The Nuremberg Code of 1947 was an answer to the medical atrocities during the Nazi period which were exposed during the Nuremberg Medical Trial 1946/47 [1; 2]. Conventionally, the Code is associated with the introduction of the concept of informed consent. However, as a number of authors have pointed out, there existed previous state regulations on human experimentation issued by the German Reich’s Ministry of the Interior in 1931 [3; 4; 5]. These regulations not only made informed consent a necessary requirement for human subjects as research objects, their neglect of respect for patients, and their general ignorance regarding issues of medical ethics. As a corollary, after negotiations involving physicians such as Julius Moses and Friedrich von Müller, the Richtlinien were drafted by the Reich Health Council in 1930, and officially enacted by the Reich Ministry of the Interior in February 1931 [4; 6; 7]. They were never formally invalidated, but in fact they were superseded by a number of amendments to the German Medicinal Product Act (Arzneimittelgesetz) which in its first version was introduced in 1961 [8].

In medical historiography and bioethics, various authors have put forward diverging assumptions about the exact legal status and practical relevance of the Richtlinien, in particular for the Nazi period. Some claimed that the Guidelines constituted a valid, enforceable law up to 1945 [e.g. 3; 9], whereas others were of the opinion that they had only been recommendations [10, p. 19]. Beyond the legal status, it was claimed that the Richtlinien “failed to achieve wide circulation”, and that “their influence on the profession remained almost negligible” [11, p. 13]. In addition, there exists the assumption that the Guidelines were annulled in Nazi Germany. Weindling also pointed to the “mythical status” of the Guidelines, since they were used by both the prosecution and the defendants at the Nuremberg Trial, but with varying interpretations, and for different ends [2, p. 260; for more details, see 12].

The following is divided into two parts: First, after a short summary of the Richtlinien’s content and legal status, issues of dissemination and implementation will be addressed for the period between their publication in 1931 and the end of the Nazi regime in 1945. Second, the use of the Guidelines in the context of the Nuremberg Medical Trial will be described, both as a benchmark of research ethics, and an instrument of exculpation.

Content, legal status, public circulation and implementation, 1931–1945

The Richtlinien contained a basic differentiation between innovative interventions and treatments serving a therapeutic purpose (neuartige Heilbehandlung) and non-therapeutic experimentation (wissenschaftliche Versuche). For these two categories of research, different kinds of informed consent were required:
Innovative therapy may be carried out only after the subject or his legal representative has unambiguously consented to the procedure in the light of relevant information provided in advance. Where consent is refused, innovative therapy may be initiated only if it constitutes an urgent procedure to preserve life or prevent serious damage to health and previous consent could not be obtained under the circumstances [13, p. 174].

Non-therapeutic research (“scientific experimentation”) was prohibited in all cases where consent has not been given [13]. Experimentation involving children or minors under 18 years of age was prohibited if it implied any risks for the subject. Any exploitation of social or economic need to investigate innovative therapies was rejected and seen as incompatible with the principles of medical ethics.

The Guidelines also included the necessity of previous animal experimentation before any new intervention on human subjects, the requirement of risk/benefit evaluation, and of written documentation, including the purpose of the intervention, as well as its justification [13].

The term Richtlinien referred to a policy instrument of the state which originated during World War I, but became more common during the Weimar Republic (1918-1933). Accordingly, the Guidelines of 1931 did not constitute direct legal rules for medical research activities, but rather they specified existing legal norms regarding physicians’ behavior. They formulated standards for the conduct of human subject research, similar to the formula “the state of science and technology” used in the context of technology law [12, p. 36-37].

The Reich Ministry of the Interior published the Richtlinien in the official Bulletin of the Reich Health Office (Reichsgesundheitsblatt) in February 1931. Within a few weeks, the regulations were also published in the Deutsche Medizinische Wochenschrift, probably the most widely read German medical weekly, and in addition in a considerable number of further medical journals [12, p. 37]. Together, these journals probably reached a large proportion of medical practitioners and functionaries, as well as representatives of public health, and thereby, immediately after their publication, the new regulations quite likely came to the attention of many, if not most German physicians.

