The victims of unethical human experiments and coerced research under National Socialism

Paul Weindling 1,*, Anna von Villiez 2,6, Aleksandra Loewenau 3,4 and Nichola Farron 5

1 Oxford Brookes University, History, Philosophy and Religion, Headington Campus, Oxford OX3 0BP, United Kingdom
2 Independent Data Analyst
3 Oxford Brookes University, Centre for Medical Humanities, Department of History, Philosophy and Religion, Gypsy Lane, Oxford OX3 0BP, United Kingdom
4 University of Calgary, Cumming School of Medicine, 2500 University Drive NW, Calgary T2N 1N4, Canada
5 Independent Holocaust Historian

There has been no full evaluation of the numbers of victims of Nazi research, who the victims were, and of the frequency and types of experiments and research. This paper gives the first results of a comprehensive evidence-based evaluation of the different categories of victims. Human experiments were more extensive than often assumed with a minimum of 15,754 documented victims. Experiments rapidly increased from 1942, reaching a high point in 1943. The experiments remained at a high level of intensity despite imminent German defeat in 1945. There were more victims who survived than were killed as part of or as a result of the experiments, and the survivors often had severe injuries.

Keywords
Unethical human experiments German National Socialism Holocaust Jewish victims Gypsy victims Mengele Auschwitz Concentration camps Nazi euthanasia

Background
The coerced human experiments and research under National Socialism constitute a reference point in modern bioethics. Yet discussions of consent and the need for safeguards for research subjects to date lack a firm basis in historical evidence. There has been no full evaluation of the numbers of victims of Nazi research, who the victims were, and of the frequency and types of experiments and research. The one partial estimate is restricted to experiments cited at the Nuremberg Medical Trial. This paper gives the first results of a comprehensive evidence-based evaluation of the different categories of victims. In 1945 liberated prisoners from German concentration camps began to collect evidence of the experiments.

The scientific intelligence officer John Thompson then pointed out not only that 90% of all medical research under National Socialism was criminal, but also the need to evaluate all criminal experiments under National Socialism, and not just those whose perpetrators were available for arrest and prosecution. The Nuremberg Medical Trial of 1946–47 was necessarily selective as to who was available for prosecution, and since then only clusters of victims have been identified. In the early 1980s Günther Schwarberg named a set of child victims: his reconstruction of the life histories of the ‘twenty children’ killed after transport from Auschwitz for a tuberculosis immunisation experiment at Neuengamme concentration camp was exemplary. The question arises whether what Schwarberg achieved in microcosm can be achieved for the totality of victims. Our aim is to identify not just clusters of victims but all victims of unethical medical research under National Socialism. The methodology is that of record linkage to reconstruct life histories of the total population of all such research victims. This allows one to place individual survivors and groups of victims within a wider context.

This project on the victims of Nazi medical research represents the fulfilment of Thompson’s original scheme of a complete record of all coerced experiments and their victims. Our project identifies for the first time the victims of Nazi coercive research, and reconstructs their life histories as far as possible. Biographical data found in many different archives and collections is linked to compile a full life history, and subjective narratives and adminis-

---

*Corresponding author: Tel.: +44 1865 483485.
6 Tel.: +49 40/3900328.
7 Annas G, Grodin M. The Nazi Doctors and the Nuremberg Code. New York: Oxford University Press; 1992; Weindling P. Nazi Medicine and the Nuremberg Trials: From Medical War Crimes to Informed Consent. Basingstoke: Palgrave Macmillan; 2000. Available online 31 December 2015

---
A further issue relates to the methods and organisation of the research. From the 1950s the experiments were viewed as ‘pseudo-science’, in effect marginalising them from mainstream science under National Socialism. For the purpose of this study, the experiments have been viewed as part of mainstream German medical research, as this renders rationales and supportive networks historically intelligible. It is clear that prestigious research institutions such as the Kaiser Wilhelm Society and funding agencies such as the German Research Fund were involved. It has been argued more recently that some experiments were cutting edge science. Another view is that the approach and methods were scientific albeit of varying quality. For the purpose of this study, the experiments have been viewed as part of mainstream German medical research, as this renders rationales and supportive networks intelligible.

Defining what constitutes research is problematic. For example, a listing of operations in a concentration camp may be nothing more than a clinical record, may have been undertaken by young surgeons seeking to improve their skills, or may indeed have involved research. As stated above, only confirmed data of research has been utilised in the project’s category of a verified instance of unethical research. The only exception is the corpses sent to anatomical institutes for research purposes. Separating these out often does not appear possible, but the project includes anatomical research on body parts and brains as separate categories.

