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An Analysis and Decision Tool to Measure Cost Benefit Of Newborn Screening for Severe Combined Immune Deficiency (SCID) And Related T-Cell Lymphopenia

A Study by the Jeffrey Modell Foundation

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Objectives of the Study

1. This study develops a working algorithm or **"decision tree"** that is validated by peer reviewed scientific literature, and harmonized for application to be used by Public Health Departments and Health Ministries in states, countries, and regions throughout the world.

2. Local or regional data can be applied to measure the threshold and economic impact of implementing or not implementing Newborn Screening for SCID.

3. This decision tree will provide the appropriate agency with a usable tool and understandable formula that will assist in deciding upon the willingness to pay for additional years of life utilizing criteria and costs specifically relevant to the locality.

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10 Important Facts to Know

1. Infants born with Severe Combined Immune Deficiency (SCID), as well as related conditions with T-cell Lymphopenia, suffer from serious, life-threatening infections, and will likely not survive their first year of life without specific therapy to protect them from infections and restore their immune function[1-3].
2. SCID and related conditions can be detected by a simple screening test (TREC Assay) using the same dried blood spot samples already collected from newborns to screen for other genetic disorders[1,2].
3. The TREC Assay provides earliest possible identification before irreversible organ damage or death. Infants receiving hematopoietic stem cell transplantation in the first few months of life, after being identified through screening, have a high probability of survival, and will have the chance to grow up and live a healthy life[1,3-8].
4. While additional laboratory methods are being developed, the current TREC Assay has proven to have outstanding specificity and sensitivity to accurately identify all infants affected with SCID (the primary targets) as well as additional infants with other T-cell Lymphopenia (secondary targets)[1,2].
5. The screening test is 100% sensitive[9]. There has not been a single missed case of SCID since the program began 5 years ago[9].
6. The U.S. Secretary of Health and Human Services has recommended that ALL newborns be screened for SCID and T-cell Lymphopenia, characterizing SCID screening using the TREC Assay as "The National Standard for Newborn Screening Programs"[10,11].
7. There are established, dedicated, and specialized treatment centers for affected patients to receive care[12].
8. The cost of the screen is $4-5 per infant. This includes equipment usage, labor and reagents[13]. More than 2.5 million babies have already been screened[2,8]. The actual incidence of SCID was found to be approximately 1:66,000 and T-cell Lymphopenia 1:20,000. The average was approximately 1:33,000[14].
9. There is a 95-100% success rate of survivorship for babies transplanted in the first three months of life[4-6]. However, the survival rate sharply declines with time[11]. SCID is fatal in infancy if not treated, and as more serious infections develop, it is more difficult to successfully transplant[3-8,15].
10. Preeminent physicians from 78 countries were brought together by the Jeffrey Modell Foundation for a three day Global Summit in Berlin, Germany. These expert physicians represent the world's leadership and are authorities in the diagnosis, treatment and management of Primary Immunodeficiencies. At the conclusion of the Symposium, the physicians signed the **"Berlin Declaration"** calling for the immediate implementation of TRECs screening in order to identify, treat and cure newborn babies born with SCID and related T-cell Lymphopenia (see Appendix 1: **"Berlin Declaration"**).

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Economic Analysis

The decision to implement Newborn Screening for SCID and related T-cell Lymphopenia will depend on the cost and effectiveness of the screening test, the incidence of SCID and related T-cell Lymphopenia within a population, the cost ratio of the intervention, and the benefit of earliest possible treatment[13,16]. If we make an assumption that the number of births within a region is 100,000 per year, and the incidence of SCID or related T-cell Lymphopenia is approximately 1:33,000 newborns, this decision tree projects 3 cases per year (See Figure 1).

The cost to screen 100,000 newborns, at $4.25 per patient, totals $425,000[13]. The cost to transplant one newborn is $120,000[17,18]. The cost of post-transplant care over the next five years may be as much as $200,000 for one newborn. Therefore, the cost to screen 100,000 newborns and treatment of one patient would be approximately $745,000. The cost to screen 100,000 newborns and treat three patients totals $1,385,000.

If newborns are not screened at birth, they will sustain overwhelming infections and hospitalizations, averaging costs estimated to be at least $2 million in the first year of life[19,20]. Given the incidence and population, the total costs of care for the predicted three affected newborns will amount to $6 million in healthcare costs[19,20].

