

# Overview of German, Nazi, and Holocaust Medicine

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## DEDICATION

This article is dedicated to the memory of Lucja Frey, a Jewish woman neurologist, who was the first physician to describe the neurological condition that bears her name—Frey syndrome—before she became a victim of the holocaust.



An overview of German, Nazi, and Holocaust medicine brings together a group of subjects discussed separately elsewhere. Topics considered include German medicine before and during the Nazi era, such as advanced concepts in epidemiology, preventive medicine, public health policy, screening programs, occupational health laws, compensation for certain medical conditions, and two remarkable guidelines for informed consent for medical procedures; also considered are the Nuremberg Code; American models for early Nazi programs, including compulsory sterilization, abusive medical experiments on prison inmates, and discrimination against black people; two ironies in US and Nazi laws; social Darwinism and racial hygiene; complicity of Nazi physicians, including the acts of sterilization, human experimentation, and genocide; Nazi persecution of Jewish physicians; eponyms of unethical German physicians with particular emphasis on Reiter, Hallervorden, and Pernkopf; eponyms of famous physicians who were Nazi victims, including Pick and van Creveld; and finally, a recommendation for convening an international committee of physicians and ethicists to deal with five issues: (a) to propose alternative names for

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eponyms of physicians who exhibited complicity during the Nazi era; (b) to honor the eponyms and stories of physicians who were victims of Nazi atrocities and genocide; (c) to apply vigorous pressure to those German and Austrian Institutes that have not yet undertaken investigations to determine if the bodies of Nazi victims remain in their collections; (d) to recommend holding annual commemorations in medical schools and research institutes worldwide to remember and to reflect on the victims of compromised medical practice, particularly, but not exclusively, during the Nazi era because atrocities and acts of genocide have occurred elsewhere; and (e) to examine the influence of any political ideology that compromises the practice of medicine.

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**Key words:** Reich Guidelines of 1931; Nuremberg Code; US prison inmates; social Darwinism; racial hygiene; genetics; sterilization; human experimentation; genocide; eponyms; Ploetz; Hallervorden; Pernkopf; Reiter; van Creveld; Pick; Waardenburg; Seckel; Robinow

## INTRODUCTION

During the 1980s, 1990s, and during the present century, a great many articles, treatises, and books by historians, physicians, and other scholars have been published about physician complicity during the Nazi era [Geiderman, 2002]. This article provides an overview of German, Nazi, and Holocaust medicine.

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## GERMAN MEDICINE BEFORE AND DURING THE EARLY NAZI ERA

Given the atrocities committed by large numbers of Nazi physicians, there is a natural revulsion of German medicine during that era. However, in some respects the truth is quite different certainly before the Nazi era and to some extent even during the early Nazi era [Wynia and Wells, 2007].

Before and during the early Nazi era, Germany led the world in epidemiology, preventive medicine, public health policy,

screening programs, occupational health laws, compensation for certain medical conditions, and informed consent for medical procedures, and Germany did this many decades before the United States.

Germany was exceptionally advanced in basic sciences and clinical medicine [Wynia and Wells, 2007]. German medical education, influenced by the Flexner report in the United States, became the model system for the world [King, 1984]. By the 1930s, Germans held half the Nobel prizes awarded up to that time [Proctor, 2003].

### Box 1: Regulations on New Therapy and Human Experimentation\* Reich Guidelines Circular, February 28, 1931

The Reich Health Council is issuing the following important guidelines for all physicians, who should sign a commitment to these principles on entering their places of work.

- (1) Sometimes in advancing medical science, novel procedures may be introduced, which involve scientific experimentation on humans in an attempt to diagnose, treat, or prevent certain diseases. The physician must carefully weigh out his responsibility for the life and health of any patient before he considers performing innovative treatment or scientific experimentation.
- (2) Innovative treatment specifically refers to therapeutic procedures on humans that have not been sufficiently evaluated on the basis of present knowledge or experience.
- (3) Scientific experimentation specifically refers to interventions or treatment methods on humans for research purposes without serving therapeutic purposes and whose effects cannot be sufficiently evaluated on the basis of present knowledge or experience.
- (4) Any novel treatment must be justified and must be performed according to the principles of medical ethics and of medical practice and theory. The anticipated benefits must be weighed out against possible adverse effects.
- (5) Innovative treatment may only be carried out after the patient or his legal representative has unambiguously consented to the procedure based on the relevant information provided in advance. When consent is refused, therapy can only be initiated if it is urgent to preserve life, prevent serious damage to health, or prior consent could not be obtained under the circumstances.
- (6) Particular care must be taken of whether or not to use innovative treatment on children or any person under 18 years of age.
- (7) Exploiting social hardship to undertake innovative therapy is incompatible with the principles of medical ethics.
- (8) Extreme caution is indicated for any innovative therapy involving microorganisms, particularly live pathogens. Such therapy is only permissible if the procedure can be assumed to be relatively safe, and similar benefits are unlikely to be achieved by any other method.
- (9) In clinics, hospitals, and other health care facilities, innovative therapy may only be carried out by the physician-in-chief or another physician designated by him in accordance with his specific instructions.
- (10) A report must be filed of any innovative therapy, the purpose of the procedure, its justification, and the manner in which it was carried out. A statement with full disclosure must be added that the patient, or when appropriate his legal representative, has been provided with the necessary information in advance, and that consent was given. Full details must also be filed in those instances in which consent was refused or could not be obtained, but urgent innovative therapy was necessary to preserve life or to prevent serious damage to health.
- (11) The results of any innovative therapy may be published provided the patient's dignity is respected and the name is not used.
- (12) Requirements for human experimentation:
  - (a) Human experimentation is prohibited in all cases in which consent has not been given.
  - (b) Experimentation involving human subjects must be avoided if animal studies will suffice.
  - (c) Experimentation involving children or youngsters under 18 years of age is prohibited if it endangers them in any way.
  - (d) Experimentation on dying subjects is unethical and is prohibited.
- (13) Physicians, particularly those in charge of hospitals, should be guided by a strong sense of responsibility towards their patients. However, they may also seek new ways of protecting or treating patients or alleviating their suffering if they are convinced that known medical methods are likely to fail.
- (14) Academic training courses should stress the physician's special role when carrying out any novel form of therapy or scientific experiment, as well as publishing the results in an ethical manner.

\*Reichsgesundheitsblatt 11, No. 10 (March, 1931), 174–175. First English translation: International Digest of Health Legislation 31:408–411, 1980. The translation is too literal and is difficult to read. I have paraphrased it in modern English so that its contents can be better understood by readers.

**Box 2: Nuremberg Code\* [1946]**

- (1) The voluntary consent of the human subject is absolutely essential.  
This means that the person involved should have legal capacity to give consent; should be so situated as to be able to exercise free power of choice without the intervention of any element of force, fraud, deceit, duress, over-reaching, or other ulterior form of constraint or coercion; and should have sufficient knowledge and comprehension of the elements of the subject matter involved as to enable him to make an understanding and enlightened decision. This latter element requires that before the acceptance of an affirmative decision by the experimental subject there should be made known to him the nature, duration, and purpose of the experiment; the method and means by which it is to be conducted; all inconveniences and hazards reasonably to be expected; and the effects upon his health or person which may possibly come from his participation in the experiment.  
The duty and responsibility for ascertaining the quality of the consent rests upon each individual who initiates, directs or engages in the experiment. It is a personal duty and responsibility which may not be delegated to another with impunity.
- (2) The experiment should be such as to yield fruitful results for the good of society, unprocurable by other methods or means of study, and not random and unnecessary in nature.
- (3) The experiment should be so designed and based on the results of animal experimentation and a knowledge of the natural history of the disease or other problem under study that the anticipated results will justify the performance of the experiment.
- (4) The experiment should be so conducted as to avoid all unnecessary physical and mental suffering and injury.
- (5) No experiment should be conducted where there is an a priori reason to believe that death or disabling injury will occur; except, perhaps, in those experiments where the experimental physicians also serve as subjects.
- (6) The degree of risk taken should never exceed that determined by the humanitarian importance of the problem to be solved by the experiment.
- (7) Proper preparation should be made and adequate facilities provided to protect the experimental subject against even remote possibilities of injury, disability, or death.
- (8) The experiment should be conducted only by scientifically qualified persons. The highest degree of skill and care should be required through all stages of the experiment of those who conduct or engage in the experiment.
- (9) During the course of the experiment the human subject should be at liberty to bring the experiment to an end if he has reached the physical or mental state where continuation of the experiment seems to him to be impossible.
- (10) During the course of the experiment the scientist in charge must be prepared to terminate the experiment at any stage, if he has probable cause to believe, in the exercise of the good faith, superior skill and careful judgment required of him that a continuation of the experiment is likely to result in injury, disability, or death to the experimental subject.

\*Nuremberg Code, 1946 is from "Permissible Medical Experiments." Trials of War Criminals before the Nuremberg Military Tribunals under Control Council Law No. 10: Nuremberg, October, 1946–April, 1949. Washington: U.S. Government Printing Office, Vol. 2, pp. 181–182.