What happened to the Richtlinien during the Nazi regime? The full text of the Guidelines was published in all four editions of Carly Seyfarth’s Der Ärzte-Knigge (1935 until 1942), a deontological introduction for medical students and young physicians [14]. There, the Guidelines were classified under the heading “Laws and Decrees” (Gesetze und Verordnungen), together with the Code of Conduct of the Reich Chamber of Physicians (Beraufordnung für die deutschen Ärzte) of November 1937, a legally binding amendment to the Reich Physicians Order (Reichärzteordnung).

In addition, the professor of hygiene at the University of Munich, Karl Kisskalt, referred to the preconditions for human subject research in the two editions of his textbook Theorie und Praxis der medizinischen Forschung (theory and practice of medical research in 1942 and 1944 [15, p.150]. Thus, the regulations and their core content were repeatedly published in various medical contexts and consecutive editions of widely read reference works, addressing young clinicians, as well as medical researchers.

However, the fact that the Richtlinien were readily available through publications does not necessarily imply that they were really known, or applied in the practice of medical research. Indeed, it is difficult to elucidate their practical impact, but there are a number of indicators which give some evidence: Hans Reiter, from 1933 onwards director of the Reich Health Office (Reichsgesundheitsamt) as well as member of the Expert Committee for Population and Race Policy (Sachverständigenbeirat für Bevölkerungs- und Rassenpolitik) in the Reich Ministry of the Interior, insisted on the implementation of the Richtlinien in two documented cases [12, p. 38-39]. These cases illustrate that the Richtlinien were not ignored, or even explicitly dismissed by representatives of public institutions in the Nazi context. They rather indicate that even a highly ranked Nazi medical functionary and race hygienist was insisting on their implementation – as long as German citizens or children were concerned.

However, there is little evidence that the Guidelines were generally followed and implemented in practice: Thus, the Richtlinien were not mentioned in any of the medical dissertations conducted at Giessen University Medical School between 1932 and 1951: Of the 771 medical theses completed in this period, 120 involved direct research interventions on human subjects. In no single dissertation was an explicit reference made to the Richtlinien, nor do they contain any documentation of informed consent by the research subjects or their legal representatives [12, p. 39].

The Guidelines at the Nuremberg Medical Trial 1946/47

In the context of the Nuremberg Medical Trial 1946/47, the Guidelines assumed a new role [2, p. 260; 12]: Andrew Ivy, a medical scientist, former president of the American Physiological Association and expert witness for the prosecution declared in a statement on the ethics of human experimentation at the Court in June 1947 that the Guidelines had been binding legal regulations since 1931. As he explained, in discussions preceding the Trial in December
1946, he had himself submitted three principles for the proper conduct of human experimentation to the House of Representatives of the American Medical Association (AMA); only afterwards had he received knowledge of the German regulations [2, p. 257-269; 12, p. 41-42]. In the context of his statement, he referred to the Richtlinien to underline his broader claim that the three principles he had formulated and submitted to the AMA had been valid for the “medical profession over the civilized world generally”. Asked by defense counsel Fritz Sauter whether these rules had existed in print, as formally published norms in the US, Ivy replied that no such rules had existed for the AMA before 1946, but that “they were understood as a matter of common practice” in medical experimentation [references in 12, p. 41-42].

Ivy had been nominated by the AMA to the emerging war crimes commission in May 1946 [2, p. 261]. Being involved in human subject research himself, and familiar with the concerns of medical scientists, one of his central aims was to prevent the publicity of the envisaged trial against German physicians from “stirring up public opinion against the use of humans in any experimental manner whatsoever” so that a hindrance will therefore result to the progress of science”. In a meeting with Judge Telford Taylor who was to become the Chief Counsel for the Medical Trial in early August 1946, Ivy suggested that “caution should be exercised in the release of publicity on the medical trials so that it would not jeopardize ethical experimentation” [quotations in 2, p. 263].

