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**Shifting Concerns of Public Health in Post-Second World War Hungary:  
From Contagious Diseases to Congenital Disorders**

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## Abstract

In the 1950s the most important epidemiological problem was the threat that contagious diseases represented for the population therefore the aim of healthcare professionals was to significantly reduce the morbidity and mortality rates resulting from these diseases. With the introduction of vaccinations, these previously lethal diseases ceased to represent any serious public health issue for the majority of Hungarians and this was visible in the statistical data. As the genetic turn reached Hungary in the 1960s clinicians recognized that new methods of genetics can be used to understand the causes of mortality and morbidity rates resulting from reproduction. Because accompanying the success of curbing contagious diseases health statistics have shown an increase in congenital disorders and thus the focus shifted towards finding ways to develop these healthcare results. Thus, reproduction became a central concern in the 1960s and 1970s for clinicians. This paper will map out the shift that took place during this period to show that eugenic thinking was present in these public health discussions, and were – to some extent – uncritically integrated into the medical genetic discussions regarding reproduction<sup>1</sup>.

**Keywords:** public health, medical genetics, reproduction, eugenics

## Eugenic Concerns After the 1950s

It is debated in the literature whether eugenics is still a relevant discourse shaping medical decision making since the 1950s<sup>2</sup>. Scholars, such as Nikolas Rose for example, argue that the contemporary medical practice is radically different from the eugenic discourses of the past. He claims that ‘optimization’ is the key concern in this medical paradigm<sup>3</sup>. He suggests that the contemporary focus on susceptibility is an extension of two modes of thought: (1) predisposition and (2) risk. Both have a long history dating back to the 18th and 19th centuries as Michel Foucault had explored<sup>4</sup>. Predisposition was understood as an inherited flaw that would manifest itself in illness or pathology. In the 19th century

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<sup>2</sup> Bashford, “Epilogue: Where Did Eugenics Go?”

<sup>3</sup> Rose, *The Politics of Life Itself*.

<sup>4</sup> Foucault, *The Birth of Biopolitics: Lectures at the College de France, 1978-79*; Foucault, *The Birth of the Clinic: An Archeology of Medical Perception*.

all predispositions (social pathology and danger) were understood as degeneracy. It encompassed problems like: urban existence affecting the life quality of the working class and other city dwellers, for others it was about how migrants contribute negatively to the nation's health standards, or how pathologies (such as tuberculosis, venereal diseases, mental illnesses) affect the quality of the offspring. Others said that the issue is rather about how these 'degenerates' are kept alive by the welfare state, so that they can pass down to their offspring their deteriorated genetic structure, thus contributing to a downward spiral of general health standards. The concerns of the biotechnological discourse over susceptibility are thus connected to these older beliefs. But according to Rose there is an important transformation in this new perspective in contrast to the earlier concerns. This, accompanied by the results of epidemiological studies that explore various sectors of the population (divided by age, gender, race, class, weight, diet, family history etc.), suggest risk scales to assess an individual's susceptibility to develop a certain disease. This means that the present discourse looks at individuals as pre-symptomatically ill. And the direction of biotechnological work is in that of the optimization of the life chances of the individual. This makes it radically different from eugenic discourses. Other social critics such as Allen Buchanan<sup>5</sup>, Dan W. Brock<sup>6</sup>, or John Harris,<sup>7</sup> similarly to Rose, see much more the positive contribution of genetic research to our societies and they think it should not be conflated with the eugenics of the past.

Other scholars also acknowledge the radical change that occurred in the perception of eugenics after the Second World War. The pseudo-scientific practices of the Nazi geneticists caused a major turning point in the health policy and genetic research of the US<sup>8</sup> for example. The focus shifted towards genetic screening and counseling to control the reproductive decisions of the citizens. During this period, we can see that the molecular level starts to dominate the medical discourse. The critical analysis of the eugenic movements in the United States and in Western Europe started to take place much earlier than the analyses of these movements within the Eastern part of Europe. For example, Daniel J. Kevles, an American historian, provided rich analyses on the history of eugenics and gave insights into the eugenic policies of the United States that lasted well beyond the

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<sup>5</sup> Buchanan, *Beyond Humanity? The Ethics of Biomedical Enhancement*.

<sup>6</sup> Brock, *Life and Death: Philosophical Essays in Biomedical Ethics*.

<sup>7</sup> Harris, *Enhancing Evolution: The Ethical Case for Making People Better*.

<sup>8</sup> Larsen, "Biology and the Emergence of Anglo-American Eugenics Movement."

Second World War<sup>9</sup>. In Europe as well, eugenic policies were at work after the 1950s<sup>10</sup>. This paper will contribute to this strand of research, as it will map out the shift that took place during the post Second World War period to show that eugenic thinking was present in these public health discussions, and were – to some extent – uncritically integrated into the Hungarian medical genetic discussions regarding reproduction.

### Developing Public Health Institutions After the Second World War

There were two fields that Hungarian medical professionals emphasized as central for the elevation of health standards early in the 1950s: (1) mother and infant protection, and (2) institutional foundations of public health. Although Hungary had excellent, internationally acknowledged medical researchers and clinicians the country's general health statistics were among the last in Europe taking into account the country's data regarding tuberculosis death rates, infant mortality rates, or typhoid fever. István Simonovits<sup>11</sup> claimed that this situation fundamentally changed after the Second World War. He listed changes in various fields such as general healing and preventive medicine, where the system of general practitioners was changed in order to function better. The GP system radically changed between the years of 1950 and 1954 because they centralized the city, city district, village, and panel-doctor system. These changes made medical services much more accessible to everyone<sup>12</sup>. It is important to note that Simonovits said that the preventive approach, inherited from the interwar period, was compatible with the socialist values therefore the centralization of public healthcare were executed with the aim of making healthcare accessible to everyone. The difference in the socialist approach to prevention in comparison to the capitalist approach, according to Simonovits, was that it included environmental issues as well such as the workers' working and living conditions. The socialist preventive method entailed work that encompassed public health and epidemiology, mother and child protection, but in addition to these issues it sought to develop the working and living conditions of the working class. The reason for this lies in the ac-

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<sup>9</sup> Kevles, *In the Name of Eugenics: Genetics and the Uses of Human Heredity*; Kevles, "Controlling the Genetic Arsenal"; Kevles, "Eugenics and Human Rights"; Kevles, "Genetics in the United States and Great Britain, 1890-1930: A Review with Speculations."