In a previous analysis, Chan et al found that the incremental cost-effective ratio (ICER) was $27,907 per Quality of Adjusted Life Year (QALY), given 70 years of life saved[13]. This ratio is highly favorable, and also compares closely with other metabolic diseases currently screened[13]. Additionally, this analysis stated that assuming society is willing to pay $50,000 per QALY, preference for screening occurred if incidence of SCID was at least 1:250,000[13].

In 2011, three U.S. Federal Agencies estimated the value of one life saved to be $7.7 million[21]. This estimate is an average provided by the Environmental Protection Agency ($9.1 million), Food and Drug Administration ($7.9 million), and the Transportation Department ($6.1 million)[21]. Given this economic information, a newborn baby with SCID or T Cell Lymphopenia that is screened and treated in the first 3.5 months of life, generates a contribution to society that is **at least 15 times greater** than the cost of screening and curative treatment.

The TREC assay is inexpensive, highly sensitive, and has been effectively integrated into public health programs (e.g. Wisconsin, California, New York, Ontario, etc.)[2,14,22]. SCID is a fatal disease that causes accrual of exorbitant healthcare costs in just one year of life[19,20]. The cost of care for just one infant with SCID could be more than the cost of screening for an entire regional population[20]. Implementation of screening through the TREC Assay will provide the earliest possible identification and allow for intervention of early transplantation before infants suffer from severe infections, organ damage, and ultimately death[1]. Newborn screening for SCID and related T-cell Lymphopenia is cost-effective, and most importantly, it is life-saving and allows children with SCID the opportunity to live a healthy life.

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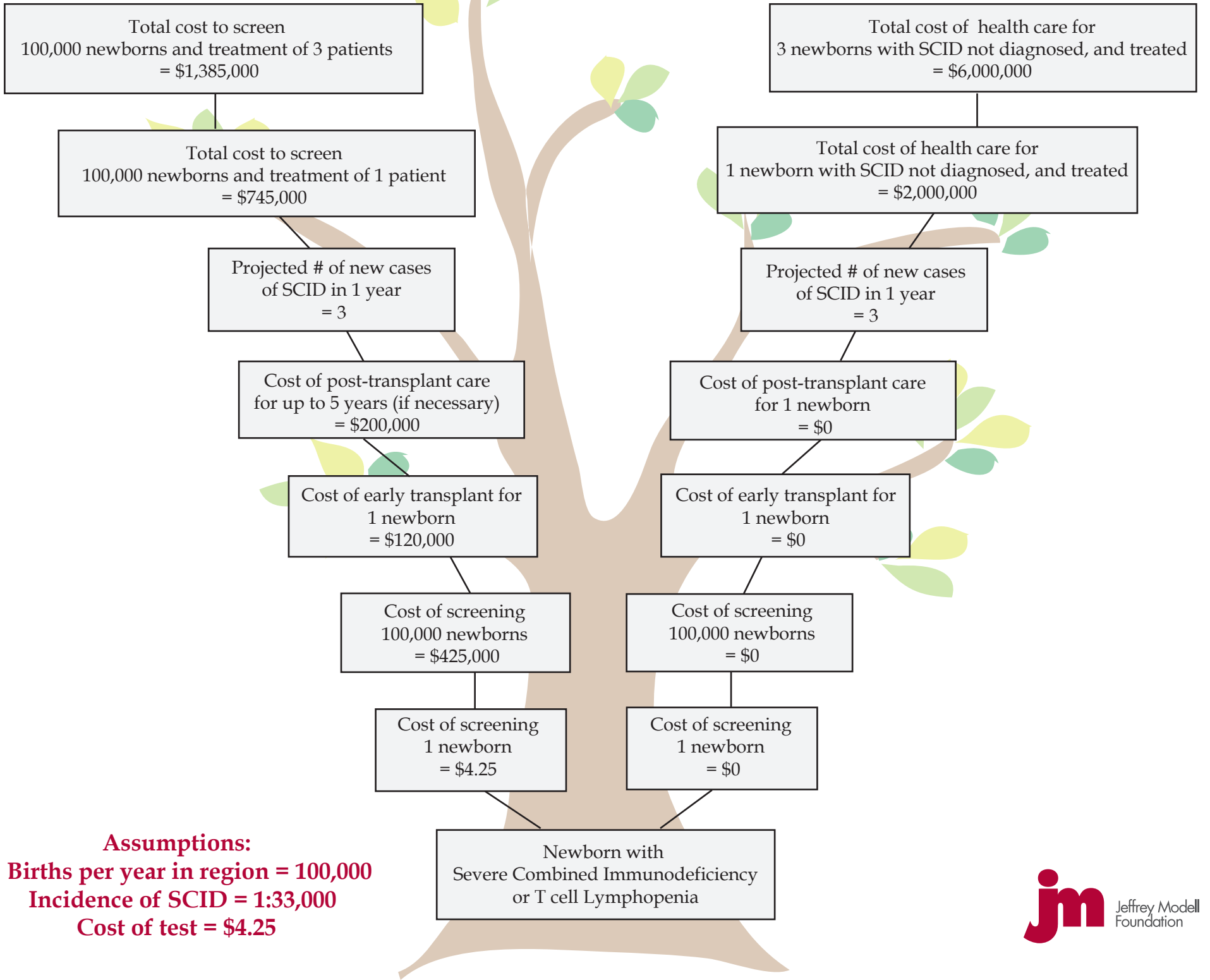
FIGURE 1:

DECISION TREE TO CONSIDER NEWBORN SCREENING FOR SEVERE COMBINED IMMUNODEFICIENCYAND RELATED T CELL LYMPHOPENIA



Assumptions:
 # Births per year in region = 100,000
Incidence of SCID = 1:33,000
Cost of test = $4.25

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The Berlin Declaration

Jeffrey Modell Centers Summit – July 17 – 20, 2013

Immunologists from all Jeffrey Modell Diagnostic and Research Centers were brought together by the Jeffrey Modell Foundation for a three day Global Summit in Berlin, Germany. The physician-experts represent the world's leadership and are authorities in the diagnosis, treatment and management of Primary Immunodeficiencies. At the conclusion of the Symposium, the physicians agreed to the following guiding principles:

Whereas infants born with Severe Combined Immune Deficiency (SCID) as well as related T cell Lymphopenia, suffer from serious, life threatening infections, and will likely not survive their first year of life without curative stem cell transplantation;

Whereas the condition can be detected by a simple screen using the same Guthrie dried blood spot samples already collected from newborns.

Whereas the TREC Assay will provide earliest possible identification before irreversible organ damage or death, and will allow children the chance to grow up and lead a normal life;

Whereas additional laboratory methods are still being developed, but, the current method of screening using the TREC Assay has the specificity and sensitivity to accurately identify affected newborns, with better than 99% accuracy;

Whereas the U.S. Secretary of Health and Human Services recommended that ALL newborns be screened for SCID and related T cell Lymphopenia, characterizing SCID screening using the TREC Assay as "The National Standard for Newborn Screening Programs";

Whereas there are established, dedicated, and specialized treatment centers for affected patients to be managed and receive care;

Whereas the cost of the screen is $4-5 per infant, and more than 2.5 million babies have already been screened. To date, the incidence of this condition has ranged from 1:35,000 to 1:60,000 of all newborns;

Resolved by the undersigned, calling for the immediate implementation of TRECs screening in order to identify, treat and cure newborn babies born with SCID and related T cell Lymphopenia;

Resolved by the undersigned, calling for continuing encouragement and support of physician education and public awareness relating to all 200 Primary Immunodeficiency disorders. This program has generated a 70% increase in identified patients worldwide over the past 18 months, and includes activities in connection with World Primary Immunodeficiency Week (WPIW) that takes place annually throughout the world during the last week in April.