Thus, in late 1946, Ivy was eager to demarcate the limits between ethical and unethical medical research on human subjects in order to avoid a public outcry and distrust in human subject research in general once the atrocities of German medical scientists became known. Being aware that no explicit rules on the relevant issues existed in the AMA, his strategy was to postulate a universal knowledge about such rules amongst physicians who undertook research [12, p. 41-42]. In the context of the Trial, he clearly formulated this claim, using the Richtlinien to give it some empirical underpinning.

**Conclusion**

The Richtlinien of the German Reich Ministry of the Interior of 1931 were an early normative document on the ethical issues of human subject research. They addressed questions of informed consent, documentation, research on minors, and exploitation of vulnerable individuals, and introduced the analytical distinction between therapeutic and non-therapeutic research.

The Guidelines were widely disseminated in medical and public health journals with high circulation in the late Weimar Republic. In the Nazi period, the Richtlinien were not explicitly dismissed by representatives of the regime or medical institutions, nor were they simply ignored. In fact, they were regularly reprinted in full in the consecutive editions of a widely read compendium for young physicians and thus easily available, and their core principle of informed consent was also clearly spelled out in two editions of an introductory textbook on medical research. It is also documented that the director of the Reich Health Office, insisted on their implementation in cases where German citizens or children were concerned. There is, however, lacking evidence of their general implementation in “normal” medical research at university medical schools before the Second World War. In contrast to their public dissemination and the documented instances of implementation before the war, the Guidelines were clearly disregarded in the contexts of coerced research on vulnerable groups in concentration camps, psychiatric asylums, and hospitals in the occupied territories. In fact, these were spaces of “de-regulated” research where physicians could carry out any kind of research they considered rational to resolve relevant, or even urgent issues, irrespective of the content of existing legal or ethical rules.

Thus, the historical evidence documents that the Richtlinien were not simply a medico-legal fact. Rather, on one level, they represented a set of ethical norms, and rules with limited legal validity. In this respect, they may be considered as a regulatory instrument intended to protect research subjects. On another level, the Guidelines may be seen as an instrument to enable the continuation and protection of human subject research in the face of grave public concerns about the motivations and actual behavior of medical researchers. This function of the Richtlinien is already apparent in their origins during the late Weimar Republic: Here, intra-professional, but in particular public debates about scandals of medical research and the implementation of new, non-routine prophylactic interventions were decisive in the formation and promulgation of the Guidelines: The very first paragraph argued that regulation of medical research was essential to enable the progress of medical science [13].

This function of the Richtlinien – to protect medical science – became even more obvious at the Nuremberg Medical Trial where highly ranked representatives of German medical science were indicted. The concerns formulated by leading British and US medical researchers such as the AMA-delegate to the trial Andrew Ivy, document that the trial and public debates that might potentially emerge from it were seen to be not only a problem for German medicine, but to threaten public confidence in the ethics of medical human subject research in general [12, p. 39-42]. In the Medical Trial itself, Ivy used the Richtlinien to argue that explicit German and international standards of human subject research did exist, that
World Medical Journal

A Review of Current Marijuana Testing Methodologies

Marijuana use is an ever-growing concern among both employers and addiction specialists. The progressive increase of recreational and medical marijuana availability at the state level is problematic for employers in particular. While drug testing regulations and practices are continuing to evolve, the federal government has stood firm on its stance against THC. The US Department of Transportation (DOT) states that its use remains unacceptable for any safety sensitive employee subject to drug testing under DOT regulations [1]. There are well documented reasons for this, as marijuana impairs judgement and reaction times enough to significantly raise the risk of road crashes. In fact, two large meta-analysis of multiple studies concluded the risk of crashing when under the influence of marijuana ranges from 1.65 to 2.73x higher then someone sober [2, 3]. Additionally, the higher risks reflected an increased likelihood of being involved in fatal collisions.

Marijuana’s parent drug is Δ²-tetrahydrocannabinol (THC), the psychoactive component that produces the subjective “high.” However, due to a clearance half-life of less than 30 minutes, THC is not detectable in urine. It is the metabolite tetrahydrocannabinol carboxylic acid (THC-COOH) that is the main detection method by which laboratory tests detect the presence of marijuana. The metabolite typically appears in urine.

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