run/how often to see doctor"
The MPS I Registry can be deployed more to help treat & inform patients
• $\frac{1}{2}$ of patients say they are registered with the Registry, and of these, about $\frac{1}{2}$ are aware and adhere to the minimum schedule of patient monitoring