The electron microscope, a German invention, was used to document asbestosis and its link to lung cancer. A newly introduced occupational law required compensation for workers with asbestos-related disease. A large epidemiologic study identified the link between cancer and smoking, and the Nazi Party was the first political entity to ban smoking in public places [Proctor, 1999].

## TWO REMARKABLE ETHICAL GUIDELINES FOR HUMAN RESEARCH IN GERMANY

In 1892, public outcry about an experiment in which prostitutes and orphans were deliberately infected with syphilis to test new treatments for the disease [Lignon et al., 2005] led to a Directive by the Prussian Minister of Religious, Educational, and Medical Affairs in 1900. It was probably the first document about the ethics of human experimentation that specifically recognized the need (1) to protect minors and those who are incompetent; (2) to explain possible adverse consequences of the research; (3) to require unequivocal consent; (4) to be carried out only by the director of a medical institute or by another physician under his direct

supervision; and (5) to keep a medical record book that demonstrates in writing how the requirements for human experimentation were met [Grodin, 1992].

Regulations for informed consent for new medical procedures were set forth in Germany in 1931 by the Reich Minister of the Interior 2 years before Hitler's rise to power. The *raison d'être* was the death of 75 children caused by an experimental vaccine for tuberculosis administered by pediatricians in Lübeck. The guidelines—*Regulations on New Therapy and Human Experimentation*—were issued on February 28, 1931 [International Digest of Health Legislation, 1980; Sass, 1983] and the document appears in Box 1.

These regulations for informed consent are visionary in scope. They require all physicians to (1) sign a commitment to the guidelines; (2) to report any new treatment; its purpose; its justification; how the procedure was carried out; and to indicate that informed consent had been obtained; (3) to stress in academic training courses the physician's special role in novel treatment and its scientific study; and (4) to protect the patient's privacy in any publication. To quote Grodin [1992], "In many ways, these guidelines are more extensive than either the Nuremberg Code or the later Declaration of Helsinki." It should be recognized that this is a

statement by Michael Grodin, who is Professor of Health Law, Bioethics, Human Rights, Socio-Medical Sciences and Psychiatry, and also Director of the Bioethics and Human Rights Program at Boston University.

Throughout the Nazi era, these regulations remained in place, although they were ignored for some persons [Sass, 1983], particularly Jews, Gypsies, Slavs, prostitutes, criminals, vagrants, political prisoners, homosexuals, psychiatric subjects, the mentally deficient, the physically deformed, and those who opposed the Nazi regime [Ernst, 2001; Geiderman, 2002; Sofair and Kaldjian, 2002].

Some authors have indicated that the Reich Guidelines were valid and enforceable laws right up to 1945 [Sass, 1983; Fischer and Breuer, 1989; Fluss and Grodin, 1992], whereas a few have claimed that the Guidelines were only recommendations without legal status [Howard-Jones, 1982].<sup>1</sup>

## THE NUREMBERG CODE OF 1946

The Nuremberg Code of 1946 was a document delimiting permissible medical experimentation on human subjects (Box 2). The Tribunal for the Doctors' Trial convened 139 times to consider the evidence on 23 defendants. A great deal of evidence was amassed about the medical atrocities committed by them, and the Nuremberg Code was useful in addressing their many failures in medical ethics. By August 20, 1947, the death sentence was imposed on seven doctors [Annas and Grodin, 1992].

The major architects of the Nuremberg Code were Leo Alexander [1949] and Andrew Ivy, both of whom were medical experts at the Nuremberg trial. They had read the works of Hippocrates (*ca.* 460 BCE—*ca.* 370 BCE), Percival (1803), Beaumont (1833), and Bernard (1865). All of these deal with the physician's responsibility to benefit the patient.

Only Hippocrates is concerned with the relationship between physician and patient. Percival addresses innovative therapy, and the first American Medical Association Code of ethics in 1847 was based on the work of Percival [Grodin, 1992]. Beaumont covers non-therapeutic experimentation; and Bernard focuses on scientific method and therapeutic research. In addition, both Beaumont and Bernard are concerned with acceptable experimental risk, but only Beaumont discusses voluntary consent as being necessary for human experimentation [Grodin, 1992]. Alexander and Ivy were aware of *at least some* of the pre-war German literature on the ethics of human experimentation; Alexander specifically cited an early German book on the ethics of human experimentation: *Der Arzt im Recht* [Ebermayer, 1930].

## TWO NOTES ABOUT THE NUREMBERG TRIALS

The small number of defendants during the Nuremberg Doctors' Trial has been criticized for its narrow focus [Moreno, 2000]. Most Nazi physicians who committed medical atrocities never came to justice by courts of law, and in the post-World War II era, went on to continue their professional lives (*vide infra*).

<sup>1</sup>I was unable to determine whether the Reich Guidelines were actually used in 1931 and 1932, later during the Nazi era for the Volk (the German people), and whether they were retrospectively and historically considered to have been valid in East Germany.

In 1946, the U.S. developed its own ethical standards for research specifically to support the Nuremberg prosecutions, not because a need was perceived for ethical guidance in America [Grodin, 1992]. In fact, these ethical standards were rushed into print 19 days after the prosecution's opening arguments were presented during the trial [Grodin, 1992]. The Code was seen "as necessary for barbarians, not for fine upstanding people." This sense of "Nazi exceptionalism" led to a very long delay in U.S. physicians taking seriously the notion of informed consent [Faden et al., 1996; Wynia and Wells, 2007].

## AMERICAN MODELS FOR EARLY NAZI PROGRAMS: COMPULSORY STERILIZATION; MEDICAL EXPERIMENTS ON PRISON INMATES; AND RACIAL DISCRIMINATION

Some events that transpired in the United States served as models for some of the early Nazi programs during their rise to power and, in some instances, to justify some of their programs already underway. These included sterilization of certain groups of people, exploitation and abuse of prison inmates for medical experiments dating from as early as 1906 (and continuing after the war until 1972), and by the well-documented discrimination against black people. The German literature of that period, including the *Archives of Racial Hygiene and Social Biology*, makes it abundantly clear that the Nazis admired what the United States had accomplished [Proctor, 1988; Lederer, 1995; Hornblum, 1997; Weyers, 1998; Geiderman, 2002]. An important book by Baron [2007] is titled *The Anglo-American Biomedical Antecedents of Nazi Crimes*.

### Sterilization

The US was the first country in the world to undertake compulsory sterilization for certain classes of people. Laws for sterilization were drafted by physicians, and were upheld by the Supreme Court in 1927. Ironically, these laws were still valid in 19 states in 1985 [Baron, 1997]. The principal targets included those with mental retardation, mental illness, epilepsy, blindness, deafness, physical deformity, and Native Americans and criminals in prisons [Kevles, 1985]. More than 65,000 individuals were sterilized in 33 states that had compulsory programs [Kevles, 1985; Carey, 1998; Baron, 2007].

### Human Experimentation on Prisoners

American prisoners were cheap; they were available; they could be coerced; and follow-up was easy. Medical researchers could offer incentives to prisoners: cigarettes and cigars; money; reduction of prison time; and for the more dangerous experiments, full pardon [Hornblum, 1997; Lerner, 2007].

In 1906, an American physician, Richard P. Strong, infected prisoners condemned to death with cholera serum in Bilibid Prison in Manila. Thirteen fatalities were eventually attributed to a bottle of bubonic plague serum "substituted by mistake." Later, Strong became Professor of Tropical Medicine at Harvard University. After 6 years, his beriberi experiments also resulted in some



deaths, but survivors were ironically “rewarded” with cigarettes and cigars [Strong, 1906; Taber, 1907; Pappworth, 1967; Cherin, 1989].

In 1915, Dr. Joseph Goldenberger, a Public Health Service researcher, induced pellagra in healthy Mississippi prisoners, who “signed up” for the experiment. The inmates experienced a severe rash; diarrhea; lethargy; mental confusion; and pains in their backs, sides, and legs [Etheridge, 1972; Lederer, 1995].

In 1918, Dr. L. L. Stanley, a resident physician at San Quentin State Prison in California, transplanted testicles from recently executed convicts into senile and devitalized men. By 1920, animal glands were substituted and were grafted to the testes of the prisoners [Hornblum, 1998].

Stanley indicated that the best glands to use were taken from rams, goats, or boars between 12 and 18 months of age. Also, hundreds of inmates were injected with animal testicular substances. Stanley was convinced that his procedures had a “decided effect” from “general asthenia” to “renewed sexual stimulation.” Stanley called his operations “practically painless and harmless” and added that they could be carried out on prisoners because of their regimented lifestyles [Hornblum, 1998]. He published his experimental findings in *Endocrinology* [Stanley, 1922].

In 1934, Dr. H. J. Corper at Denver’s National Jewish Hospital claimed that a tuberculosis vaccine that he had developed was ready for trial on human beings. Two convicts from the Colorado Penitentiary were selected for the clinical trial among the 800 prisoners who had applied because Governor Edwin C. Jones had promised executive clemency for survivors of the risky experiment [Hornblum, 1997].

By the summer of 1942, inmates in state penal systems were involved in dangerous medical experiments, including injecting blood from beef cattle as a new source of plasma; studies of atropine; experimentation with sleeping sickness, sandfly fever, and dengue fever; and exposure to gonorrhea and gas gangrene [United States Department of Justice, 1944; O’Hara, 1948; Wharton, 1954].