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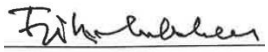
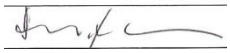
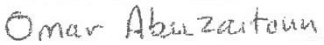
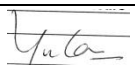
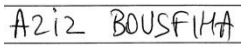
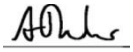
 Fritz Melchers, MD Berlin, Germany **Max Planck- Institute for Infection Biology**	 Jennifer Puck, MD San Francisco, California, USA **University of California, San Francisco**	 Alain Fischer, MD Paris, France **Hopital Necker – Enfants Malades**
 Chaim Roifman, MD Toronto, Canada **Hospital Sick Kids**	 Lennart Hammarstrom, MD Stockholm, Sweden **Karolinska Institute**	 Jordan Orange, MD Houston, Texas, USA **Texas Children's Hospital**
 Omar Abuzaitoun, MD Nablus, Palestine **Nablus Specialty Hospital**	 David Rawlings, MD Seattle, Washington, USA **Seattle Children's Hospital**	 Yu Lung Lau, MD Hong Kong, China **University of Hong Kong**
 Bodo Grimbacher, MD Freiburg, Germany **University Hospital Freiburg**	 Aziz Bousfiha, MD Casablanca, Morocco **Casablanca Children's Hospital**	 Adrian Thrasher, MD London, United Kingdom **Great Ormond Street Hospital**
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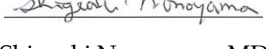
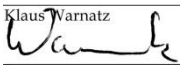
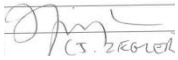
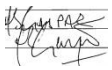
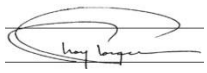
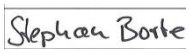
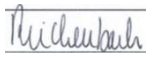
 Shigeaki Nonoyama, MD Saitama, Japan **National Defense Medical College**	 Joris van Montfrans, MD Utrecht, Netherlands **University Medical Center**	 Antonio Condino - Neto, MD Sao Paulo, Brazil **University Sao Paulo**
 Klaus Warnatz, MD Freiburg, Germany **University Medical Center**	 Ridha Barbouche, MD Tunis, Tunisia **Institut Pasteur de Tunis**	 John Ziegler, MD Sydney, Australia **Sydney Children's Hospital**
 Bobby Gaspar, MD London, United Kingsom **Great Ormond Street Hospital**	 Christoph Klein, MD Munich, Germany **Dr. von Haunersches Children's Hospital**	 Troy Torgerson, MD Seattle, Washington, USA **Seattle Children's Hospital**
 Stephan Borte, MD Leipzig, Germany **Municipal Hospital St. Georg**	 Talal Chatila, MD Boston, Massachusetts, USA **Children's Hospital Boston**	 Isil Barlan, MD Istanbul, Turkey **Marmara University**
 Fred Lorey, MD Pleasant Hill, California **California Department of Public Health**	 Janine Reichenbach, MD Zurich, Switzerland **University Children's Hospital**	 Ricardo Sorensen, MD New Orleans, Lousiana, USA **LSU Children's Hospital**

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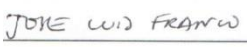
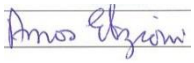
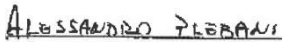
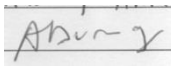
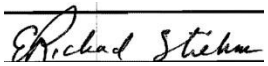
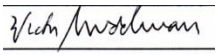
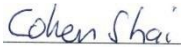
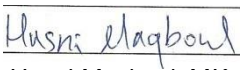
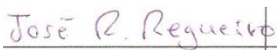
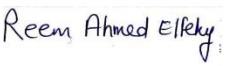
 Jose Luis Franco, MD Medellin, Colombia **University of Antioquia**	 Amos Etzioni, MD Haifa, Israel **Meyer Children's Hospital**	 Alessandro Plebani, MD Brescia, Italy **University of Brescia**
 Maite de la Morena, MD Dallas, Texas, USA **UT Southwestern Medical Center**	 Anne Durandy, MD Paris, France **Hôpital Necker-Enfants Malades**	 Darko Richter, MD Zagreb, Croatia **University Hospital Center**
 Ewa Bernatowska, MD Warsaw, Poland **Children's Memorial Health Institute**	 Richard Stiehm, MD Los Angeles, California, USA **Mattel Children's Hospital**	 Tadej Avcin, MD Ljubljana, Slovenia **University Children's Hospital**
 Victor Nudelman, MD Sao Paulo, Brazil **Hospital Israelita Albert Einstein**	 Shai Cohen, MD Alon Hagalil, Israel **Carmel Medical Center**	 Volker Wahn, MD Berlin, Germany **University Hospital Charite**
 Husni Maqboul, MD Nablus, Palestine **An-Najah National University**	 José Reueiro, MD Madrid, Spain **University Compultense**	 Reem El-Feky, MD Cairo, Egypt **Ain Shams University**
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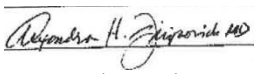
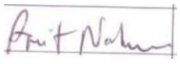
 Lisa Filipovich, MD Cincinnati, Ohio, USA **Cincinnati Children's Hospital**	 Reinhold Schmidt, MD Hannover, Germany **Clinic for Immunology & Rheumatology**	 Amit Nahum, MD Rehovot, Israel **Kaplan Medical Center**
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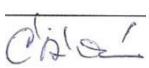
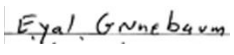
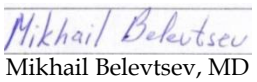
 Peter Ciznar, MD Bratislava, Slovakia **Children University Hospital**	 Zeina Baz, MD Beirut, Lebanon **St. George University Hospital**	 Leigh Ann Kerns, MD Cleveland, Ohio, USA **Rainbow Babies and Children's Hospital**
 Ken Paris, MD New Orleans, Lousiana, USA **LSU Children's Hospital**	 Eyal Grunebaum, MD Toronto, Canada **Hospital for Sick Children**	 Mikhail Belevtsev, MD Minsk, Belarus **Belarusian Research Center for Pediatrics**