<sup>10</sup> Weindling, *Health, Race, and German Politics between National Unification and Nazism, 1870-1945*; Roll-Hansen, "Conclusion: Scandinavian Eugenics in the International Context"; Tydén, "The Scandinavian States: Reformed Eugenics Applied."

<sup>11</sup> Simonovits, István (1907-1985), physician, hematologist, university professor, undersecretary, and a member of the Hungarian Academy of Sciences.

<sup>12</sup> Simonovits, "A Gyógyító-Megelőző Ellátás Fejlődésének Tíz Éve," 88-89.

knowledge that without improving these factors long lasting change in public health standards would not happen<sup>13</sup>.

Simonovits recalled that the first sign of state intention to centralize healthcare occurred in the nineteenth century. The 1876. XIV. statute first paragraph stated that “public health belongs to the sphere of state governmentality”<sup>14</sup>. So he said that although it is true that efforts to centralize healthcare started more than eighty years ago it was not completed for various reasons (the capitalist approach of the Dualist period, still different approach in the interwar period, the Second World War) but in the fifties stronger efforts were made to complete the process. For example epidemiological work strongly improved because, as Simonovits wrote, until the end of the Second World War there was only one institution that dealt with public health<sup>15</sup>. After the war the National Institution of Workhealth (OMI) was organized, but at the same time the National Food Safety Institute was also established (OÉTTI). In relation to epidemiology the most important development was the organization of KÖJÁL<sup>16</sup> across the country in 1954. This meant that a network of epidemiological stations was established in every county of the country (basically these stations were situated in county towns)<sup>17</sup>. These institutes were organized around issues such as contagious diseases, food bacteriology, parasitology, water chemistry, and work health issues<sup>18</sup>. It was an important legal change in that previously physicians had the power only to give recommendations, in the new, socialist structure they had the right to take measures and to penalize citizens or institutions<sup>19</sup>.

### Mother and Infant Protection

Mother and infant protection became one of the central medical priorities by the mid-1950s. In these debates on how to develop the institutional network that would help mothers and infants the role that the state and medical workers must play in protecting mothers and their infants was very much emphasized<sup>20</sup>. Two directions were outlined by Imre Lóránt that would contribute to better reproductive results. The first one was the

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<sup>13</sup> Simonovits, “Népi Demokráciánk Egészségpolitikája,” 308.

<sup>14</sup> Simonovits, 306.

<sup>15</sup> This was the OKI, National Institution of Public Health [Országos Közegészségügyi Intézet].

<sup>16</sup> Translates to Public Health and Epidemiological Station.

<sup>17</sup> Simonovits, “Népi Demokráciánk Egészségpolitikája,” 310.

<sup>18</sup> Vilmon, “Közegészségügyünk És Járványügyünk 10 Éves Fejlődése,” 113.

<sup>19</sup> This is an important change that affected Roma people throughout the Socialist period (see for example Bernáth and Polyák).

<sup>20</sup> Drexler, “Hajtsuk Végre Maradékalanul Az Anya- És Gyermekvédelmi Rendeletet!”

law that made abortion illegal<sup>21</sup>, it was understood as a crime that endangers the life of the mother and kills the fetus. In medical cases<sup>22</sup>, when the life of the mother was in danger, abortion remained a legal option. But every miscarriage and in-utero intervention was required by ministerial statute to be reported<sup>23</sup>. Another important direction was to reduce the infant mortality rates in the country. To achieve this goal, the state supported the establishment of infant-care facilities. In hospitals, divisions for prematurely born children were established to support the already existing child departments<sup>24</sup>. The state also wanted

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<sup>21</sup> Imre Ozsváth and Sándor Radó reviewed the developments that occurred since the 1953 law that prohibited abortion (Ozsváth and Radó, 124). They emphasized that the law itself placed so much burden on maternity wards and hospitals that it was softened immediately in 1954 and gradually it was changed in 1956. The 1956 law (1047/1956 M.T. statute) basically relegated this right to the sphere of individuals; it was argued that women could decide best for themselves whether they want the child or not (Ozsváth and Radó, 121). But they also placed emphasis on the fact that the number of abortions increased as a result of the relaxed law and also because of the social and eugenic perspectives that direct the decision making of parents, and thus they argued abortion became a public health issue by the 1960s. The solution they proposed was systematically offered sexual instruction for teenagers; they agreed with the law that abortion is a basic personal right, but they also saw that women who opted for abortion were not familiar with the methods of sexual protection or they used various ineffective methods (such as irrigation with water after sexual intercourse), thus the primary task for Ozsváth and Radó was to work out methods for information distribution.