Studies of malaria in over 400 prisoners were carried out at the Stateville Penitentiary in Illinois between 1944 and 1946. One inmate wrote that although they had to contend with periodic mosquito bites, raging fevers, nausea, vomiting, blackouts, endless untested medications, and occasional relapses, “no one squawked. They all took it like men” [Leopold, 1958]. A New York Times editorial stated, “these one-time enemies to society appreciate to the fullest extent just how completely this is everybody’s war [Laurence, 1945].

The medical experiments on prisoners continued during the post-war period until 1972. Although they did not influence the Nazis, these experiments by American physicians became more extensive during this period of time than before and during the war. To allow modern physicians to become familiar with these unethical experiments in our own country, they are summarized in Appendix I.

## Discrimination Against Black People in the United States

For contrast of early Nazi policy with discrimination in the US against black people, the Nuremberg Laws are briefly summarized.

The Nuremberg Laws signed by Hitler in 1935 (1) excluded Jews from German citizenship, (2) prevented marriage and/or sexual relations between Jews and non-Jews, and (3) defined those who were 1/8 Jewish and in some cases 1/4 Jewish as legally Aryan who could marry full-blooded Germans. In 1938, Jewish physicians were barred from practicing medicine except on other Jews [Proctor, 1992].

In the United States, several southern states defined an individual who was 1/32 black as still legally black. German medical journals produced charts showing which states disallowed blacks from marrying whites or from voting. In 1939, the *Archives of Racial Hygiene and Social Biology* reported the refusal of the American Medical Association to admit 5,000 black physicians to their ranks<sup>2</sup> [Proctor, 1992].

## TWO IRONIES IN US AND NAZI LAWS

(1) In 1933, Hermann Göring banned vivisection of laboratory animals ironically on the grounds that it was unethical [Proctor, 1999]. This became a Nazi law on November 24 of the same year [Grodin, 1992]. If the Reich Guidelines Circular of 1931 (Box 1) had any force in law, “the guidelines’ stipulation that animal experimentation precede any human experimental trials would have been revoked by this 1933 Nazi legislation. Ironically, if this law . . . (had included human beings as animals) . . . most, if not, all Nazi human experimentation would have been outlawed” [Grodin, 1992].

A parallel irony is found in some laws in the United States. The Society for the Prevention of Cruelty to Animals became a law earlier than any law to protect children. In fact, the first case brought on behalf of a child on April 19, 1874 stated explicitly that the child, as an animal, should be protected. The American Society for the Prevention of Cruelty to Children was finally organized in December 1874 [Cone, 1979; Grodin, 1992].

(2) In Germany, Haeckel [1900] was the first to consider killing “weaklings” [Haeckel, 1900]. Binding and Hoche [1920] published *Release and Destruction of Lives Not Worth Living* in which “the right to live must be justified.” Certain individuals, such as the incurably ill and institutionalized psychiatric patients, could have their lives terminated, and this was claimed to be humane. These ideas, of course, became incorporated into Nazi policy [Geiderman, 2002].

Examples of “lives not worth living” also appeared in the American literature, although they never became widely accepted. This idea received support from Carrel [1935], the French-American Nobel Laureate, who strongly suggested that those individuals who were criminals or mentally ill should be “humanely and economically disposed of in small euthanasia institutions supplied with proper gasses.”

Carrel also praised the Nazi regime:

The German government has taken energetic measures against the propagation of the defective, the mentally diseased, and the criminal. The ideal solution would be the suppression of each of these individuals as soon as he has proven himself to be dangerous [Reggiani, 2002; Baron, 2007].

<sup>2</sup>On July 10, 2008, JAMA finally issued an online apology by the AMA for “its past history of racial inequality towards African-American physicians.”

Later, as German psychiatrists were sending the last of their patients to the gas chambers, F. Kennedy [1942], in the *Journal of the American Psychiatric Association*, called for the killing of children with mental retardation, who he referred to as “nature’s mistakes.”

American journals as diverse as the *American Scholar* and the *Journal of the American Institute of Homeopathy*, among others, debated using forced euthanasia until the reports of the Nazi exterminations appeared in US newspapers [Proctor, 1992].

## SOCIAL DARWINISM, RACIAL HYGIENE, AND THE NAZI DOCTORS

Charles Darwin’s epoch-making book *Origin of Species* was published in 1859. Evolution took place by natural selection to ensure that the “fittest” of species would survive. However, fitness was relative to the ecological niche in which the organism evolved [Darwin, 1859].

Social Darwinism was the notion that Charles Darwin’s biological evolution through competition (survival of the “fittest”) could be applied to human individuals, groups, or nations. This concept was derived from the work of Herbert Spencer’s book of 1864, *Principles of Biology* [Spencer, 2002; updated version]; Thomas Malthus’s *An Essay on the Principles of Population* [Malthus, 1798]; Charles Darwin’s cousin, Francis Galton, the founder of eugenics [Forrest, 1974]; and others. Even before Darwin’s work, Arthur de Gobineau wrote about racial superiority in *An Essay on the Inequality of Human Races* (1853–1855) [Biddiss, 1970]. In Germany, Ernst Haeckel’s *Riddle of the Universe* first published in 1899 brought Social Darwinism and racial hygiene to a very wide audience [Haeckel, 1900].

The Social Darwinists in Germany were concerned with two basic problems: (1) medical intervention had allowed the weak to survive and reproduce, which confounded natural selection and (2) “weak and inferior races” were reproducing faster than the “German race,” and this was considered to be particularly harmful since ethnic Germans were experiencing a falling birth rate [Geiderman, 2002].

In 1879, as a youth, Alfred Ploetz, a German physician, biologist, and eugenicist, founded a secret schoolboy society for the improvement of the human race. He first proposed the theory of racial hygiene in 1895 [Ploetz, 1895]. He founded the periodical *Archives for Racial and Social Biology* in 1904. Also, Ploetz together with Ernst Rüdin, a psychiatrist, founded the Society for Racial Hygiene in 1905 [Kater, 1989].

Ploetz, who thought the white race was superior and the German people were at the top, suggested that during a war, only inferior members of a race should be sent to the front to serve as “cannon fodder.” He even thought that to keep a superior race healthy, a group of doctors should decide whether an infant should be allowed to live [Kater, 1989].

Ploetz was given an honorary doctorate from Munich University in 1930, and 6 years later, Hitler personally appointed him as Professor there [Kater, 1989].

Fritz Lenz, a pupil of Alfred Ploetz, was the Chief Editor of the *Archives for Racial and Social Biology* from 1913 to 1933. In 1923, he became the First Chair in Eugenics at Munich University. In 1933,

he established the first department of eugenics at the Kaiser Wilhelm Institute of Anthropology, Human Heredity, and Eugenics in Berlin. Lenz together with Bauer and Fischer summarized all their research in *Human Hereditary Theory and Racial Hygiene* in 1936. Lenz<sup>3</sup> and coworkers were considered to be Germany’s leading racial theorists. Lenz praised Hitler as the first great politician to adopt racial hygiene as a state policy. It was Lenz [1931] too who coined the phrase *applied biology*, which Nazi leaders used when they referred to National Socialism as *applied biology* [Proctor, 1992]. Lenz’s idea that the superiority of the “Nordic Race” was under threat made a strong impression on Hitler [Kater, 1989].

German university institutes for racial hygiene (about 20 in number) were established *before* the Nazis rose to power. The largest such institution was Verschuier’s Frankfurt Institute for Racial Hygiene, where Josef Mengele did his doctoral research on the genetics of cleft palate [Proctor, 1992].

The idea of biological determinism attracted German physicians to join the Nazi party. By 1929, 6% of all doctors joined the National Socialistic Physicians’ League. By 1937, doctors were members of the SS with seven times the frequency of other employed male groups in the population. By 1942, half of all German doctors had joined the Nazi party, and many had roles in the Nazi government and in the universities [Kater, 1983, 1989; Cohen, 1988; Proctor, 1992].

The medical profession, particularly psychiatrists and university physicians, played key roles in sterilization, cruel medical experiments, selecting those to be murdered, and the exploitation of dead bodies. The Action T4 Program between 1939 and 1941 led to the systematic killing of “lives not worth living.” Later, during the “final solution” for Jewish victims, “selection” for death was performed by SS doctors who had gained “experience” earlier by making medical decisions in the Action T4 Program. Physicians also determined the modes of death.<sup>4</sup> The gas chamber, for example, clearly developed from Nazi medicine [Mitscherlich and Mielke, 1949; Lifton, 1986; Proctor, 1988, 1992; Wild, 1988; Kater, 1989; Gallaher, 1995; Müller-Hill, 1998; Hoedeman, 1991; Breggin, 1993; Friedlander, 1995; Ernst, 2001; Dudley and Gale, 2002; Seeman, 2005; Seidelman, 2007].