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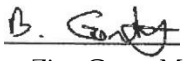
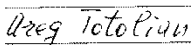
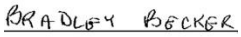
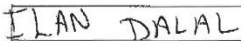
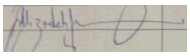
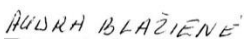
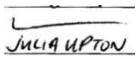
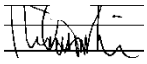
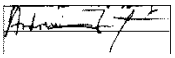
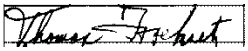
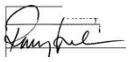
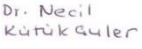
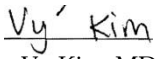
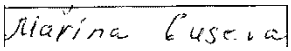
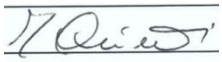
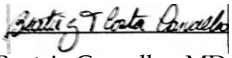
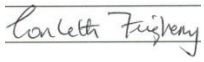
 Ozden Sanal, MD Ankara, Turkey **Hacettepe Children's Hospital**	 Alessandro Aiuti, MD Milan, Italy **San Raffaele Telethon Institute for Gene Therapy**	 Ben-Zion Garty, MD Petah-Tikva, Israel **Schneider Children's Medical Center**
 Areg Totolian, MD St. Petersburg, Russia **St. Petersburg Pasteur Institute**	 Manuel Grez, MD Frankfurt, Germany **Georg-Speyer-Haus**	 Bradley Becker, MD St. Louis, Missouri, USA **Cardinal Glennon Children's Medical Center**
 Ilan Dalal, MD Holon, Israel **Edith Wolfson Medical Center**	 Liudmila Sizyakina, MD Rostov-on-Don, Russia **Rostov Medical University**	 Michael Borte, MD Leipzig, Germany **Municipal Hospital St. Georg**
 Reza Alizadehfar, MD Montreal, Canada **Montreal Children's Hospital**	 Audra Blaziene, MD Vilnius, Lithuania **Vilnius University Hospital**	 Julia Upton, MD Toronto, Canada **Hospital for Sick Children**
 Katie Convers, MD St. Louis, Missouri, USA **Cardinal Glennon Children's Medical Center**	 Anders Fasth, MD Gothenburg, Sweden **Queen Silvia Children's Hospital**	 Andrew Issekutz, MD Halifax, Canada **Dalhousie University**
 Thomas Issekutz, MD Halifax, Canada **Dalhousie University**	 Ramsay Fuleihan, MD Chicago, Illinois, USA **Lurie Children's Hospital**	 Necil Kutukculer, MD Izmir, Turkey **Ege University**
 John Sleasman, MD St. Petersburg, Florida, USA **All Children's Hospital**	 Vy Kim, MD Toronto, Canada **Hospital for Sick Children**	 Marina Guseva, MD St. Petersburg, Russia **St. Petersburg Pasteur Institute**
 Francisco Bonilla, MD Boston, Massachusetts, USA **Children's Hospital Boston**	 Andrew Cant, MD Newcastle upon Tyne, United Kingdom **Great North Children's Hospital**	 B. Wainstein, MD Sydney, Australia **Sydney Children's Hospital**
 Isabella Quinti, MD Rome, Italy **La Sapienza University of Rome**	 Beatriz Carvalho, MD Sao Paulo, Brazil **University of Sao Paulo**	 Igor Resnick, MD Jerusalem, Israel **Hadassah-Hebrew University Medical Center**
 Conleth Feighery, MD Dublin, Ireland **St. James' Hospital**	 Eleonora Gambineri, MD Florence, Italy **Anna Meyer Children's Hospital**	 S. Chanafieva, MD Rostov-on-Don, Russia **Rostov Medical University**