<sup>22</sup> Gyula Nyitray and János Asbot discussed the lack of regulation regarding abortion until 1952 June that would have helped to save the life of women in case of any health danger. They wrote that this was an issue that was up to scientific and moral convictions of doctors to decide when they consider the case dangerous to recommend and perform abortion (Nyitray and Asbot, 82-83). Another problematic issue that they mentioned is the lack of clarification regarding the quality of the health problem. This practice was very problematic because in several cases women who really needed medical intervention could not get adequate help, they were forced by this chaotic system to find someone who understood their problem and perhaps similarly saw the necessity to terminate the pregnancy, and there were cases in which women ran out of time during this process and were forced to give birth. In 1952 the Health Ministry issued a statute that regulated procured abortion (81/34/1952). The statute stated that procured abortions could only be performed in institutions, it established and regulated statewide the first and second-degree committees who opinionated and allowed procured abortions. It also defined the diseases that accompanying pregnancies indicate abortions. It also allowed to the second-degree committees to decide in cases when the disease that affect the pregnant woman is not listed in the statute. In most cases tuberculosis served as the indication of procured abortions for both first and second degree committees (Nyitray and Asbot, 84).

<sup>23</sup> Lóránt, 1953, "Anya- És Gyermekvédelmi Feladataink," 71.

<sup>24</sup> Lóránt, 72.

to achieve by 1954 the presence of nurses in every part of the country<sup>25</sup>. Thus monitoring and helping every mother and newborn child.

As a result of the regulation that the health ministry made – it extended mother protection by integrating midwives into the system of prenatal care and made it compulsory to report every pregnancy – the number of those women who appeared in pregnant counseling services grew rapidly. By 1954 more than one million women took part in these counseling services which in comparison to the 33000 women of the 1938 data is huge. The number of beds in obstetrical wards and in maternity hospitals also grew. And all of these changes resulted in a closer monitoring of pregnant women and the process of pregnancy itself, thus by 1954 the death of mothers per birth reduced to 5.3 percent per 10000 occasions (in 1945 this was 15.8 percent)<sup>26</sup>. In a later publication, Lóránt placed emphasis on the further development of nurse system in Hungary<sup>27</sup>. He suggested that it would be beneficial to extend its capacity in a manner that every village doctor would have a nurse accompanying him/her to closely monitor pregnancies and infant health.

### **Institutional Foundations of Public Health and Its Results**

The most important task after the Second World War was to stop the spread of contagious diseases, thus one key area of health work concentrated on issues of public health and contagious diseases (Közegészségügy-járványügy). The stations of KÖJÁL started to be established state-wide from 1954 and by 1955 there were 24 stations across the country. In 1957 the organization of local groups that dealt with epidemiological issues was started in various districts in Budapest and at the same time in county towns (these groups were known as (Public Health and Epidemiological Service [Közegészségügyi és Járványügyi Szolgálat, KJSz]). These groups were responsible for controlling local epidemiological problems. An important structural change took place in 1968 regarding the organization when its name was changed from Állami Közegészségügyi Felügyelet to Állami Közegészségügyi-Járványügyi Felügyelet. In this new framework the duties were more precisely separated: (1) authority related and (2) other public health tasks<sup>28</sup>. The re-

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<sup>25</sup> According to Lóránt (1953) compared to 1938 the number of nurses more than quadrupled (from 344 to 1709) which was crucial since they help the work of physicians in ensuring the healthy process of pregnancy. It was their specific task to take care of the prematurely born, endangered infants and pregnant women. Because they worked closely with their panel-doctors (GPs) the statistics of infant mortality rates were significantly developed.

<sup>26</sup> Lóránt, 1955, “Anya- És Gyermekevédelmünk 10 Éves Fejlődése,” 107-108.

<sup>27</sup> Lóránt, 1956, “A Második Ötéves Terv Anya- És Gyermekevédelmi Feladatai,” 114.

<sup>28</sup> Kátay, “A Közegészségügy-Járványügy Fejlődése,” 86–87.

sults of epidemiological work from the 1950s until the end of the 1960s were remarkable: traditional epidemiological problems were reduced greatly in their significance. Important examples to underscore this success are the following: there was a serious outbreak of typhoid fever in 1954 which affected 158 people, but it ceased to be a serious problem after 1958 (there was no other recorded typhoid fever case after that time). Child-paralysis decreased from 1000 instances in the 1950s to 1-7 occurrences in the years of 1961-1968 as a result of systematic polio vaccinations<sup>29</sup>. Kátay emphasized that the results were in general thanks to systematic vaccinations (polio, BCG) but also to the results of the work of KÖJÁL that encompassed activities from information distribution to environmental control.

Besides the obvious structural benefits for public health the functioning of KÖJÁL had its drawbacks as well. One of the most important negative aspects was the following: (1) they could not develop the quality of enlightening work regarding health issues, a problem that Gyula Vilmon<sup>30</sup> emphasized was that the institution did not use the help of the radio, the press, and other public institutions; and (2) they did not develop the antiseptic system in the villages. This latter one would contribute greatly to the cause of public hygiene<sup>31</sup>. Aladár Kátay, who was a pediatrician, similarly emphasized the interconnection between epidemiology and antiseptic work. Epidemiology without the latter is not efficient. He wrote that the training of occasional antiseptic workers was completed in all counties; the problem is that their knowledge is not applied when it should have been. He further placed emphasis on one preventive method of epidemiology and this was the protection against lice. Kátay explained that it is a very important field because, without efficient antiseptic action against lice, the infection of typhus would always be a constant problem<sup>32</sup>. He underscored his point by giving an example: from Budapest and Zala county where the combined action of KÖJÁL with the police, Red Cross, and the relevant state authorities achieved good results.

In addition to these introduced structural changes, the state introduced vaccination to control contagious diseases in the 1950s. These vaccinations were against contagious child paralysis, typhoid fever, diphtheria, and tuberculosis<sup>33</sup>. Although the introduction of BCG vaccination was a significant step in the struggle against tuberculosis, in Hungary

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<sup>29</sup> Kátay, 89.