## NAZI PERSECUTION OF JEWISH PHYSICIANS

Hitler spoke of the German people as biological corpus (*Volkskörper*), which was diseased because of the Jew, who is a “bacillus” or “parasite” engaging in “blood poisoning” inside the German national body. He lamented that the “Jewish poison” had been able to “penetrate the bloodstream” of the German people

<sup>3</sup>In marked contrast, his son Widukind Lenz was a humanitarian and distinguished physician geneticist, who delineated many newly recognized disorders (Lenz microphthalmia syndrome, Cenari-Lenz syndrome, femur-fibula-ulna dysostosis, and caudal deficiency complex, to name a few). He was the first to recognize the thalidomide disaster and became an authority on limb malformations. He published extensively and had widely diversified interests, including, among others, growth and development, nutrition, sex determination, and gonadal function [Opitz and Wiedemann, 1996].

<sup>4</sup>With the exception of death by machine gun or by hanging.

earlier because the state had no power to master the “disease” [Kater, 1989].

This imagery of Jews became part of the mainstream thinking of the Nazi Physicians’ League, in which “cleansing of *völkisch* body” from Jews was bandied about. The anti-Jewish race laws were introduced in 1935 [Kater, 1989]. The Nazis continued their medicalized war against the Jews. Physicians who were Jewish were forbidden from practicing on non-Jews, and were dismissed from university posts, particularly professorships, as well as from other facets of health leadership and from medical societies. In the “final solution,” massive genocide of 6 million Jews took place in concentration camps during the Holocaust. Three Nazi medical images had converged by that time: the Jew as “disease,” the German people as the “patient,” and National Socialism as the “physician” [Kater, 1989]. Jewish pediatricians and dermatologists, who made up a significant proportion of both medical specialties (49% of all pediatricians,  $n = 1,253$ , and 32% of these were women [Seidler, 2000]; 27.4% of all dermatologists,  $n = 2,078$  [Sholz and Eppinger, 1999]) experienced the worst kind of persecution.

## PSEUDO-GENETICS AND THE NAZI PHYSICIANS

In 1933, the Nazi’s implemented their *Law for the Prevention of Hereditarily Diseased Descendants*. This law permitted the involuntary sterilization of those thought to be carrying diseases of genetic origin [Proctor, 1988; Hanauske-Abel, 1996]. The purpose was to “cleanse” the gene pool and improve the “German race.” Although those with “congenital feeble-mindedness” and schizophrenia made up the majority of targeted individuals, the law also applied to those with manic depressive psychosis, idiopathic epilepsy, Huntington disease, major malformations, congenital blindness, congenital severe hearing deficit, and chronic alcoholism. The law was later expanded to include “dangerous habitual criminals and allowed for the involuntary abortion of a fetus during the first 6 months of pregnancy carried by a mother with “hereditary illness” [Geiderman, 2002].

The law resulted in the sterilization of about 400,000 individuals. Some 200 “Genetic Health Courts” were set up in which a jury of “experts” determined who should be sterilized [Rothmaler, 1989; Ernst, 2001]. Men underwent vasectomy and women underwent tubal ligation or exposure to radiation. Most were Germans rather than Jews or other non-Aryan peoples [Proctor, 1988; Barondess, 1996; Weyers, 1998].

The *Law for the Protection of the Genetic Health of the German People* required premarital medical examinations to “prevent the spread of racially damaging diseases” and the *Law for the Protection of German Blood and German Honor* forbade marriage or sexual relations between Jews and non-Jews and defined what percentage of Jewish ancestry was permissible [Proctor, 1988; Weindling, 1989, 2005].

Physicians were required to receive training in “genetic pathology” at the racial institutes. They became state spies who were to report patients who were potential candidates for sterilization [Seidelman, 1996]. In 1933, *Deutsches Artzeblatt* published an article titled *The Physician and Genetic Improvement* and introduced the concept of the extermination of a “life not worth living” [Lommel, 1933].

## NAZI PHYSICIANS WHO COMMITTED ATROCITIES AND EPONYMS OF UNETHICAL GERMAN PHYSICIANS

Table I lists some important Nazi physicians who committed atrocities. These Nazi physicians and those who were tried at Nuremberg represent only the tip of the iceberg. In 1949, Mitscherlich and Mielke estimated that about 350 doctors behaved criminally, but from more recent data, Ernst [2001] has indicated that this figure represents a gross underestimate. Table II lists some eponyms of unethical German physicians with recommended changes in the names of the disorders [Strous and Edelman, 2007].

Some of these physicians were Professor Doctors. These include Professor Dr Hans Eppinger (Table II), Professor Dr Julius Hallervorden (Table II), Professor Dr August Hirt (Table I), Professor Dr Jussuf Ibrahim (Table II), Professor Dr Eduard Pernkopf (Table II), Professor Dr Hans Conrad Julius Reiter (Table II), Professor Dr Ernst Rüdin (Table I), Professor Dr Karl Schneider (Table I), Professor Dr Hugo Spatz (Table II), Professor Dr Hermann Stieve (Table I), Professor Dr Walter Stoeckel (Table II), Professor Dr Otmar von Verschuer (Table I), and Professor Dr Hermann Voss (Table I).

Except for the suicides of Eppinger, Hirt, and Schneider, the other Professor Doctors listed in Tables I and II, despite the atrocities they committed during the Third Reich, were never prosecuted, and went on to continue their professional lives after the war. They are discussed below except for Julius Hallervorden and Eduard Pernkopf, whose criminal behavior was so heinous as to warrant separate sections (Boxes 3 and 4).

Ibrahim, a pediatrician, was honored after World War II with the Ibrahim Clinic for Child and Adolescent Medicine (Kinderklinik Jussuf Ibrahim) at the Friederich–Schiller–Universität in Jena; two Ibrahim kindergartens; and one Ibrahim Street. An investigative commission concluded that Ibrahim had not only supported the Nazi euthanasia project but also played an active role in the killing of severely sick and handicapped children. His name was removed following a public outcry [Reif-Spirek, 2001].

Despite Reiter’s dedicated support of Hitler’s policies, his fanatical university teaching of racial hygiene, his appointment as Director of the Health Department in the State of Mecklenburg-Schwerin, and his authorization of experimental atrocities in concentration camp inmates, he was awarded a number of international honors after the war, including being a corresponding member of the Royal Society of Medicine in London [Panush et al., 2003; Lu and Katz, 2005]. In 2003, an international group of editors of rheumatology journals made the decision not to permit Reiter’s name in any of the disorders previously named after him to be used in their journals [Dendl et al., 2004] (see Table II).

Rüdin, a cofounder of the Society for Racial Hygiene, was an intellectual leader of the Nazi program of enforced eugenic sterilization and was honored twice by Hitler for his contributions. He was the President of the German Society for Psychiatrists and Neurologists from 1935 to 1945. His colleagues nicknamed him *Reichsführer for Sterilization*. Rüdin neither fled nor hid at the end of the war, but simply claimed that he was only a nominal member of the Nazi Party, not a major architect of the Nazi sterilization program, and he was completely exonerated (vide infra). His work

TABLE I. Some Important Nazi Physicians Who Committed Atrocities

Names	Lifespan	Post-war disposition	Atrocities committed
August Hirt	1898–1945	Suicide	Professor of Anatomy, Strasbourg Medical School. Co-inventor of the fluorescent microscope. Hirt wanted to collect skulls of all races and people for his department. Nazi authorities, in cooperating with him, gassed about 86 Jewish prisoners from concentration camps and transferred the bodies to his department. Hirt was also involved in experimental atrocities with mustard gas and phosgene. Served in the SS as a physician in Auschwitz. Participated in the selections for gassing on at least 14 occasions. He was likely involved in the deaths of several thousand prisoners. He was also interested in the impact on the internal organs resulting from starvation of prisoners. He killed such prisoners with phenol injections after which histopathological slides were made of the liver, spleen, and pancreas for his study.
Johann Paul Kremer	1883–1965	He was convicted at the Auschwitz trial and sentenced to death, but this was later commuted to life imprisonment. He was released in 1958 and died in 1965	Carried out terminal experiments on prisoners in special pressure chambers to help develop methods to deal with the problems of high altitude flying. This research was jointly sponsored by the Luftwaffe and the SS. Rascher caused the death of about 100 prisoners. He was also involved in freezing experiments that caused the deaths of about 90 prisoners and extreme pain to about 200 others at Dachau concentration camp.
Sigmund Rascher	1909–1945	For illegal adoption and registration of two boys, Rascher and his wife were arrested, and Rascher was executed at Dachau just before liberation <sup>a</sup>	Director of the Kaiser-Wilhelm Institute of Psychiatry in München. Major leader of the Nazi eugenics program and was the principal architect of the enforced program of sterilization. He was President of the German Society of Psychiatrists and Neurologists from 1935 to 1945. Rüdín's work on the genetics of schizophrenia continues to be cited in the field of psychiatric genetics without reference to his major role in the eugenics sterilization program in Nazi Germany.
Ernst Rüdín	1874–1952	Never prosecuted	Professor and Chairman of the Psychiatry Department at the University of Heidelberg. He studied victims of euthanasia while they were still alive and dissected their brains after they were murdered. Professor of Anatomy at the University of Berlin. When women were to be executed by the Gestapo, Stieve was informed of their dates of execution in advance and the women were also informed of the dates of their deaths. Stieve would then study the effects of the psychic trauma on the their menstrual patterns. Following their executions, Stieve would dissect out their pelvic organs for histological examination and he published these studies. Both a lecture room and a sculpted bust were dedicated to his honor at the Berlin Charité Hospital [Seidelman, 2007].
Karl Schneider	1891–1946	Committed suicide in 1946	Director of the University Institute of Genetics at the University of Frankfurt and the Kaiser-Wilhelm Institute of Anthropology of Berlin-Dahlem. He was an expert on twin studies and was the principal investigator in the experiments of Joseph Mengele in Auschwitz.
Hermann Stieve	1886–1952	After the war, Stieve served as Dean of the Faculty of Medicine of Humbolt University, the successor to the University of Berlin	
Otmar von Verschuer	1896–1969	Became Professor and Head of Genetics at the University of Münster, where he trained many post-war German leaders in the field of genetics	



