
Mustard Gas and American Race-Based Human Experimentation in World War II

Susan L. Smith

During World War II, scientists funded by the United States government conducted mustard gas experiments on 60,000 American soldiers as part of military preparation for potential chemical warfare.¹ One aspect of the chemical warfare research program on mustard gas involved race-based human experimentation. In at least nine research projects conducted during the 1940s, scientists investigated how so-called racial differences affected the impact of mustard gas exposure on the bodies of soldiers. Building on cultural beliefs about “race,” these studies occurred on military bases and universities, which became places for racialized human experimentation.

This paper examines the risks of racialized science and the logic of racial thinking as revealed in the mustard gas experiments. It shows how easily scientists slipped into investigating racial differences without interrogating what they were actually measuring when they tested subjects by “race.” Race was a concept both invoked and constructed through these experiments, and medical scientists conducted tests based on what they termed “race, pigment, and complexion” to determine which factors influenced susceptibility to and injury from exposure to mustard gas.² Their studies built on a conceptualization of four racialized groups: African Americans, Japanese Americans, Puerto Ricans, and, as the control group, whites. By World War II, the idea of racial differences among European immigrants and their descendants had become less prominent.³ During the war, however, medical scientists drew on and helped to shape ideas about race in the service of scientific and military goals. After exposing dozens, perhaps hundreds, of men to harmful chemical agents in these nine projects, they concluded that race matters were less significant than they had anticipated.

American mustard gas experiments took place within a transnational program of Allied government human experimentation. During World War II, Britain, Australia, Canada, and the United States conducted mustard gas experiments on their own soldiers in order to prepare for the possibility of chemical warfare.⁴ The war marked a time when federally funded scientific research teams conducted experimentation in various locations, and American soldiers considered it their patriotic duty to participate.⁵ In light of the gas warfare used on the battlefields of World War I, governments resumed their interest in the toxicol-

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ogy of mustard gas. They conducted experiments for both defensive and offensive purposes: to learn how to best protect allied soldiers from potential gas attack and how to create casualties and disable the enemy. American officials also worked closely with their counterparts to learn from the results of experiments conducted on 7,000 British soldiers at Porton Down in England, 3,000 Australian soldiers at Innisfail in Queensland, and 2,000 Canadian soldiers at the Suffield Experimental Station in southern Alberta.⁶

In the United States, scientists conducted mustard gas testing under the direction of the Office of Scientific Research and Development (OSRD) to evaluate the quality of protective clothing, ointments, and respirators (or gas masks). They developed three types of mustard gas programs, most of which were run through the Army's Chemical Warfare Service and the Naval Research Laboratory. The first type was the drop test and patch test in which scientists applied a small amount of mustard agent to bare skin or to skin

they would face or that there would be little immediate care and no follow up care. Indeed, mustard gas exposure caused a wide range of pain and humiliation for the soldiers in these tests, and for some young men, the experiments were a form of torture. Some soldiers experienced immediate and severe eye injuries and damage to lungs. Most frequently, men had burns and blistering on the skin, especially on the face, hands, underarms, buttocks, and genitals. They were sometimes in agony for days, weeks, and even months from the enormous, grotesque blisters and oozing sores. In addition, the men in the gas chamber tests experienced intense fear. Finally, many of them also suffered long-term health consequences, such as psychological disorders, cancer, asthma, emphysema, and eye problems, including blindness.⁹

Medical scientists conducted race-based studies because they suspected that non-whites would have a different response than whites to the effects of mustard gas. Scientific interest in racial differences was

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partially covered with an ointment to examine its protective properties. The second type was the field test in which low flying airplanes sprayed soldiers with mustard gas while they were in open fields wearing various levels of protective clothing. Finally, in the third type of test, known as the “man-break test,” scientists placed men in gas chambers and released mustard gas in order to determine how long it took before the men were incapacitated.⁷

Military and scientific interests, coupled with a hierarchical system in which soldiers were encouraged or ordered to “volunteer,” made these appalling experiments possible. Veterans report that they participated in the experiments out of patriotism, boredom, the promise of extra pay and special leave privileges, and sometimes when they learned that their military unit was to be shipped out to the front.⁸

Most of the veterans have insisted that they had been given no warning of the level of suffering that

not new, however. Historians of race and American medicine have documented over two centuries of race-based scientific exploitation. There is a long history of the use and abuse of racialized bodies in the name of advancing medical knowledge, beginning with Native Americans and enslaved African Americans. The most well-known American example of racism and medical experimentation is the Tuskegee Syphilis Study, a non-therapeutic experiment conducted by government officials of the U.S. Public Health Service on African Americans from 1932 to 1972.¹⁰

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of the research program. Racial concerns, generated in part by a war against Japan and its “non-white” soldiers, shaped the development of these experiments.