The project has graded victim evidence into two categories, so that there should be a set of verifiable and proven victims established as incontestable evidence of having been a victim. The unexpectedly high numbers of identified experiment victims makes this necessary. The two categories are:

1. those who were identified as confirmed victims through a reliable source such as experimental records kept at the time.
2. those who have claimed to have been experimented on, but confirmation could not so far be obtained.

The project did not set out to adjudicate on the authenticity of victims’ claims. In Warsaw ca. 3600 compensation files of victims of human experiments were viewed, while there are a further 10,000 files representing claims deemed unsuccessful. It is sometimes unclear whether extensive injuries were retrospectively defined to have resulted from an experiment to meet the criteria of the compensation scheme offered by the Federal Republic of Germany in various forms since 1951, or whether experimentation had taken place in a hitherto unknown location. The project discounted claims of abuse when no experiment or research was involved, or when victims having misunderstood compensation schemes for experiments being about

---

13 Schwertner von. Experimentalisierung des Menschen: Der Genetiker Hans Nacht- sehmd und die vergleichende Erbpathologie 1920–1945. Göttingen: Wallstein Verlag; 2004; Schmuhl H-W. The Kaiser Wilhelm Institute for Anthropology, Human Heredity and Eugenics, 1927–1945: Crossing Boundaries. Dordrecht: Springer; 2008.
14 Roelecke V. Fortschritt ohne Rücksicht, In: Eschebach I, Ley A. eds. Geschlecht und “Rasse” in der NS-Medizin. Berlin: Metropol Verlag; 2012: 101–114.
15 Hildebrandt S. Anatomy in the Third Reich: An outline, Part 1. National Socialist politics, anatomical institutions, and anatomists. Clinical Anatomy 2009; 22: 883–893.
‘experiences’. It is hoped that further research will provide confirmation of experiments in disputed locations like the concentration camps of Stutthof and Theresienstadt.\(^\text{16}\)

While Yugoslav victims were abused for experiments in German concentration camps, claims for experiments in the former Yugoslavia and Northern Norway have not so far been confirmed. The grading of victims’ claims into the verified and as yet unverified enable the project to establish verifiable minimum numbers, while indicating the possibility of higher numbers being confirmed by further research.

**Project findings**

The project is able to present results on: how many victims were killed in the course of the experiment, how many died from the consequences of the experiment or were killed as potential evidence of Nazi criminality, and how many survived? The project has covered experiments, as the most notorious experiments taken to the point of death and supported by the SS in concentration camps, as well as dispersed experiments in a variety of clinical contexts, particularly on psychiatric patients. Some sets of experiments and locations, not least those sponsored by German pharmaceutical companies remain shadowy, and require more detailed research possibly on the basis of further disclosure of documents held in company archives. The extent of involvement of German pharmaceutical companies like that of IG-Farben (using the branded product names of ‘Bayer’, ‘Hoechst’ and ‘Behringwerke’) remains contentious. The company supplied Helmut Vetter with samples for experiments at Auschwitz and Mauthausen. Similarly problematic is the extent that Schering-Kahlbaum supported Clauberg’s uses of X-ray contrast fluids

---

**Table 1. Nationality (as at March 1938).**

| Nationality    | Confirmed victim | Pending | Total |
|----------------|------------------|---------|-------|
| Austrian       | 782              | 17      | 799   |
| Belgian        | 16               | 32      | 48    |
| British        | 16               | 2       | 18    |
| Czechoslovakian| 264              | 1020    | 1284  |
| Danish         | 2                | 1       | 3     |
| Dutch          | 265              | 26      | 291   |
| French         | 156              | 57      | 213   |
| German         | 2254             | 123     | 2377  |
| Greek          | 426              | 18      | 444   |
| Hungarian      | 609              | 1393    | 2002  |
| Irish (Republic)| 1               | 1       |       |
| Italian        | 71               | 6       | 77    |
| Latvian        | 1                | 1       | 2     |
| Lithuanian     | 4                | 2       | 6     |
| Luxembourian   | 1                | 1       |       |
| Norwegian      | 11               | 1       | 12    |
| Polish         | 2737             | 4168    | 6905  |
| Romanian       | 51               | 39      | 90    |
| Soviet         | 1022             | 26      | 1048  |
| Spanish        | 22               | 4       | 26    |
| Stateless      | 449              | 4       | 453   |
| Swedish        | 1                | 1       |       |
| Swiss          | 3                |         | 3     |
| Yugoslav       | 536              | 3421    | 3957  |
| Unknown        | 6054             | 1644    | 7698  |
| Grand total    | 15,754           | 12,005  | 27,759|