Hermann Voss	1894–1987	<p>Voss continued his career after the war. He had appointments at Halle, Jena, and subsequently as Professor Emeritus at the Greifswald Anatomical Institute</p> <p>Professor of Anatomy and Dean of Medicine of Reichsuniversität of Pozen. Following the death of Poles, they were either cremated in the ovens of his institute or dissected in his anatomy laboratory. He used the bodies of executed prisoners for the preparation of skeletons, which he sold for profit. Voss also prepared death masks and busts from the bodies of Jews from a nearby concentration camp. These were then sold to the University of Vienna Museum of Natural History, together with the skulls of Jews and non-Jewish Poles. The skulls, masks, and busts were displayed in the Museum's Race Gallery. Voss also coauthored a textbook of anatomy <i>Taschenbuch de Anatomie</i>. It was probably the most popular anatomic textbook ever published in Germany. There were 17 German language editions, and Spanish and Polish editions as well [Seidelman, 2007]</p>
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Based on data from Lachman [1977], Kater [1989], Kasten [1991], Aly [1994], Seidelman [1996, 2001, 2007].  
<sup>a</sup>Rasher's wife could not have children and Rasher depended on male progeny, but the two boys had been illegally abducted. Rasher was arrested and later shot by Himmler's men for the abduction [Kater, 1989].

on the genetics of schizophrenia is often cited without any reference to his being a major architect of the Nazi sterilization program [Stern, 1951; Seidelman, 1996].

Franz Kallmann (Kallmann syndromes 1, 2, 3, and 4)<sup>5</sup> was a German psychiatrist and geneticist, who moved to the United States in 1936 and continued his career, writing a large number of articles. He was discussed in a favorable light in the US, where he was said to be strongly opposed to forced eugenic measures and had vocally expressed this. He was said to have been banned from publishing or speaking at medical meetings in Nazi Germany. In the United States, he became one of the founders of psychiatric genetics and was a leader in the studies of schizophrenia and other disorders [Gershon and Müller-Hill, 1989; Rainer, 1989]. A sympathetic biographical sketch also appeared [Beighton and Beighton, 1997].

Kallmann was born into a Jewish family, although his father had converted to Christianity. Kallmann's wife Helly was Lutheran, and her sister, an ardent Nazi functionary, advised Helly, in 1936, to divorce Kallmann or failing that, they should flee Germany together for another country, such as the United States. Although Kallmann left because he was of Jewish heritage, more recent articles [Abdullah, 2001; Mildenerger, 2002] have shown that he had an unsavory past in Nazi Germany. He and von Verschuer (*vide infra*) made up the powerful inner circle of Ernst Rüdin, the cofounder of the Society for Racial Hygiene and the *Reichsführer for Sterilization* (*vide supra*).

In 1935, Kallmann presented an article at the International Congress for Population Science in Berlin hosted by Hitler's Interior Ministry. He proposed an even more radical sterilization policy than the Nazis had by arguing for the sterilization of apparently healthy relatives of schizophrenics as well as the schizophrenics themselves to eliminate all the defective genes. Kallmann's article was well received and highly acclaimed. In fact, his genetic studies were used partly to justify the murder of psychiatric patients, including many children [Mildenerger, 2002].

It was Rüdin who orchestrated Kallmann's move to the United States, where Kallmann was reported to have commented, "Schizophrenics... (are)... a source of maladjusted and criminal offenders... I am reluctant to admit the necessity of different eugenic programs for democratic and fascistic communities... There are neither biological nor sociological differences between a democratic and totalitarian schizophrenic" [Abdullah, 2001].

After his immigration to the US, Rüdin's assistant Theobald Lang delivered Kallmann's German data to him. His genetic studies based on these data together with new studies in the United States were published simultaneously in the US and Nazi Germany in 1938. In this work, Kallmann thanked Rüdin. At the end of the war, Kallmann certified that Rüdin was only a nominal member of the Nazi Party and was not involved in any criminal activities, which resulted in Rüdin's complete exoneration (*vide supra*) [Abdullah, 2001; Mildenerger, 2002].

Spatz, who researched the brains of children killed by euthanasia, was arrested but never charged. In fact, he was invited to join the U.S. Aeromedical Center in Heidelberg, where he

<sup>5</sup>See OMIM [2008] in reference section.

TABLE II. Eponyms of Unethical German Physicians and Recommended Changes\*

Names	Eponyms	Recommended changes	Unethical behavior
Julius Hallervorden (1882–1965)	Hallervorden–Spatz syndrome	PKAN neuroaxonal dystrophy	Hallervorden as Professor and Head of Neuropathology at the Kaiser Wilhelm Institute for Brain Research acquired 697 brains from victims of involuntary medical killing (“euthanasia”). He is said to have been present at the killing of more than 60 children and adolescents at the Brandenburg Psychiatric Institute. For details, see Box III
Hugo Spatz (1888–1969)	Spatz–Stiefler reaction	Paralysis agitans	Spatz as Director of the Kaiser Wilhelm Institute worked with Hallervorden and did research on children killed in the “euthanasia” project. He also obtained hundreds of brains from mentally ill patients killed at the Brandenburg Psychiatric Institute
Hans Eppinger (1879–1946)	Cauchois–Eppinger–Frugoni syndrome	Portal vein thrombosis	Eppinger was Professor of a prominent internal medicine clinic in Vienna. He conducted cruel experiments on Gypsy prisoners who were forced to drink sea water
Murad Jussuf Bey Ibrahim (1877–1952)	Eppinger spider nevus Beck–Ibrahim disease	Spider nevus Congenital cutaneous candidiasis	Ibrahim was an Egyptian pediatrician who completed his studies in Berlin and was later appointed as Professor of Pediatrics. He supported the Nazi killing program (“euthanasia”) and was thought to have taken an active role in killing sick and mentally ill children, who had been defined by the Nazis as “unworthy life”
Friedrich Wegener (1907–1990)	Wegener granulomatosis	Idiopathic necrotizing granulomatosis	Wegener was a pathologist who was a dedicated Nazi even before Hitler came to power. Under Hitler, he became a lieutenant colonel. He is thought to have been involved in the atrocities at the Lodz ghetto, where he was stationed
Hans Conrad Julius Reiter (1881–1969)	Reiter syndrome Reiter spirochete Reiter test	Infectious uoarthritis A treponeme variant, once called Treponema forans Complement fixation test for syphilis	Reiter was a German bacteriologist who joined the Nazi party in 1932 and embraced Hitler’s doctrines. He became Department Director of the Kaiser Wilhelm Institute of Experimental Therapy in Berlin and was later appointed Director of the Health Department of the State of Mecklenburg-Schwerin. Throughout his career, he encouraged the fanatical teaching of racial hygiene in universities. As Director, he devised, approved, and supervised medical experiments on victims in concentration camps, including one in which 250 Buchenwald prisoners died of typhus inoculations

Hans Joachim Scherer (1906–1945)	Van Bogaert–Scherer–Epstein syndrome	Cerebrotendinous xanthomatosis	Scherer was a German neuropathologist who was the first physician to clearly distinguish primary and secondary glioblastomas. Working in the Neurology Institute of Breslau, he was directly involved in the neuropathologic study of over 300 Polish and German children killed (“euthanized”) at the nearby Loben Psychiatric Clinic for Youth
Walter Stoeckel (1871–1961)	Stoeckel operation Schauta–Stoeckel operation Kelly–Stoeckel suture	Pubovaginal fascial sling operation for stress incontinence Radical vaginal hysterectomy with lymphadenopathy Anterior colporrhaphy	Internationally renowned German gynecologist who was Professor of Gynecology at the Berlin Charity Hospital. He was very sympathetic to Nazi causes. Together with other German gynecologists, he sent Hitler a telegram of enthusiastic support. As President of the German Society of Gynecology, he was with a single exception responsible for the expulsion of all Jewish physicians from the Society
Eduard Pernkopf (1888–1955)	Pernkopf Atlas of Human Anatomy	See Box 4 on Pernkopf	Pernkopf was Professor of Anatomy and Dean of Medicine at the The University of Vienna. He joined the Nazi Party in 1933. He was the major instigator in purging Jewish physicians from the medical school: 153 Jewish faculty members, including three Nobel Laureates. Pernkopf wrote a monumental and still used anatomical atlas, in which the anatomical drawings were signed with swastikas. At his Anatomical Institute, he received almost 1,400 bodies from Gestapo execution chambers in Vienna. For details, see Box 4

Data from Shafer [1977], Harper [1996], Israel [1998], Wallace and Weisman [2000], Shevell and Peiffer [2001], Panush et al. [2003], Lu and Katz [2005], Waywadt et al. [2006], Strous and Edelman [2007], OMIM 234200 [2008].