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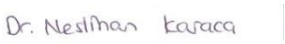
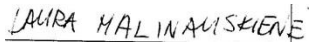
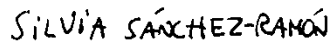
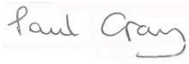
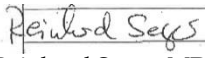
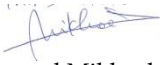
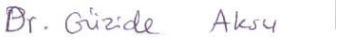
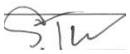
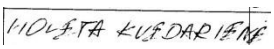
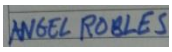
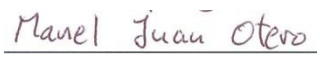
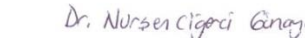
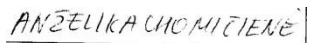
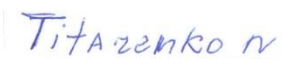
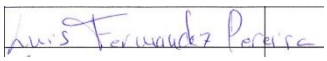
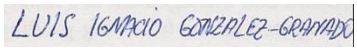
 Neslihan Kasaca, MD Izmir, Turkey **Ege University**	 Laura Malinauskiene, MD Vilnius, Lithuania **Vilnius University Hospital**	 E. Chigaera, MD Rostov-on-Don, Russia **Rostov Medical University**
 Silvia Sanchez-Ramon, MD Madrid, Spain	 Anna Savisko, MD Rostov-on-Don, Russia **Rostov Medical University**	 Paul Cray, MD Sydney, Australia **Sydney Children's Hospital**
 Reinhard Seger, MD Zurich, Switzerland **University Children's Hospital**	 Raymond Mikhael, MD Beirut, Lebanon **Hotel-Dieu de France Hospital**	 Guzide Aksu, MD Izmir, Turkey **Ege University**
 Alejandra King, MD Santiago, Chile **Hospital Luis Calvo Mackenna**	 U. Chasanov, MD Rostov-on-Don, Russia **Rostov Medical University**	 Sara M. Calleta Antolin, MD Leon, Spain
 Stuart Turvey, MD Vancouver, Canada **University of British Colombia**	 Esia Zopnok Knie, MD Izmir, Turkey **Ege University**	 Violeta Kufdariene, MD Vilnius, Lithuania **Vilnius University Hospital**
 L. Chelova, MD Rostov-on-Don, Russia **Rostov Medical University**	 Elena Roman Ortiz, MD Valencia, Spain	 Laia Alsina, MD Barcelona, Spain
 Angel Robles, MD Madrid, Spain **La Paz Hospital**	 Jose Antonio Garcia Teujllo, MD Caceres, Spain	 M. Belskich, MD Rostov-on-Don, Russia **Rostov Medical University**
 Manel Juan Otero, MD Barcelona, Spain	 Nursen Cigerci Ginaydn, MD Izmir, Turkey **Ege University**	 E. Antonera, MD Rostov-on-Don, Russia **Rostov Medical University**
 Jose Carlos Rodriguez Gallego, MD Canary Islands, Spain	 Janet Chou, MD Boston, Massachusetts, USA **Children's Hospital Boston**	 Anjelika Chomitiene, MD Vilnius, Lithuania **Vilnius University Hospital**
 N. Titazenko, MD Rostov-on-Don, Russia **Rostov Medical University**	 Luis Fernandez Pereira, MD Caceres, Spain	 Luis Ignacio Gonzalez-Granado, MD Madrid, Spain