**Table 2. Gender.**

| Gender     | Confirmed victim | Pending | Total |
|------------|------------------|---------|-------|
| Female     | 3960             | 4381    | 8341  |
| Male       | 9700             | 7188    | 16,888|
| Unknown    | 2094             | 436     | 2530  |
| Total      | 15,754           | 12,005  | 27,759|

---

\(^{16}\) Hunt N. *The Soviet Experience of Nazi Medicine: Statistics, Stories and Stereotypes*. MPhil thesis, Oxford Brookes University; 2011; and Loewenau A. *The impact of Nazi medical experiments on Polish inmates at Dachau, Auschwitz and Ravensbrück*. PhD thesis, Oxford Brookes University; 2012.
and a substance to seal the fallopian tubes at Auschwitz. Initially, Clauberg asked for deliveries to his clinic at Königshütte (so making the experiments appear as taking place in a consensual clinical context), but later on to Auschwitz. The extent that the company’s senior staff knew that their employee and Clauberg’s pharmaceutical assistant Johannes Goebel worked at Auschwitz is contentious (Figure 2).\(^{17}\)

The occurrence of unethical research provides insight into the structure of Nazi medical research. The project traced how Nazi coercive research began in the context of eugenic research in the mid-1930s. After numbers of experiments dipped in 1940 due to military call-up of medical researchers, the research rapidly intensified both in terms of numbers of experiments and victims, and in terms of severity for victims. This can be seen from 1942 with the notorious and often fatal experiments on low pressure, exposure to freezing temperatures, and infectious diseases when research could be taken to the point of death. Pharmacological experiments on therapies for tetanus, typhus and typhoid were spurred by the realisation that Allied military medical research on infectious diseases was outstripping German military medical expertise. From November 1942 racial priorities came increasingly to the fore, as exemplified by Schumann’s X-ray sterilisation experiments on Jews in Auschwitz.

![Figure 5](image-url)  
**Figure 5.** A gypsy used for seawater experiments in Dachau to test methods of making seawater drinkable, ca. July–September 1944. United States Holocaust Memorial Museum, courtesy of National Archives and Records Administration, College Park W/S #78688.

| Ethnicity          | Confirmed victims (15,754) |
|--------------------|---------------------------|
| Jewish             | 20% (3098)                |
| Roma and Sinti     | 2% (335)                  |
| Unknown or other   | 78% (12,321)              |

| Religion           | Confirmed victims | Pending | Total |
|--------------------|-------------------|---------|-------|
| Jewish             | 3076              | 792     | 3868  |
| Other or unknown*  | 12,678            | 11,217  | 23,891|
| Grand total        | 15,754            | 12,008  | 27,759|

\(^{*}\)This category includes: Christians (Catholics, Protestants, and Orthodox), Muslims, Jehovah’s Witnesses, Seventh-day Adventists and atheists.

![Figure 4](image-url)  
**Table 3.** Ethnicity.  
**Table 4.** Religion.  
**Figure 4.** Age of victims at the start of experiment.

![Figure 6](image-url)  
**Figure 6.** Start year of experiments.

\(^{17}\) Weindling, P. Victims and Survivors of Nazi Human Experiments: Science and suffering in the Holocaust. London: Bloomsbury, 2014.
the experimentation. We find victims include a Swiss conscientious objector used for malaria experiments at Dachau, and British commandos captured in Norway used for amphetamine and high performance experiments on the shoe track at Sachsenhausen, and subsequently executed.

Statistics on gender indicate a proportion of male to female of approximately 2:1 (Table 2). One possible reason is the high number of military experiments as related to infectious diseases. Another is that more men than women were held in concentration camps, so that there was a higher male availability in the predominately male camps. In Ravensbrück the situation was reversed with the large female camp and a small male compound (Figure 3).

While for most nationalities male victims were the majority, in the case of certain national groups, female victims were in the majority. This is the case for victim groups from the Netherlands (in the case of sterilisation at Auschwitz), and Greece (for the Jewish skeleton collection). Children were often victims of experiments in psychiatric clinics. Later in the war, Roma and Jewish children were targeted for research by Mengele in Auschwitz.

The statistics show the age distribution was the same for men and women. While there was a very wide age spectrum, the peak is of victims born in 1921, so in their early twenties at the time of the experiment (Figure 4). Several hundred Jewish children were held by Mengele for twin research, and batches of Jewish children were dispatched for hepatitis and tuberculosis research, and body parts of small children were retained by psychiatric researchers.