\*Kallmann syndromes 1, 2, 3, and 4 do not appear in this table. See text for Franz Kallmann's unsavory past in Nazi Germany. I invite medical geneticists to give me their recommendations about whether an eponymous change is recommended.

### Box 3: Julius Hallervorden

Julius Hallervorden (1882–1965), trained originally as a psychiatrist and later as a neuropathologist, was Professor and Head of the Neuropathology Department of the Kaiser Wilhelm Institute for Brain Research. He had succeeded Max Bielchowsky, who was dismissed in 1933 because he was a Jew [Harper, 1996; Shevell and Peiffer, 2001].

At the end of the war, Hallervorden was debriefed about his personal involvement in Action T4, the official Nazi program from 1939 to 1941 in which 250,000 individuals with mental or physical disabilities were systematically killed. He was remarkably frank [Alexander, 1945; Harper, 1996; Shevell and Peiffer, 2001]:

“I heard they were going to do that . . . (carry out the killings) . . . and so I went up to them and told them, ‘Look here now, boys. If you are going to kill all those people, at least take the brains out so that the material can be utilized.’ There was wonderful material among those brains, beautiful mental defectives, malformations and early infantile disease. They asked me ‘how many can you examine?’ And so I told them an unlimited number—the more the better. I gave them fixatives, jars and boxes, and instructions for removing and fixing the brains. They came bringing them in like a delivery van from the furniture company. The public ambulance society brought the brains in batches of 150–250 at a time. I accepted the brains, of course. Where they came from and how they came to me was really none of my business. Whoever looked sick or was otherwise a problem patient from the nurses’ or attendants’ point of view was put on a list and was transported to the killing center. The worst thing about this business was that it produced a certain brutalization of the nursing personnel. They got to simply picking out those whom they did not like” [Alexander, 1945].

During the war, Hallervorden carried out neuropathological examinations on (1) Action T4 victims of Brandenburg–Gordon; (2) patients from the Leipzig-Dossen Psychiatric Institute, a transfer center for Action T4; (3) child euthanasia victims from various hospitals; and (4) typhus deaths from the Jewish Hospitals in Warsaw and Lublin [Shevell and Peiffer, 2001]. Hallervorden was never charged with any crimes and continued his career during the post-war years. During that time, he published 12 scientific articles based on these Nazi victims [Peiffer, 1991; Shevell and Peiffer, 2001].

He received an honorary doctorate in 1956 and retired as a Professor Emeritus before his death in 1965 [Krücke, 1966; Richardson, 1990; Shevell and Peiffer, 2001]. Ironically, a laudatory biography of Hallervorden is included in an American book titled *The Founders of Child Neurology* [Richardson, 1990].

Hallervorden and Spatz, in 1922, described a newly recognized disorder consisting of familial brain degeneration in 5 of a sibship of 12 individuals. Unusual histological features included iron deposition. The syndrome has since been known as Hallervorden–Spatz syndrome. Harper [1996] suggested that because of the heinous crimes committed during the Nazi era, it is indefensible to use the names of Hallervorden and Spatz to describe the disorder, even though the original published article in 1922 involved no wrongdoing. The term neuroaxonal dystrophy has been considered a suitable substitute [Harper, 1996; Strous and Edelman, 2007]. However, the disorder is now known to be caused by a mutation in the pantothenate kinase gene *PANK2* (mutations in the same gene also cause the allelic disorder HARP syndrome). The abbreviation PKAN stands for pantothenate kinase-associated neurodegeneration. Therefore, an appropriate term for the disorder is PKAN neuroaxonal dystrophy [OMIM 234200, 2008].

continued to do research. In 1949, Spatz was given laboratories in the Physiological Institute in Giessen and later transferred to the new Max Planck Institute in Frankfurt [Strous and Edelman, 2007].

Stoeckel, an internationally known gynecologist and obstetrician, was an ardent supporter of Hitler, and together with other German gynecologists sent Hitler a telegram, expressing their “enthusiastic admiration.” He served as President of the German Society of Gynecology from 1933 to 1934 and was responsible for the expulsion of Jewish physicians from the society. He died in 1961 [Strous and Edelman, 2007].

### EPONYMS OF FAMOUS PHYSICIANS WHO WERE NAZI VICTIMS

Table III lists the eponyms of five famous physicians who were Nazi victims. These doctors need to be remembered for their remarkable contributions [Strous and Edelman, 2007].

Two of these are very well-known in medical genetics: Ludwig Pick (Fig. 1) (Niemann–Pick disease, types A, B, C1, C2; Lubarsch–Pick syndrome; Pick cell; Pick retinitis)<sup>5</sup> and Simon van Creveld (Fig. 2) (Ellis–van Creveld syndrome; van Creveld–Gierke syndrome)<sup>5</sup> [Strous and Edelman, 2007]. Pick was imprisoned in a concentration camp where he died in 1944 [Simmer, 1994; Shevell, 1999]. van Creveld and his wife were both imprisoned in a concentration camp; van Creveld demonstrated great courage treating the children there [Emed, 2000]. He survived the war and was reinstated as Professor of Pediatrics.

Lucja Frey (Fig. 3) (Frey syndrome)<sup>5</sup> was a Jewish woman neurologist, whose syndrome is well-known to neurologists. She was killed by the Nazis [Dunbar et al., 2002; Moltrecht and Michel, 2004; Maciejewska et al., 2007]. Abraham Buschke (Fig. 4) (Buschke disease or Busse–Buschke disease, Buschke–Fischer–Brauer syndrome, Buschke–Löwenstein tumor, Buschke–Ollendorf syndrome)<sup>5</sup> and Karl Herxheimer (Fig. 5) (Herxheimer disease; Jarisch–Herxheimer reaction)<sup>5</sup> were famous Jewish dermatologists in Germany. Both were professor doctors,



TABLE III. Eponyms of Famous Physicians Who Were Nazi Victims

Names	Eponyms	Lifespan	Pertinent facts
Ludwig Pick	Niemann–Pick disease Lubarsch–Pick syndrome Pick cell Pick retinitis	1864–1944	World-renowned German pathologist. Imprisoned by the Nazis at Theresienstadt concentration camp where he perished on February 3, 1944
Simon van Creveld	Ellis–van Creveld syndrome van Creveld–Gierke syndrome	1894–1971	Famous Dutch pediatrician, Professor of Pediatrics at the University of Amsterdam. He was expelled and imprisoned with his wife in a concentration camp where he bravely treated children there suffering from disease. He survived the war and was reinstated as Chairman of Pediatrics
Lucia Frey	Frey syndrome	1889–1942	Well-known syndrome among neurologists. Refers to unilateral injury to the parotid gland with rerouting of fibers affecting the sweat glands. On tasting food, transitory flushing and sweating occur on the face with absence of salivation from the ipsilateral parotid gland. Polish Jewish woman neurologist. Killed by Nazis while she was confined to a local ghetto clinic
Abraham Buschke	Buschke disease or Busse–Buschke disease Buschke–Löwenstein tumor Buschke–Ollendorff syndrome Buschke–Fischer–Brauer disease	1868–1943	World famous Jewish Professor Dr of Dermatology at Rudolf Virchow Hospital. With 400 beds, his clinic was one of the largest dermatology units in Germany. He was an excellent clinician and teacher with multiple eponyms. Buschke was deported to Theresienstadt concentration camp where he expired in a debilitated condition following severe enteritis
Karl Herxheimer	Jarisch–Herxheimer reaction Herxheimer disease or Pick–Herxheimer disease <sup>a</sup>	1861–1942	World famous Jewish Professor Dr of Dermatology and Head of the Department of Dermatology at Frankfurt University. He was deported to Theresienstadt concentration camp where he died in 1942 from hunger and dysentery

Data from Gans [1961], Curth and Ollendorff-Curth [1983], Gold and Nurnberger [1992], Natter [1994], Simmer [1994], Sholz and Eppinger [1999], Shevell [1999], Emed [2000], Dunbar et al. [2002], Moltrecht and Michel [2004], Steffen [2006], Maciejewska et al. [2007], Strous and Edelman [2007].

<sup>a</sup>Philipp Josef Pick, not Ludwig Pick.



FIG. 1. Ludwig Pick (1868–1944) was a world-renowned German pathologist and Director of Pathological Anatomy at the City Hospital in Friedrichshain-Berlin. He was imprisoned in a concentration camp where he perished. *Z. Ärztl Forbild (Jena)* 44:43, 1950. From the public domain.



FIG. 3. Lucja Frey (1889–1942) was a Polish Jewish woman neurologist, who had studied mathematics and philosophy as an undergraduate. After she became a physician, she described the disorder that bears her name *before* she became a licensed neurologist. After struggling through much of her career against the prejudice of being a Jewish woman physician, she became a victim of the Holocaust. *Wydawnictwo, Lekarskie PZWŁ*. From the public domain.