Although American scientists conducted most of the mustard gas tests on white soldiers, they designed several studies to investigate how “race” shaped the human body’s reaction to mustard gas exposure. At a time when the American military was segregated, including separate African American and Japanese American units, there were at least four research projects that compared mustard gas exposure in African American soldiers to white soldiers and at least four projects that compared Japanese American soldiers to white soldiers. Medical scientists conducted these studies at several locations, including Cornell University Medical College, the University of Chicago Toxicity Laboratory, the Institute for Medical Research in Cincinnati, and the Rockefeller Institute for Medical Research.¹² In addition, American researchers compared Puerto Rican soldiers to mainland white sol-

the government called “evacuation” and “relocation” from the West Coast, scientists experimented on Japanese American soldiers in order to learn how to defeat Japan. They used Japanese American bodies as substitutes for the bodies of the Japanese enemy. In the Pacific War of World War II, the American military considered mustard gas a potentially useful weapon in the tropical locations and dug-in footholds of the Japanese troops occupying Pacific islands. In sum, scientists likely performed race-based human experimentation to better protect white American soldiers, rather than to develop better protective gear for African American, Japanese American, and Puerto Rican soldiers.¹³

The mustard gas experiments provide evidence of the climate of contested beliefs over the existence and meanings of racial differences in the 1940s. Some of the details of these experiments can be gleaned from the meta-analysis of several of the wartime studies presented in a final report in 1947 by medical scientists

The scientists’ expectation of uniformity *within* racial groups and differences *across* racial groups was a belief repeated across at least two centuries of American research. Yet, their assumptions were not proven in their studies, and researchers admitted that individual variation was the most significant finding. Although the medical scientists did not refer to the racial categories they had invoked in their experiments as mere social constructs, their own research led them to conclude that “race” provided little, if any, meaningful health information.

diers in what came to be known as the San Jose Project. Created by the U.S. Chemical Warfare Service, the San Jose Project tested mustard gas in the tropical conditions of San Jose Island, located off Panama in Central America. There officials brought Puerto Rican soldiers and mainland white soldiers to the island to compare their responses to mustard gas exposure.

Scientists carried out mustard gas experiments on African Americans, Japanese Americans, and Puerto Ricans for the same reasons that they did on whites: to save white American lives. It appears that tests on African American and Puerto Rican men were for defensive purposes. If they proved less susceptible to mustard gas than white men, then they could be used in the front lines in combat in Europe or the Pacific instead of white troops if the enemy used chemical weapons. The tests on Japanese Americans were likely for offensive purposes. While Japanese American families faced a harrowing process of what

at Cornell University Medical College. For example, test results on African Americans appeared to confirm racial differences to mustard gas exposure. According to the Cornell University authors, “All investigators agree that the skin of negroes [*sic*] as a group is much less sensitive to mustard gas than the skin of whites.” Commenting on other wartime studies, as well as their own, the Cornell University researchers cited a World War I study that “reported that about 78 per cent of negroes [*sic*] are ‘resistant’ as compared with 20-40 per cent among the whites.” The authors suggested that one reason for the finding that African Americans were less sensitive to mustard gas exposure than whites was their thicker skin. For centuries, white Americans have promoted ideas about the existence of physical differences between blacks and whites, including ideas about differences in skin. Beginning with the efforts to justify slavery, physicians and scien-

tists interpreted any perceived differences as signaling black inferiority.¹⁴

Yet, the government's final report on chemical warfare agents in 1946 argued that attempts to identify clear cut racial differences in responses to mustard gas produced at best inconclusive results. For example, the 1946 report by the Office of Scientific Research and Development and the National Defense Research Council concluded that the testing of African Americans had been insufficient. According to the authors, although a number of wartime studies using the drop test and patch test demonstrated that African Americans were "more resistant than whites" to mustard gas exposure and thus less susceptible to injury, there were still gaps in the research. As they noted, "There do not appear to have been man-chamber [i.e., gas chamber] or field tests to determine whether the *casualty-producing* effect of H [mustard gas] in negroes [*sic*] is sufficiently less than in whites to be of practical significance in warfare."¹⁵ Therefore, they indicated that they did not have solid evidence that African Americans could better survive the physical effects of mustard gas exposure during warfare.