<sup>30</sup> Vilmon, Gyula (1897-1966), physician, undersecretary of healthcare.

<sup>31</sup> Vilmon, "A Közegészségügyi-Járványügyi Állomások Működésének Eredményei És Hiányosságai," 87.

<sup>32</sup> Kátay, "A Közegészségügyi-Járványügyi Állomások Járványügyi Munkája," 94–95.

<sup>33</sup> Simonovits, "Népi Demokráciánk Egészségpolitikája," 310–311.

it remained a serious problem for the foreseeable future. Dénes Mosolygó noted<sup>34</sup> that it was known at that time that because of the organized preventive work and the introduction of BCG vaccinations in the Scandinavian countries tuberculosis started to lose its epidemiological character. The first vaccinations were carried out in 1923 and it was used only sporadically until the late 1940s. In 1947 and 1949, the state carried out a campaign in which 1.5 million people were vaccinated. The most significant development was the ministerial statute of 60/1953 in which it was mandated to vaccinate every newborn child.

Since 1949, according to Mosolygó, a slow but steady development can be observed<sup>35</sup>. The obstacles that he listed were in relation to mistrust by citizens towards the vaccination. This was the primary reason why the statute was enacted: it was argued by physicians that further development in the issue of tuberculosis was not possible unless vaccinations were mandatory for everyone. And another related problem was the issue of re-vaccination. He explained that mistrust and lack of medical staff was the cause of bad results in re-vaccination. He stated that to develop the medical control of tuberculosis<sup>36</sup> it was necessary to organize more closely the work of general practitioners, nurses, crèches, pre-school, school doctors, pediatricians, epidemiological medical officers, and obstetrical wards.

In a ten years time-period significant developments were visible. Tibor Bakács<sup>37</sup>, by reviewing the statistical results regarding the mortality rates of contagious diseases, stated

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<sup>34</sup> Mosolygó, "A Tuberkulózis Elleni Küzdelem Továbbfejlesztése," 314.

<sup>35</sup> Mosolygó.

<sup>36</sup> Tibor Németh and his colleagues claimed that the public health work that aimed at finding defense mechanisms against tuberculosis could be divided into two phases: the first seventy years were characterized by passive protection, and the last thirty years were characterized by active measure such as vaccination (Németh, Nyárádi, and Vadász, "A Gümőkór Helyzete a Világban És Hazánkban (1882-1982)," 1309). They claimed that by 1983 with the method active protection the number of newly infected patients decreased to a yearly 5000 incidents. Ottó Schweiger similarly stated that the BCG vaccinations introduced in the early 1950s worked for children from their birth until their 15th birthday Schweiger, "A Tbc-Elleni Küzdelem Eredményei Magyarországon 100 Évvel a Mycobacterium Felfedezése Után.". After fifteen years the vaccination started to lose its effectiveness, thus re-vaccination was necessary. This meant that the age group between 15-50 years were considered high risk population thus their public health care were considered to be of high priority. They added that poverty and harmful habits such as alcohol consumption could contribute to ineffective containment of the disease. They also said that tuberculosis remained largely the problem of the elderly who were above 50 years, and mostly the new incidents of infection appeared in this group. At the same time, they argued that in the recent years tuberculosis ceased to be considered by medical professionals as an everyday health issue, thus they unfortunately often misinterpret the reappearing symptoms on patients, which made it harder to eradicate the problem entirely from the population but that was their long term goal.

<sup>37</sup> Bakács, Tibor (1912-1977), physician, university professor.

that roughly a 60 to 80 percent decrease could be measured in comparison to the statistics of 1953. He concluded that the systematic developments since the end of the Second World War placed Hungary into a circle of European countries whose health statistics regarding contagious diseases could be seen as average (previously Hungary was among the least successful countries in struggling with these health issues). He also underscored that one of the best results that Hungary managed to achieve was the decrease of tuberculous mortality rates thus tuberculosis ceased to be a lethal epidemiological disease by 1965<sup>38</sup>. As a result of these efforts, Bakács suggested, medical and economic resources could be used to tackle other important issues that had recently emerged such as elderly tuberculosis infection, and malignant tumors. And other clinicians and researchers suggested a focus on the rising numbers of congenital malformations and their possible medical management.

### **The Direction of Standardizing and Managing Developmental Abnormalities**

As early as the end of the 1950s discussions around congenital malformations began. Alfréd Berndorfer was among the first clinicians who urged his fellow colleagues to find common ground in understanding this matter. He wrote that there are three medical aims in tackling congenital malformations: researching the cause of the disease, treating the disease, and preventing the disease<sup>39</sup>. In order to become successful in tackling this issue, it was necessary to set up a department that only dealt with congenital malformations to treat, research and contribute to the prevention of these disorders<sup>40</sup>. This discussion only became much more acknowledged and thus influential in the 1960s with the advances of molecular biology.

The breakthrough that the molecular level of inheritance meant for medicine was enormous. With molecular understandings the issue of inheritable diseases was placed onto biochemical grounds. György Szemere<sup>41</sup> distinguished three causes that could result in genetic harms: (1) mutagenic agents, (2) the pairings of recessive mutants, and (3)

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<sup>38</sup> Bakács, "Magyarország Járványügyi Helyzetének Alakulása a Nemzetközi Adatok Tükrében – A Strukturális Változások Elemzése," 385–386.

<sup>39</sup> Berndorfer, "Egységes Szemlélet a Fejlődési Rendellenesség Kérdésében," 637.

<sup>40</sup> Berndorfer, 639.