FIG. 2. Simon van Creveld (1894–1971) was Professor of Pediatrics at the University of Amsterdam. He was expelled by the Nazis and imprisoned with his wife in a concentration camp. He was very courageous treating children there. He survived the war and was reinstated as Professor of Pediatrics in Amsterdam. *Instituut voor Geschiedenis der Geneeskunde, Katholieke Universiteit, Nijmegen, Holland*. From the public domain.

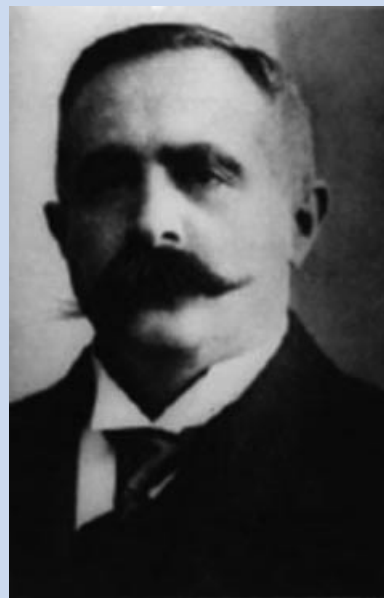


FIG. 4. Abraham Buschke (1868–1943) was famous as Professor Doctor of Dermatology at the Rudolf Virchow Hospital. His dermatology unit, with 400 beds, was one of the largest in Germany. The large number of dermatologists he trained is his legacy. There are four medical eponyms that bear his name. As a Jewish physician, he was sent to a concentration camp where he died from severe enteritis. From the public domain.



**FIG. 5.** Karl Herxheimer (1861–1942) became the Director of a Dermatology Clinic at the amazing age of 33. He later became a famous Professor Doctor and Director of Dermatology at Frankfurt University. There are two medical eponyms that bear his name. The German Dermatological Society named their annual award after him. After his retirement, he refused to take the advice of his friends to leave his own country. He was sent to a concentration camp because he was Jewish. He died there from hunger and dysentery. From the public domain.

excellent clinicians, researchers and teachers. Buschke died in a concentration camp from severe enteritis. Herxheimer also died in a concentration camp of hunger and dysentery [Gold and Nurnberger, 1992; Sholz and Eppinger, 1999; Steffen, 2006; Strous and Edelman, 2007].

Petrus Johannes Waardenburg (Waardenburg syndromes types I, II, IIA, IIB, IIC, IID, IIE, III or Klein–Waardenburg syndrome; Waardenburg–Shah syndrome; Waardenburg–Shah–syndrome, neurologic variant; Waardenburg–Jonkers disease)<sup>5</sup> courageously opposed the racial politics of the Nazis and bravely published against Nazi racism and anti-Semitism during the occupation of Holland. He was never incarcerated and died in 1979 [Waardenburg and Jonkers, 1961; Opitz, 1980; Williamson, 1980].

Large numbers of eponyms are attached to many physicians who fled from the Nazis. Many but not all of them were Jewish. Some fled for political reasons. Two physicians are well-known to medical geneticists: Paul George Seckel (Seckel syndrome, types 1, 2, 3, and 4)<sup>5</sup> and Meinhard Robinow (Robinow syndrome, autosomal dominant and autosomal recessive types)<sup>5</sup> [Strous and Edelman, 2007].

## RECOMMENDATIONS

I suggest considering the convening of an international committee of physicians and ethicists, independent of the International Helsinki Committee, to examine five issues. Perhaps the best way to

### Box 4: Eduard Pernkopf

Eduard Pernkopf (1888–1955) was Professor of Anatomy at the University of Vienna. He joined the Nazi Party in 1933, and after Hitler invaded Austria in 1938, he was appointed Dean of the Medical School. Pernkopf was responsible for purging 153 Jewish Faculty Members from the Medical School, including 3 Nobel Laureates. He was an ardent Nazi, and as Editor of the Viennese Medical Weekly (*Wiener Klinische Wochenschrift*) in a 1938 address to the Faculty of Medicine, he stated:

To assume the medical care—with all your professional skill of the Body of the People (*Volkskörper*) which has been entrusted to you, not only in the positive sense of furthering the propagation of the fit, but also in the negative sense of eliminating the unfit and defective. The methods by which racial hygiene proceeds are well known to you: control of marriage; propagation of the genetically fit whose genetic, biologic constitution promises healthy descendants; discouragement of breeding by individuals who do not belong together properly, whose races clash; finally, the exclusion (*Ausschaltung*) of the genetically inferior from future generations by sterilization and other means [Pernkopf, 1938].

Pernkopf is best known for his textbook of anatomy (*Topographische Anatomie des Menschen: Lehrbuch und Atlas der regionär-stratigraphischen Präparation*) [Pernkopf, 1943]. This is a seven volume work written and illustrated between 1933 and finally finished in 1955. Editions have appeared in German, English, Japanese, and Italian. It is considered the classic work on the subject among anatomists and surgeons, and it continues to be used in medical centers throughout the world. Positive reviews have appeared in the *New England Journal of Medicine* [Snell, 1990] and the *Journal of the American Medical Association* [Hast, 1990].

Pernkopf's illustrated work has become the standard work by which all other anatomy texts are measured [Williams, 1988]. The original publisher of the illustrated anatomic work was Urban and Schwarzenberg [Seidelman, 2007]. However, the book was written and illustrated during the Nazi era with profound ethical implications for its continued use.

Each illustration by three major artists is accompanied by each artist's signature together with a swastika attached. In fact, even the 1964 English version retains those signatures with swastikas. These have been airbrushed out in subsequent German and English versions [Seidelman, 2007].

Pernkopf was concerned about the shortage of cadavers in 1938 and 1939. He requested the use of bodies of executed victims in occupied Poland from the authorities in Berlin, but this request was denied. Pernkopf then put pressure on the administration of Vienna to order all city hospitals not to dissect bodies, but to turn them over to his institute [Lehner, 1990].

After considerable pressure by William E. Seidelman from Canada, Howard A. Israel from the United States, and the Yad Vashem from the State of Israel, the University of Vienna finally

carried out an investigation of Pernkopf's institute [Seidelman, 2007]. An announcement by the Rector, Professor Dr Alfred Ebenbauer [Presse-Konferenz der Universität Wien, 1997], showed that Pernkopf's Institute of Anatomy received almost 1,400 bodies from the Gestapo execution chamber of the Vienna Regional Court (*Landesgerichte*) [Senatsprojekt der Universität Wien, 1998]. An updating by Daniela Angetter [2000] of the Department of Medical History showed that 1,377 bodies, including 8 of Jewish origin, were guillotined at the Vienna Regional Court, but some of them had been shot by the Gestapo at a rifle range on the outskirts of Vienna. The names of the victims, their dates of execution, and the reasons for the sentences were documented. Most were sentenced for political reasons, but petty crimes such as pickpocketing, black marketeering, unauthorized slaughter of animals, or listening to enemy broadcasts also carried capital punishment. The Department of Histology was also found to have 98 specimens fixed in formaldehyde as well as histological sections and paraffin blocks given to the department by Heinrich Gross between 1953 and 1957. These specimens were dated from 1942–1944 and originated from the children murdered in the Nazi T4 “euthanasia” program [Angetter, 2000; Hubenstorf, 2000]. During the last years of the war, victims killed in execution chambers were supplied from Linz, München, and Prague [Lehner, 1990].

After the war, Pernkopf spent three years in Glasenbach, an Allied prison camp. He was never charged with any crimes, and following his release, he continued to work on his book in Vienna until his death in 1965 [Israel, 1998].

Pernkopf's tainted anatomy volumes have had varied responses. Riggs [1998] has indicated that the “use of the atlas itself is itself the most fitting tribute to those who died for it, whether they were victims of Nazi repression or not.” I regard this view as a sophistry.

Some have suggested that future editions of Pernkopf's work should include an explanation of its tainted background. Professor Dr Alfred Ebenauer, speaking on behalf of the The University of Vienna has stated, “I agree with the contemporary efforts of American physicians to add an explanation to the Pernkopf Atlas” [Presse-Konferenz der Universität Wien, 1997].

The Yad Vashem [Dafni, 1995] has indicated that the most appropriate course of action should be (1) an investigation by outside experts to determine who the subjects were in Pernkopf's atlas and how they died and (2) if some of the subjects were Nazi victims, there should be public commemoration by the responsible institution(s) and future editions of the book should contain a commemoration to them.

Many authors [Broder, 1996; Israel and Seidelman, 1996; Panush, 1996; Wade, 1996, 1997; Israel, 1998; Seidelman, 2007] have addressed the disturbing history of Pernkopf and his book. Some have even proposed removing the book from circulation, but Israel [1998] has indicated that suppression of the book is inappropriate.

Responses by medical libraries have been varied. The medical library of the National Institutes of Health has placed Pernkopf's volume on reserve with a note in the book referring the reader to

a binder of articles describing the biomedical ethical issues [Grefsheim, 1997]. Another library has expunged Pernkopf's book from its collection, but has retained it in a symbolic manner to remember the lessons surrounding the production of the book [Panush, 1996]. Some libraries have raised the issue of how to label controversial material, whereas others have not [Israel, 1998].