Testing on Japanese American soldiers of the Nisei or American-born generation also presented disappointing results for medical scientists looking for solid evidence of racial differences. According to the findings of Cornell University researchers and the authors of other wartime studies, Japanese American bodies exposed to mustard gas presented the same susceptibility as whites. For example, two of the physicians who authored the Cornell report, Dr. Marion Sulzberger and Dr. Rudolf Baer, conducted a series of drop tests "on the backs and the buttocks of white and nisei volunteers who three weeks previously had been exposed to mustard gas in the vapor [i.e., gas] chamber and to minute quantities of liquid mustard gas applied as skin tests to the upper back and the forearms. The entire skin, except for the areas protected by the gas mask and the impregnated shorts, had been exposed to the vapor." "Impregnated shorts" were shorts in which the cloth had been chemically treated to provide some protection against mustard gas. According to Sulzberger and Baer, "In about 25 per cent of the white volunteers and 50 per cent of the nisei volunteers, the not previously exposed buttock area was less sensitive than the previously exposed back area," suggesting increased sensitivity on those body sections that had faced earlier mustard gas exposure. Yet, the Cornell physicians, as well as other wartime scientists, "could demonstrate no significant difference in the primary mustard gas sensitivity of white and nisei (Japanese-American) soldiers."¹⁶

Furthermore, American mustard gas tests conducted outside the United States also demonstrated little evidence of racial differences in bodily responses to gas exposure. The San Jose tests off Panama showed that both Puerto Rican soldiers and white mainland soldiers suffered equally painful burns. Hence, the scientists concluded that Puerto Ricans were not different from mainland whites in their sensitivity.¹⁷

Thus, only one racialized group was singled out as distinct from whites — African Americans — and even the data on this group was inconclusive. Instead, medical scientists noted in their final reports that race matters were less significant than external conditions and individual variation. They included, although they did not highlight, these conclusions. For instance, in summarizing the data from numerous wartime studies, the 1947 Cornell University report explained that many factors influenced sensitivity to mustard gas, including the purity of the gas, the techniques used, and the effects of temperature, humidity, and exercise, with racial group playing only a minimal role. Only in the most qualified fashion did the authors cite racial group as potentially an influence on the human body's response. Indeed, the Cornell authors stated that the research suggested that individual differences were the most important factor. As the authors explained, "All investigators agree...that different individuals differ greatly in their primary sensitivity, i.e. in their level of response to the obligate damaging effect of mustard gas; and that every large group of human volunteers can be shown to include representative groups of very sensitive, normally sensitive, resistant, and very resistant individuals."¹⁸ This insistence on the significance of individual variation was also evident in the 1946 final report of the Office of Scientific Research and Development and the National Defense Research Council. As it noted, "[T]here can be little doubt that considerable and, rarely, large variations in susceptibility to injury do exist between individuals of a group that is apparently homogenous."¹⁹

The scientists' expectation of uniformity *within* racial groups and differences *across* racial groups was a belief repeated across at least two centuries of American research. Yet, their assumptions were not proven in their studies, and researchers admitted that individual variation was the most significant finding. Although the medical scientists did not refer to the racial categories they had invoked in their experiments as mere social constructs, their own research led them to conclude that "race" provided little, if any, meaningful health information.

Although the Allies did not use mustard gas in combat during World War II, the history of the mustard gas experiments provides a cautionary tale about risk-

ing human health in the name of racialized science. It shows us the appeal and danger of race matters in medical research and how the logic of racial thinking shaped scientific procedures in ways that were misguided and produced serious health consequences. **Race matters remain a troubling theme in the health sciences, even when invoked in the name of protection and health promotion.**

Acknowledgement

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References

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7. In 1943 the U.S. began mustard gas testing on human subjects. At least 2,500 men were tested in gas chambers, 1,000 men in field tests, and the rest of the 60,000 with patch tests and drop tests. *Id.* (Freeman); see also Pechura and Rall, eds., *supra* note 1, at 10.
8. *Id.* (Pechura and Rall).
9. *Id.*, at 4-5, 64-66, 388.
10. **J. H. Jones**, *Bad Blood: The Tuskegee Syphilis Experiment* (New York: Free Press, 1981).
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15. See OSRD and NDRC, *supra* note 2, at quotes on 507-508; emphasis in original.
16. *Id.*, at 372, quotes at 375.
17. *Id.*, at 507; **Pugliese**, *supra* note 13, at 55-60.
18. See Sulzberger et al., *supra* note 16, at quote on 370, 390-391.
19. See OSRD and NDRC, *supra* note 2, at 508.