<sup>41</sup> Szemere, György (1931-2016), medical geneticist, university professor. He founded the first genetic counseling office outside of Budapest in 1964 and he was among the first clinicians who applied the results of cytogenetic analysis in genetic counseling (see Raskó and Horváth, "Szemere György Professzor (1931-2016), Az Első Vidéki Genetikai Tanácsadó Megteremtője."

the change of the genetic code for some unknown reason<sup>42</sup>. Basically, he argued that all struggles that aimed at preventing inheritable genetic diseases must focus on studying these causes. Studies should focus on for example radiation<sup>43</sup>, or on the interaction of the human body with other chemical agents. And when pairings were at stake, genetic counseling was the adequate answer to prevent genetic disorders. And lastly, extensive studies were needed for the third issue: to understand more about the changes of the genetic code.

One of the key areas in the light of the above was the mortality rates of infants. The statistical results of Hungary were very poor in comparison to other European countries. The main problem that researchers such as Márius Hancsók and Endre Czeizel identified was fetal impairment. And they could only see development in this problem if research was focused on the different factors that could affect fetal development. The factors that they identified were microbiological causes (such as virus infections, bacterial infections, parasitological causes), alcohol consumption (they found out that coffee consumption was not harmful), smoking, ABO blood group incompatibility, the time of conception, and pathospermia. They claimed that the knowledge produced regarding these causes could help design modern preventive measures<sup>44</sup>. The development of infant mortality statistics, according to them, was only possible with extensive research regarding these factors in order to design educational and medical measures that would contribute to prevention. Sziráki and his colleagues contributed to this discussion by similarly analyzing possible causes of perinatal mortality rates. Based on the data of the Central Statistical Agency (Központi Statisztikai Hivatal) they argued that congenital malformations had a significant role. They compared their data with international statistics in which congenital developmental malformations were identified as the third most important cause of perinatal mortality rates. Thus, they claimed, that to decrease mortality rates in Hungary, it was necessary to study the various different causes of the most relevant malformations<sup>45</sup>. One of their key results was that they managed to consolidate the acceptance of other research results, for example, that among the various factors, the age of the mother plays an important role in the development of Down syndrome. More specifically, they claimed that after the age of 27 the incidence of Down-syndrome increases and the number triples in every 5 years<sup>46</sup>. These studies,

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<sup>42</sup> Szemere, "A Humángenetika Eredményei És Távlatai."

<sup>43</sup> Czeizel, "A Terhesség Alatti Magzati Sugárkárosodások."

<sup>44</sup> Hancsók and Czeizel, "A Magzati Károsodások Kórereditéről."

<sup>45</sup> Sziráki, Bodnár, and Szabó, "Magzati Fejlődési Rendellenességek Szülészeti Osztályunk 10 Éves Anyagában," 899.

<sup>46</sup> Sziráki, Bodnár, and Szabó, 901.

they suggested, could be important contributions to the accepted ‘modern’ preventive medical principles in which the main aim was to prevent developmental malformations in utero.

### **Biotechnological Developments in the Management of Reproduction**

Development of the field of cytogenetics started in 1963. Scholars began to appreciate the role that it could play in clinical medicine. Sándor Nagy for example emphasized that this was a new field (only three years old at the time of the publication of his article) and has relatively few contributions to make, but one of them was the discovery of trisomy 21, the tripled 21 chromosome that indicates Down syndrome<sup>47</sup>. Nagy noted that although it was very complicated at the time to do chromosome analysis it was still a promising method for diagnostics because if systematically applied it would contribute to the detection of chromosomal anomalies<sup>48</sup>.

Important breakthroughs were necessary in order to accept cytogenetics as a method to help clinical diagnostics and prevention, and thus become a key tool in genetic counseling. According to Tamás Fleischmann<sup>49</sup> the following breakthroughs were paramount. In 1956 Tijo and Levan discovered that the normal chromosome number in a human being is 46. In 1959, the cause of Down-syndrome was pointed out by Lejeune and his colleagues; and because previous studies managed to explain the differences regarding the role of Barr sex chromatin in various (Turner, Klinefelter) syndromes, following this lead cytogeneticists primarily wanted to clarify the role that pathological sexual chromosomes play in various disorders. The most important contribution of Fleischmann’s review is that he spelled out the clinical consequences of the latest cytogenetic studies for clinical practice. Clinical cytogenetic studies were the most important and most rapidly developing subfield of medical genetics in the 1960s. These analytical works aimed at mapping

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<sup>47</sup> This result was published by Lejeune, Gautier and Turpin in 1959 (Nagy, “Klinikai Chromosoma Vizsgálatok,” 1162). In their own research results they analyzed cases for Klinefelter syndrome, leukemia, and polycythemia-leukemia.

<sup>48</sup> Nagy, 1166.

<sup>49</sup> Fleischmann, “A Human Cytogenetika Újabb Eredményei (A Chromosoma-Vizsgálat Klinikai Jelentősége).”

the boundaries of 'normal human chromosomes'<sup>50</sup> in order to facilitate easier and quicker identification processes<sup>51</sup>. Fleischmann emphasized the significance of population based cytogenetic studies that gather data in order to help automatization and shape the focus of medical concerns in designing screening procedures.