Strous and Edelman [2007] come to the closest to my own perspective on Pernkopf's book:

Needless to say, many other anatomy books exist today that provide significant improvement based on modern media technology. The use of such a tainted atlas has no place in modern medical usage.

I recommend some concrete steps that can be taken about Pernkopf's anatomy book in Box 5.

convene such a committee is as an adjunct to some future international medical genetics meeting. The committee should also include non-geneticists who are knowledgeable about the subject, including, among others, William E. Seidelman, Michael Grodin, Robert Jay Lifton, Howard Israel, E. Ernst, Joel Geiderman, Rael Strous, and Morris Edelman. A final report can be issued to appear in a journal of the committee's choice with a summary issued to all medical journals together with a notation about the journal reference in which the report is published.

First, eponyms of those doctors who exhibited complicity during the Nazi era (see Table II) should be reviewed and alternative names should be recommended, as suggested by Strous and Edelman [2007]. Perhaps some of the names need molecular updating, as I have done for the disorder described originally by Hallervorden and Spatz (PKAN neuroaxonal dystrophy;<sup>5</sup> see Box 3 about Julius Hallervorden). The case of Pernkopf's name attached to an anatomy book (Box 4) is particularly problematic and is discussed separately in Box 5.

Second, the eponyms of physicians who were victims of Nazi genocide (or in one case survival of a concentration camp) deserve special honors and their stories deserve to be repeated and publicized widely. I have reviewed five such physicians in Table III. They have also been discussed by Strous and Edelman [2007].

Third, during the Nazi era, many Poles and Russians as well as Jews were slaughtered in execution chambers. Contrary to German law, the bodies were not released for burial by relatives, but were sent to various university anatomical institutes [Evans, 1996; Seidelman, 2007]. Some institutes, after extreme external pressure, held investigations and issued reports (e.g., University of Vienna) [Seidelman, 2007]. However, not all have held their own investigations [Seidelman, 2007], and in these instances, the committee should recommend applying vigorous pressure to those German and Austrian institutes that have not yet determined if the bodies of Nazi victims remain in their collections.



### Box 5: Possible Courses of Action on Pernkopf's Anatomy Book

Four major suggestions have been put forth: (1) to be strong advocates for an introduction to future editions explaining Pernkopf's tainted background [Presse-Konferenz der Universität Wien, 1997]; (2) to recommend other anatomy texts rather than Pernkopf's book [Strous and Edelman, 2007]; (3) to find out who the bodies were that were used for the anatomical drawings [see Dafni, 1995; Israel, 1998]; and (4) to remove or not to remove the book from circulation (see Israel [1998] for discussion). It has been suggested that suppression of Pernkopf's book is inappropriate because it is reminiscent of the burning of Jewish books that occurred during the Nazi era [Israel, 1998].

It is known that the youthful age, cachectic appearance, and crude haircut of one subject portrayed in Pernkopf's Atlas raises the question of possible prisoner status [Israel and Seidelman, 1996; Israel, 1998]. Another illustration is of an adult male with a circumcised penis [Israel, 1998]. The specific identification of the bodies used for modeling remains unknown to date despite the large number of executed bodies procured by Pernkopf's Institute discussed in Box 4. In fact, exact identification of the bodies used for the drawings perhaps may not be forthcoming because "the Anatomical Institute and its collections were destroyed by a bomb near the end of the war" [Seidelman, 2007]. It appears not to be known yet if the involved records were also destroyed. However, Pernkopf's criminal behavior was so heinous, as shown in Box IV, that the proposed committee might consider issuing a report about Pernkopf's complicity during the Nazi era and distributing it to all departments and journals of anatomy and surgery as well as to all medical libraries.

Apparently, there are no plans for further editions of Pernkopf's book in either German or English [Israel, 1998]. However, we should still be vigilant for possible further printings, which are not the same as new editions, and we should also be watchful for the possibility of another publisher producing the book. I have seen a number of instances of both. Should either of these possibilities occur, the committee might consider applying strictures to Pernkopf's Atlas that are similar to those applied to the syndromes originally named after Reiter (see section titled "Nazi Physicians Who Committed Atrocities and Eponyms of Unethical German Physicians") and the syndrome named after Hallervorden and Spatz (see Box III), and although these have already been discussed, they are briefly summarized here: (1) An international group of editors of rheumatology journals decided not to permit Reiter's name to be used in any of their journal articles [Dendl et al., 2004], and (2) Harper [1996] indicated that because of the Nazi atrocities involving Hallervorden and Spatz, the use the eponym Hallervorden–Spatz syndrome is indefensible even though the disorder was described in 1922 before the Nazi era.

Similarly, if another printing should occur, the committee might consider recommending the renaming of Pernkopf's Atlas on ethical grounds alone, such as the "Vienna Atlas" or some other name, together with an introduction explaining the book's tainted background. Furthermore, a group of journal editors might consider not reviewing any reprinting of the Atlas in their journals. A decision to rename the book and not review it in any journal does not, of course, preclude further investigation of the bodies used for the drawings, nor does it preclude commemoration of its victims.

Fourth, McIntye and Popper [1983] have proposed that the lessons of the past bear repeating, and that an annual commemoration should be held worldwide in medical schools and research institutes. This would allow reflection about ongoing challenges together with the role and influence of university physicians and scientists in medicine.

The commemoration should include a lament for the victims of medical abuse [Seidelman, 2007]. Memorials to victims and their remains have been addressed by Seidelman [1989, 1996] and Peiffer [1991].

Fifth, it is essential to examine the influence of any political ideology that compromises the practice of medicine. Although it is perhaps comfortable to believe that what happened in Nazi Germany could not have occurred elsewhere, the fact is that atrocities and acts of genocide have been committed at various times in different places [Baron, 1999].

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### APPENDIX I

#### Post-War Increase in Medical Experiments in United States Prisoners

The post-World War II era ushered in a dramatic upsurge of experimentation in US inmates by American physicians, including studies of athlete's foot, histoplasmosis, infectious hepatitis, amoebic dysentery, influenza, and flash burns "which might result from atomic bomb attacks" [United States Department of Justice, 1945; Butterfield, 1951; Hornblum, 1997].

At the New York State Prison at Ossining, a "volunteer" to become a "human blood cleaning agent" had his circulatory system linked with that of a young girl dying of cancer in hope that her "poisoned blood" would be cleaned through the prisoner's blood stream. Following the risky experiment, the 8-year-old cancer victim died, and the prisoner won his freedom [New York Times, 1949].

Researchers from the Sloan-Kettering Institute for Cancer Research injected liver cancer cells into over 100 inmates from the Ohio State Prison System. The inmates were told that they were in "no grave danger. Any cancer that took would spread slowly and could be removed surgically" [Newsweek, 1956; Hornblum, 1997].

During the 1960s, Dr. Austin Slough, collaborating with some pharmaceutical companies, carried out a series of drug tests and blood plasma projects on prisoners in Oklahoma, Arkansas, and Alabama. As many as 30 inmates per month contracted viral hepatitis. One alarmed inmate wrote to the New York Times, "they're dropping like flies here." Studies of tropical diseases, respiratory infections, and pain tolerance studies were also carried out on prison inmates [Rugaber, 1969; Hornblum, 1997].

At Holmesburg Prison in Philadelphia, inmates were exposed to dioxin and chemical warfare agents. Research sponsors included pharmaceutical companies, R.J. Reynolds, Dow Chemical, and the US Army [Hornblum, 1998].

From 1963 to 1971 medical researchers irradiated the testicles of healthy male prisoners in Oregon and Washington. They repeatedly took biopsies, and the inmates reported rashes, peeling, and blisters on the scrotum, as well as sexual difficulties [Lerner, 2007].

In Tuskegee, Alabama, a study of untreated syphilis was carried out on 399 black prisoners from 1932 to 1972 under the auspices of the venereal disease section of the U.S. Public Health Service. These inmates had deliberately been left untreated for 40 years so that medical researchers could study the natural course of the disease [HR 16160, 1974]. The prisoners were not informed of their diagnosis. Instead, they were told that they had "bad blood," and for their cooperation, they could receive free medical treatment, free rides to and from the clinic, hot meals on examination days, and burial insurance in case of death [Olansky et al., 1954; Schuman et al., 1955; Jones, 1981; Reverby, 2000].

When the study began in 1932 standard treatments for syphilis were toxic, dangerous and of questionable effectiveness. By 1947, penicillin had become the standard treatment.

However, Tuskegee doctors withheld penicillin and also information about penicillin as well. The "special treatment" that the prisoners received consisted of (1) diagnostic lumbar puncture for signs of neurosyphilis and (2) free treatment for minor ailments [Kampmeier, 1972, 1974; Jones, 1981; Reverby, 2000].

A 1972 Associated Press story led to public awareness of the Tuskegee experiment [Heller, 1972]. At that time, with the black power movement and protests of the Vietnam war in full force, widespread condemnation was immediate [HR 16160, 1974; Tyler and Carlson, 1975; Lerner, 2007]. A National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research was set up and, later, the "Belmont Report, which recommended revamping human experimentation using the principles of respect for persons, non-maleficence, and justice" [Lerner, 2007].

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