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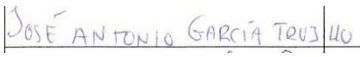
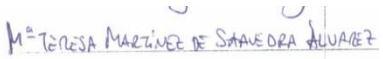
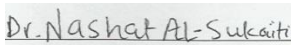
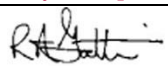
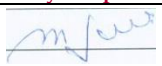
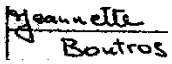
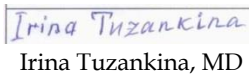
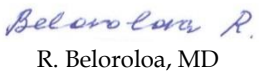
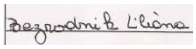
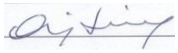
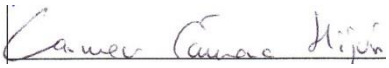
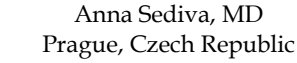
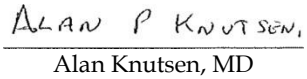
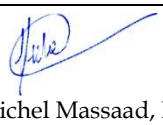
 Hans Ochs, MD Seattle, Washington, USA **Seattle Children's Hospital**	 Jose Antonio Garcia Teujho, MD Caceres, Spain	 Jose G. Ruiz de Morales, MD Leon, Spain
 Teresa Martinez, MD Canary Islands, Spain	 Anna Shcherbina, MD Moscow, Russia **Federal Research Center**	 Nashat Al-Sukaiti, MD Muscat, Oman **Royal Hospital**
 M. Shagenova, MD Rostov-on-Don, Russia **Rostov Medical University**	 Mehdi Mohammad Adeli, MD Doha, Qatar **Hamad General Hospital**	 Richard Gatti, MD Los Angeles, California, USA **UCLA School of Medicine**
 Haifa Jabara, MD Boston, Massachusetts, USA **Children's Hospital Boston**	 Isabelle Meyts, MD Leuven, Belgium **University Hospital Leuven**	 Jodri Tague Ribes, MD Barcelona, Spain
 Martin van Hagen, MD Rotterdam, Netherlands **Erasmus Medical Center**	 Margit Serban, MD Timisoara, Romania **Children's Hospital "Louis Turcanu"**	 Jeanette Boutros, MD Cairo, Egypt **Cairo University Immunology Clinic**
 Irina Tuzankina, MD Yekaterinburg, Russia **Russian Academy of Sciences**	 R. Beloroloa, MD Rostov-on-Don, Russia **Rostov Medical University**	 Liliana Bezrodnik, MD Buenos Aires, Argentina **Children's Hospital Ricardo Gutierrez**
 Horst von Bernuth, MD Berlin, Germany **University Hospital Charite**	 Brigita Sitkauskiene, MD Kaunas, Lithuania **Lithuanian University of Health Sciences**	 Asghar Aghamohammadi, MD Tehran, Iran **Children's Medical Center Hospital**
 Aydan Ikinciogullari, MD Ankara, Turkey **Ankara University School of Medicine**	 Carmen Carnera Hijun, MD Caceres, Spain	 Anna Sediva, MD Prague, Czech Republic **Motol University Hospital**
 Tim Niehues, MD Krefeld, Germany **Helios Klinikum Krefeld**	 Magda Carneiro-Sampaio, MD Sao Paulo, Brazil **University Sao Paulo**	 Roshini Abraham, MD Rochester, Minnesota, USA **Mayo Clinic**
 Alan Knutsen, MD St. Louis, Missouri, USA **Cardinal Glennon Children's Medical Center**	 Rachida Boukari, MD Blida, Algeria **University Saad Dahlab**	 Michel Massaad, MD Boston, Massachusetts, USA **Children's Hospital Boston**