As a result of rapid developments of genetics in the 1950s and 60s medical genetics applied its insights in many spheres of medicine, thus by the end of the 1960s it was unimaginable to have modern gynecological assistance without cytogenetic laboratory<sup>52</sup>. Cytogenetic studies pointed out that at least one fifth of miscarriages had some kind of abnormal genetic structure. This abnormal structure can be differentiated into two larger groups: (1) gene mutations, which are molecular differences from the norm; (2) chromosome-mutations; these mutations could be the parts of chromosomes or whole chromosome mutations. The problem with these genetic mutations, they claimed was that these embryos can survive intra uterine life and can live for a short period. "These chromosome-aberrations which are compatible with life for a short period of time play role in pre- and perinatal-mortality"<sup>53</sup>. The most frequent problems are autosomal trisomies with 45 percent; these are Edwards-syndrome, Down-syndrome, and Patau-syndrome. And they also refer to the problem of sex-chromosome anomalies, when their excess number (XXY, XXX) or the lack of them (X0) enables the development of abnormal variants. And sometimes sex-chromosomes develop into forms which are incapable of living (Y0). All of these could be detected researchers argued in prenatal testing thus could be prevented by abortion. In their studies Papp and his colleagues<sup>54</sup>, emphasized that newborn retardation could be caused by chromosomal anomalies, therefore they suggested that prenatal genetic diagnostics could help in screening those problems. At the same time, they emphasized the significance of pre-conception and prenatal care of mothers in order to ensure the birth of children.

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<sup>50</sup> One of the most researched field is the comparative aspects of sexual chromosomes. Studies conducted in this field for example in the 1960s focused on the 'XYY syndrome' because knowledge regarding this problem could significantly contribute to clinical diagnosis. The theory was that tall aggressive criminals share this karyotype, so the basic question is whether these people are indictable because of their genetic predetermination towards these crimes. Most of the geneticists thought that they were not punishable precisely because of this genetic predisposition (Fleischmann, "Klinikai Cytogenetika: 1968-1969").

<sup>51</sup> Fleischmann, 1623.

<sup>52</sup> Papp et al., "Cytogenetikai Vizsgálatok Jelentősége a Szülészeti Praeventióban," 1911.

<sup>53</sup> Papp et al., 1911.

<sup>54</sup> Papp et al., 1914.

The field of population based cytogenetic<sup>55</sup> research was not only interested in Down-syndrome but they were looking for other relatively frequent chromosomal variations as well. One of the general criticism of cytogenetics was that it deals with ‘clinical rarities’<sup>56</sup>. According to this standpoint, chromosomal deficiencies are not epidemiological issues. To temper this position Károly Méhes<sup>57</sup> reviewed the recent global statistical data and pointed out that roughly 0.5 to 0.6 percent of live births show chromosome issues, from this amount, 0.2 percent are those mutations known as Down, Patau, and Edwards-syndrome. Méhes compared the mean value of global literature to that of Baranya county and stated that with minimal differences (Down syndrome, and Patau syndrome were more frequent for example, while Edwards syndrome was less frequent) they had similar results, thus similar epidemiological consequences could be inferred. He emphasized here, that these results make explicit that child-mortality rates are affected but also the occurrence of these diseases place burden (though not stated explicitly, but precisely because of this, it could be a burden both economic and personal) on healthcare institutions that take care of people with disabilities<sup>58</sup>. He infers two conclusions as to how the results of cytogenetic studies could be used: (1) family planning should direct couples to aim at having children before the women reached the age of 32 to 35. To justify this suggestion, he drew on the literature that emphasized the significance of the age of the mother regarding Down syndrome at least since 1933 when Penrose published his findings but Méhes claimed that this is the case with other chromosome abnormalities as well. And (2) the new technology of prenatal diagnostics seemed promising to him in the work of preventing the occurrence of genetic disorders but in his time the economic and technological constraints of the society made it important to identify precisely the risk groups where amniocentesis would work best. (Méhes, among other clinicians, placed emphasis

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<sup>55</sup> The strand of research called population cytogenetics that studies chromosome abnormalities according to geographical location and age groups emerged in the 1960s (Méhes, “Az Orvosi Cytogenetika 25 Éve: A Sexchromatintól a Preanatólis Diagnosztikáig,” 2211).

<sup>56</sup> Méhes, 2212.

<sup>57</sup> Méhes, Károly (1936-2007), pediatrician, medical geneticists, university professor, member of the Hungarian Academy of Sciences.

<sup>58</sup> Méhes, “Az Orvosi Cytogenetika 25 Éve: A Sexchromatintól a Preanatólis Diagnosztikáig,” 2212.

on the technique of amniocentesis<sup>59</sup> in order to ensure precise diagnosis that aids medical efforts to find inheritable anomalies with cytogenetic analysis.)

It is also important that he acknowledged the fact that cytogenetics reaches beyond the medical sphere by affecting family planning and love relationships by ‘perhaps’ influencing choices<sup>60</sup>. In this claim, it was entailed that this eugenic technique of the state influences citizenship understanding thus it affects how individuals view their personal contribution to the society and what they also expect from their partners as conscious biological citizens who take into account the interest of their people.

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<sup>59</sup> New ways of fetal diagnostics also contributed to the improvement of fetal health statistics which was among the most urgent public health matters of the 1960s. Fetal death during pregnancy considerably decreased by the end of the 60s, but during the perinatal period death results were significant just as in utero and puerperal death statistics. In order to facilitate improvements in these regards it was necessary to focus on factors such as isoimmunisation, toxemia, diabetes, over-carrying, infections, and other pregnancy related diseases – the same causes were linked by doctors to infant mortality rates as well. Ferenc Szontágh emphasized in these cases that to improve the related health statistics the best method was prevention. So he listed and explained the contemporary methods that could contribute to the goals of this preventive perspective. These methods are: endocrinology, amniocentesis, amnioscopy, fetal electrocardiography, microanalysis of fetal blood, Apgar-score, ultrasound diagnostics. Within endocrinology he discussed the quantitative definition of HCG (helps in the prognosis of miscarriage and judging whether an abortion was completely carried out), the measurement of steroid release (gives information about the placenta’s functionality and helps interpreting any danger regarding the status of the fetus), and oxytocin-sensitivity test (helps defining the time of birth-giving). Regarding amniocentesis, he emphasized that the amniotic fluid with precise analysis could be used for diagnostics or therapeutic purposes (and that it was relatively safe for both mothers and fetuses). Amnioscopy was an entirely safe method to diagnose asphyxia in utero. Fetal ECG was developed in 1906 to detect heart functionality and healthcare professionals integrated the method widely since then. The microanalysis of blood sample from the fetus is an important method to diagnose fetal metabolic disorders. The Apgar-score was developed to get a better understanding about the health status of infants. And lastly ultrasound diagnostics was a key development in exchanging x-ray tests to follow the different stages of fetal development. All of these methods were used in the Hungarian obstetrics practice and their most important contribution was in their possibility to improve fetal results both quantitatively and qualitatively. Thus, these methods contributed to negative eugenic aims by for example diagnosing fetal issues and justifying the medical indication of the termination of a pregnancy. But on the other hand these methods improved the health standards of those fetuses who for example were diagnosed with PKU and helped these infants to immediate access to therapeutic procedures, thus these methods function as important indicators to start a necessary healing procedure (based on Szontágh, “A Terhességi Diagnosztika Új Útjai.”).