Ethnicity and religion have been recorded, as for the definitively confirmed experiment victims (Table 3). Here, one is thrown back on the categories imposed by the Nazis. Thus a victim of the Jewish skeleton collection for the anatomy department at Strasbourg was baptised Protestant.\(^\text{18}\) Generally, the Nazis used the generic stigmatising term of ‘Zigeuner’ or gypsy rather than the self-identifying terms of ‘Sinti’ and ‘Roma’.

\(^\text{18}\) www.die-namen-der-nummern.de/html/the_names.html (accessed 8 October 2014).
In addition to the experiment victims are Roma and Sinti victims of large scale anthropological investigations of Ritter, Justin, and Ehrhardt, amounting to at least a further 21,498 persons (Figure 5).

If however one takes the year 1943 we find a higher proportion of Jewish victims, in part because of the intensification of experiments on Jews (particularly on women and children) at Auschwitz and Auschwitz-Birkenau. This would again indicate that there was an intensification of racial research (Table 4).

Victim number indicates how from 1942 onwards there was an overall intensification of research (Figure 6).

The life history approach allows appraisal of both experiments and victim numbers over time. The period 1933–39 shows sporadic experimentation in the context of racial hygiene. Mixed race adolescents were sterilised and evaluated by anthropologists. The concerns of racial hygiene with mental illness explain why psychiatrists and neurologists conducted experiments in psychiatric institutions. The psychiatrist Georg Schaltenbrand pointed out that his neurological research subjects were transferred to other institutions, many as we now know to be killed. This interrupted his research on the transmissibility of multiple sclerosis. The numbers of brains and body parts increased. From 1942 onwards there was an overall intensification of research.

The chart (Figure 7) shows when experiments started, but not the distribution of victims over time. The largest series of experiments were for infectious diseases. Malaria research at Dachau between 1942 and 1945 had 1091 confirmed victims, and after infection different combinations of drugs were tested. These experiments by Schilling began in 1942 and remarkably Schilling tried to continue the research after the liberation of the camp. 19

He pleaded at his trial to be allowed to continue the research, albeit on volunteers. The highest numbers were in 1943. The momentum continued even though the war was clearly lost. Other large groups included the twins researched on by Mengele, and to date 618 individuals are known (Figure 8).

The overall findings provide an accurate basis for analysis of experiments to date. First, nearly a quarter of confirmed victims were either killed to obtain their organs for research, or died as a result of experiments taking the research subject to the point of death (notoriously, the experiments on freezing and low pressure at Dachau). The euthanasia killings and executions were sources of bodies for research, and the extent that this happened and research conducted before and after the end of the war is still being documented. Of the fully documented victims died 781 died before the end of the war as a result of the experiments: research subjects were weakened by the strain of the experiment such as a deliberate infection or severe cold, or they were deliberately killed because it was feared that they would testify against the perpetrators (Table 5).

While, most subjects survived, amounting to 24,010 persons, many had severe physical disabilities with lifelong consequences. 20

Conclusion

The analysis presented here shows that several types of unethical medical research occurred under National Socialism. Not only were large numbers of victims affected, but also overall, numbers of surviving victims were far higher than anticipated. The survivors were often seriously disabled and handicapped for the remainder of their lives. The experiments gained in numbers with the war and the implementation of the Holocaust, and were sustained at a high level of intensity despite imminent defeat.

One issue arising is that body parts of deceased victims were retained by medical research and teaching institutes, notably for anatomy and brain research. While there was meant to be full disclosure of specimens deriving from euthanasia victims and executed persons by 1990, specimens continue to be identified.21 The complex data is to be further augmented and refined, the history of specimens retained for research during and after WW2 is being documented, and the narratives of survivors analysed in order to understand more fully the consequences of coerced research. This research provides a basis in historical evidence for discussions of the ethics of coerced medical research.

Acknowledgments

Wellcome Trust Grant No 096580/Z/11/A on research subject narratives. AHRC Grant ‘AH/E509398/1 Human Experiments under National Socialism.

Conference for Jewish Material Claims Against Germany Application 8229/Fund SO 29.

20 Loewenau A. Die “Kaninchen” von Ravensbrück: Eine Fotogeschichte. In: Eschebach I, Ley A eds. Geschlecht und “Rasse” in der NS-Medizin. Berlin: Metropol Verlag; 2012:115–140.
21 Weindling P. “Cleansing” Anatomical Collections: The Politics of Removing Specimens from German Anatomical and Medical Collections 1988–92. Annals of Anatomy 2012; 194:237–242.

www.sciencedirect.com