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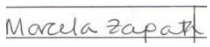
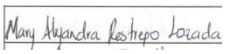
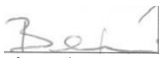
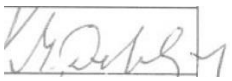
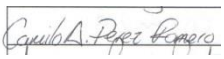
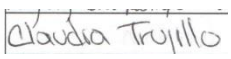
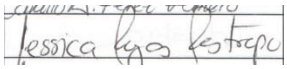
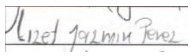
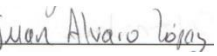
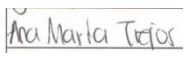
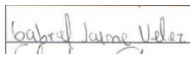
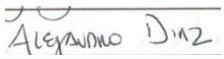
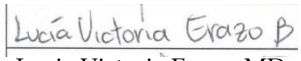
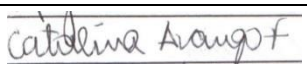
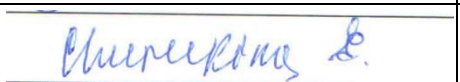
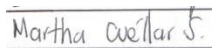
 Dalia El-Ghoneimy, MD Cairo, Egypt **Ain Shams University**	 Marcela Zapata, MD Medellin, Colombia **University of Antioquia**	 Rostov-on-Don, Russia **Rostov Medical University**
 R. Beloroloa, MD Rostov-on-Don, Russia **Rostov Medical University**	 Mary Alejandra Restrepo Lozada, MD Medellin, Colombia **University of Antioquia**	 Stefan Blazina, MD Ljubljana, Slovenia **University Children's Hospital**
 Ljubljana, Slovenia **University Children's Hospital**	 Camilo A. Perez Romero, MD Medellin, Colombia **University of Antioquia**	 Bembeera, MD Rostov-on-Don, Russia **Rostov Medical University**
 Claudia Trujillo, MD Medellin, Colombia **University of Antioquia**	 Rostov-on-Don, Russia **Rostov Medical University**	 Jessica Reyes Restrepo, MD Medellin, Colombia **University of Antioquia**
 Anja Koren Jeverica, MD Ljubljana, Slovenia **University Children's Hospital**	 Lizet Jazmin Perez, MD Medellin, Colombia **University of Antioquia**	 Juan Alvaro Lopez, MD Medellin, Colombia **University of Antioquia**
 Ana Maria Trejos, MD Medellin, Colombia **University of Antioquia**	 A. Debedenko, MD Rostov-on-Don, Russia **Rostov Medical University**	 Babral Jaime Velez, MD Medellin, Colombia **University of Antioquia**
 Sebastian Gutierrez, MD Medellin, Colombia **University of Antioquia**	 Catalina Martinez, MD Medellin, Colombia **University of Antioquia**	 Meta Accetto, MD Ljubljana, Slovenia **University Children's Hospital**
 Y. Yaydomaka, MD Rostov-on-Don, Russia **Rostov Medical University**	 Alejandro Diaz, MD Medellin, Colombia **University of Antioquia**	 Lucia Victoria Erazo, MD Medellin, Colombia **University of Antioquia**
 Tina Vesel, MD Ljubljana, Slovenia **University Children's Hospital**	 Carolyn Alvarez, MD Medellin, Colombia **University of Antioquia**	 Rostov-on-Don, Russia **Rostov Medical University**
 Catalina Arangof, MD Medellin, Colombia **University of Antioquia**	 Rostov-on-Don, Russia **Rostov Medical University**	 Carolyn Alvarez, MD Medellin, Colombia **University of Antioquia**
 Clara V. Jimenez, MD Medellin, Colombia **University of Antioquia**	 Vesna Glavnik, MD Ljubljana, Slovenia **University Children's Hospital**	 Martha Weller S., MD Medellin, Colombia **University of Antioquia**

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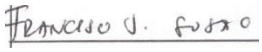
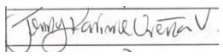
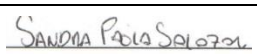
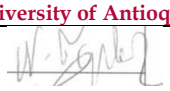
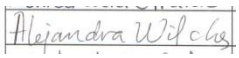
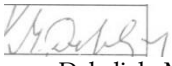
 Gasper Marxels, MD Ljubljana, Slovenia **University Children's Hospital**	 Francisco J. Sosxo, MD Medellin, Colombia **University of Antioquia**	 Rostov-on-Don, Russia **Rostov Medical University**
 Jenny K. Urena, MD Medellin, Colombia **University of Antioquia**	 Yermis Rochon Ametar, MD Medellin, Colombia **University of Antioquia**	 Diana Arocha Hoyoi, MD Medellin, Colombia **University of Antioquia**
 Sandra Paola Solozor, MD Medellin, Colombia **University of Antioquia**	 Nataja Toblave, MD Ljubljana, Slovenia **University Children's Hospital**	 Monica Lucia Giraldo, MD Medellin, Colombia **University of Antioquia**
 Alejandra Wilches, MD Medellin, Colombia **University of Antioquia**	 Angela Maria Castaneda, MD Medellin, Colombia **University of Antioquia**	 Janez Lazbec, MD Ljubljana, Slovenia **University Children's Hospital**
 Marusa Debeljak, MD Ljubljana, Slovenia **University Children's Hospital**		

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