<sup>60</sup> Méhes, “Az Orvosi Cytogenetika 25 Éve: A Sexchromatintól a Preanatólis Diagnosztikáig,” 2212.

## Target Groups of Medical Genetics in the 1960s and 1970s

### *People with Mental Disorders*

Mental retardation became an epidemiologically relevant issue because 3 to 4 percent of the population was affected. This is the reason why more and more studies appeared concerning congenital mental retardation. From the various different chromosomal anomalies, the most frequent were the Down-syndrome, Klinefelter-syndrome, and Turner-syndrome<sup>61</sup>. In addition to these issues, researchers were aware of the frequency of metabolic problems as well that could affect mental health (i.e. PKU or galactosemia).

In order to define more precisely the frequency of these above mentioned disorders in the Hungarian population Péter Cholnoky and his colleagues used a closed, small population sample of 140 children, boys and girls, aged between 4 to 14, who lived in a mental health asylum in Bóly, Baranya county. They concluded that in comparison to the average population, among the mentally retarded there were more intersex individuals, they also claimed that regarding other chromosome anomalies, the Turner, and Klinefelter-syndromes were significant, but the Down-syndrome was the most frequent in their sample group. They stated that “in these cases the proof of the diagnosis is important solely regarding the patients and the families prognosis,” and they also added that the health state of those who suffer from these chromosome anomalies could also be improved, so early diagnosis could be used to help them attain a better quality of life. The scientific contribution that has epidemiological consequences was that they managed to prove that in most cases mental disorders are genetically caused thus their results indicate the introduction of statewide screening programs for both newborns and infants<sup>62</sup>. They claimed that ethical and economic considerations also underscore their suggestion.

In a similar vein, László Szabó and his colleagues tried to raise attention of the genetic background of mental disabilities. They wrote that because of the increasing number of mentally disabled people their sheer number puts more strain on the country's economy thus it would be beneficial to find out what the genetic mutations were which were most prevalent in the Hungarian population and develop screening programs to help prevent mental disorders. They found chromosome-abnormalities that are directly connected to mental disability. The most frequent chromosome disorders that they mentioned were similarly Down, Turner, and Klinefelter-syndrome. In addition to these genetic disorders they claimed that by 1970 roughly 100 metabolic disorders were iden-

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<sup>61</sup> Cholnoky et al., “Genetikai Jellegű Vizsgálatok Súlyos Mentális Retardáltaknál,” 809.

<sup>62</sup> Cholnoky et al., 814.

tified and in these diverse problems the most frequently shared symptom was mental disability<sup>63</sup>. Mapping the frequency of these disorders would contribute to better results in genetic counseling. They also argued that by introducing newborn screening programs that target metabolic disorders genetic diagnostics could contribute to the prevention of mental problems.

### *The Body of Pregnant Women*

There were numerous articles published in international medical journals about the effects of smoking on the fetus and on pregnancy in general but for Hungarian researchers it was only in the late 1960s that the effects of smoking became a focal point. Influenced by these works, László Makay and Jenő Vincze drew on these studies to compare smokers with non-smokers and concluded that among smokers more women gave birth prematurely and to newborns with less weight in general, but they also presupposed that smoking could play role in miscarriages and in other developmental malformations<sup>64</sup>. They also noted that scholars published results in the international literature that analyzed the effects of passive smoking, such as the effects of smoking fathers on their pregnant wives, and the effects of smoking on spermatogenesis as well.

In addition to environmental effects and behavioural factors such as smoking other variables like the age of the mother were studied as well. It was widely known that the age of the mother was connected to Down syndrome as early as the first decade of the twentieth century. Lóránt Bodnár used this information as a starting point for their observations with his colleagues; they managed to prove that the age of the mother affected the appearance of congenital abnormalities. The population of mothers was divided according to their age groups and they observed that below the age of 20 the frequency of congenital abnormalities was less than 0,01 percent, while after the age of 40 the number of congenital disorders rapidly rose; but a steady growth was pointed out by them between these age groups<sup>65</sup>. Bodnár claimed that based on the data that they collected from 1958 to 1967 they found that most frequently abnormalities occurred in first pregnancies, after several pregnancies, and above the age of 40. In addition to the age of pregnant women the age of their grandmothers became important. Papp and his colleagues for example

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<sup>63</sup> Szabó et al., “Értelmi Fogyatékos Gyermekközösségben Végzett Genetikai Jelleű Szűrővizsgálatok,” 25.

<sup>64</sup> Makay and Vincze, “Dohányzás És Terhesség.”

<sup>65</sup> Bodnár, “Az Anyai Életkor És a Szülési Sorrend Befolyása a Veleszületett Fejlődési Rendellenességek Előfordulására,” 625.

discussed the significance of the age of grandmothers in the case of Down-syndrome<sup>66</sup>. They argued that because high numbers of children born with Down syndrome were borne by young mothers so their age could not be the reason why their child had the disorder. This is why Papp and his colleagues argued that the age of the grandmother could be an important factor because she could have developed a form of mosaicism that she may have transmitted to her daughter (both of them asymptomatic) and her daughter may have given birth to a child with Down syndrome for this reason. They also posited that the role of the paternal grandmother's age and the possible mosaicism from that lineage could be more significant than was previously supposed.

### *Focus on Male Infertility*

Of studies that started out from a focus on pregnant women, more precisely, how their habitual miscarriages happen, some shifted the focus to men, or more specifically to sperm analysis. In one study for example, Czeizel and his colleagues started out from the scientific claim that a significant amount of childless marriages were the result of male infertility and they also pointed towards the possible interrelationship of pathospermia to fetal impairments. So they suggested that the focus should be much more on the variables of fatherhood, and how this plays out in the process of conception. They claimed that “although the teratoid forms (of sperms) are infertile, their increased presence indicates pathological spermatogenesis. In the case of pathological spermatogenesis one must take into account microscopically invisible biochemical abnormalities that manifest themselves during fetal development and could result in the impairment of the fetus”<sup>67</sup>. This remained an important direction in medical genetic research.

As is evident in a later published article by András Tóth and his colleagues in the 1980s it was an epidemiological issue since 10 to 15 percent of marriages had this problem. In their research, Tóth and his team focused on male infertility because they claimed that men were responsible in 30 percent of infertile marriages and they contributed to infertility in 20 percent of the cases. They drew on international literature and claimed that studies linked infertility to chromosomal abnormalities, thus they used the classification introduced in 1963 by Lionel S. Penrose to differentiate between infertile men. The first group included those who suffered from a lethal disorder and died before their reproductive age; the second group consisted of those who had a mental or somatic disorder and

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<sup>66</sup> Papp, Váradi, and Szabó, “A Nagyanyai Életkor Vizsgálata Down-Szindrómában.”

<sup>67</sup> Czeizel, Hancsók, and Viczián, “A Habitúan Vetelő Asszonyok Férjeinél Végzett Ondóvizsgálat Jelentősége,” 1595.

were incapable of normal heterosexual relationship (i.e. people with Down syndrome); and the third group of people whose general health condition was fine but who suffered from some kind of chromosome problem that decreased their capability for fertility<sup>68</sup>. The most important contribution of their study was that they pointed towards a relatively new gender aspect of genetic counseling, namely to suggest chromosome analysis for couples who visited counselors because of infertility problems<sup>69</sup>. This chromosome test could significantly reduce the number of further examinations and could open the way for alternative solutions such as in vitro fertilization or perhaps adoption.

### *From Major to Minor Anomalies*

Ilona Pazonyi and her colleagues discussed a shift in the focus of mapping diseases. In previous medical practices of anamnesis, the focus was on major anomalies. Clinicians wanted to register every major physical anomaly because it was the sign of serious disorder. This started to change during the mid-1960s when researchers started to point towards the significance of minor anomalies as possible indicators of serious invisible disorders. Minor anomalies are defined as physical signs, unusual morphological markers that do not have direct medical consequences; their significance is that they can indicate serious problems and they can be the signs of syndromes that could help clinicians in recognizing a disorder<sup>70</sup>. An example that they gave for such a minor anomaly was the so called ‘single palmar crease’<sup>71</sup> that is linked to Down syndrome, but researcher contemplated other morphological variations such as ear shape, head shape, and facial variations. They pointed out that the difficulty of using data collected about these differences lay in understanding them as minor anomalies or simple phenotype variations<sup>72</sup>. Minor anomalies are important mainly for recognizing multiplex disorders that point toward congenital diseases, thus they urged their colleagues to examine routinely such differences because these could help the early recognition of disorders and hence the therapeutic work could be started earlier.

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<sup>68</sup> Tóth, Gaál, and László, “A Férfimedddőség Citogenetikai Háttére,” 1723.

<sup>69</sup> Tóth, Gaál, and László, 1728.

<sup>70</sup> Pazonyi et al., “A Minor Rendellenességek Gyakorisága És Jelentősége,” 3.

<sup>71</sup> In the article the term simian crease (majombarázda) was used, but it is not used anymore because it conveys negative meaning, thus I chose to refer to this phenomenon by the contemporary terminology.

<sup>72</sup> Pazonyi et al., “A Minor Rendellenességek Gyakorisága És Jelentősége,” 6.

## Conclusion

The reasoning that occurred in the public health discussion concerning raising the health standards and health statistics of the country is important because it preceded genetic counseling that started in the late 1960s early 1970s. In this period from the '50s to the '70s, the dominant concern in medicine was the threat of contagious diseases. To successfully control these problems class issues such as environmental problems were placed at the forefront of discussions. Access to vaccinations again was approached from the perspective of class as the aim was to give equal protection to every citizen since this was in the interest of the society as well. This discussion was within an already defined preventive approach and this preventive approach had implicit eugenic values already incorporated into its mechanisms which were extended towards the management of reproduction. This is crucial because in the medical genetic period that started to take shape from the 1970s clinicians took for granted eugenic values that were already at work in the system. In this new phase, where clinicians were concerned with the management of healthy reproduction, gender perspectives were taking shape. In this discourse women were positioned as the primary responsible agents whose body came under closer medical surveillance. It is important that the accumulated medical knowledge was intended to enhance decision making on the part of women, but this decision making process was already burdened with eugenic expectations.

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