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Solveig Jülich

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## IN THE LIGHT OF MEDIA

# Mass miniature radiography surveys for tuberculosis in Sweden, c. 1940–1970

Solveig Jülich

*This paper aims to highlight the medical and medial relationships that were established and negotiated through the mass X-ray surveys for tuberculosis in Sweden from the early 1940s to 1970. In particular it focuses on three interrelated aspects. Firstly, it shows how mass miniature radiography was developed through the pairing of old X-ray technology with new photographic technology. Secondly, it demonstrates how the survey campaigns enabled connections between medical and media institutions and professional groups. Thirdly, it discusses how the mass surveys helped to create and mediate relations between doctors and patients, experts and lay people, sick and healthy people, participants and objectors. In conclusion, it argues that these three aspects together are crucial if we wish to understand the mediatisation of the medical sphere as well as the medicalisation of everyday life during the twentieth century.*

**KEYWORDS** media history; history of medicine; mass miniature radiography; public health; Sweden

Beginning in the 1940s and ending in 1970, the state Medical Board in Sweden screened people in all the counties for pulmonary tuberculosis. In the span of almost 30 years, about 90% of the entire Swedish population (everyone aged 11 and above) was examined by mass miniature radiography, one or several times. Although it has drawn less attention, the media was an inseparable dimension of this medical history. Media technologies were coupled to medical instruments, medical professionals collaborated with journalists in anti-tuberculosis campaigns, and doctors and patients were co-constituted through mediated views of their relationship. Looking more closely at the mass X-ray surveys can help map out the complex territory of medical–media relations in Sweden during the Second World War and post-1945.

There is a wealth of scholarship of the history of tuberculosis, often focused on national contexts and policies.<sup>1</sup> Mass miniature radiography surveys, in Sweden and elsewhere, have however received less attention in earlier research and the few studies undertaken have primarily investigated the implementation of anti-tuberculosis campaigns in different countries, how successful they were and the governmental policies instigated through these activities.<sup>2</sup> More generally, historical research on public health has contributed important insights to the understanding of public health education but it has mostly dealt with an earlier period, often drawing on the concepts of governmentality and biopolitics.<sup>3</sup>

This study aims instead to highlight the medical and medial relationships that were established and negotiated through the X-ray surveys in Sweden from the early 1940s to

1970. It draws upon a broad selection of primary sources, including archival materials related to the Medical Board, medical publications, reports in illustrated magazines, news-reels and posters and focus in particular on three interrelated aspects. Firstly, it will show how the development of mass miniature radiography encompassed the co-evolution of medical and media technologies. Secondly, it will demonstrate how the mass X-ray surveys enabled connections between medical and media institutions and professional groups. Thirdly, it will discuss how the mass surveys contributed in creating different categories of people: sick and healthy persons, imaging experts and the lay public, participants and X-ray objectors. I argue that these three aspects together are crucial if we wish to understand how the 'mediatisation' of the medical sphere, on one hand, and the growing 'medicalisation' of everyday life, on the other, have together constituted and shaped (potential) patient–doctors interactions.<sup>4</sup>

In this way, the present study hopes to contribute to a growing historical research field in which media history intersects with the history of medicine. As scholars such as Virginia Berridge, Kelly Loughlin and Ayesha Nathoo have argued, the media have all too often been seen as an appendage to the more important medical story.<sup>5</sup> My point of departure is that medicine and the media have always been dependent on and related to each other: co-produced, to use Sheila Jasanoff's term.<sup>6</sup> We cannot understand changes in medicine unless identifying the specific motifs, processes and events involved in medical–media relations. Nonetheless it has been in the professional interest of both doctors and journalists to establish and maintain boundaries between their respective domains. For this reason, it is important to undertake a historical analysis of the specific ways in which medicine and the media have interacted and also how the perceived gap between these areas has been described, justified and negotiated.<sup>7</sup>

### Mass Miniature Radiography Surveys

As part of the strategy to combat what was considered as a significant public health issue in the early twentieth century, that is, tuberculosis, there was a desire to provide a simple and cheap X-ray technique to enable surveys of large groups of people for the early detection of this illness. After many attempts, the Brazilian radiologist Manoel de Abreu in collaboration with Siemens was able to construct a radiographic apparatus that was used in a chest survey of patients at the German Hospital of Rio de Janeiro in 1936.<sup>8</sup> Following de Abreu, the SS radiologist Hans Holfelder improved the method and also took the initiative in designing a transportable version that could be used in assembly halls as well as in specially customised buses. During the Party Day in Nuremberg in 1938, the 'SS X-ray battalion', as it was known, headed by Holfelder examined 10,000 SS soldiers, and in the following year Mecklenburg's adult population—over half a million people.<sup>9</sup> This event was reported by the Swedish illustrated magazine *Se* ('See'), which emphasised how fast and efficient the new method was (Figure 1).<sup>10</sup> When Germany invaded Norway in 1940, mass screenings of the Norwegian population were carried out under Holfelder's management.<sup>11</sup> Many other countries in Europe and elsewhere, such as North America, Australia and Japan, also introduced various forms of mass miniature radiography (the procedure was known by a variety of names) that were used in large-scale anti-tuberculosis campaigns.<sup>12</sup>



FIGURE 1

Typically, the procedure of mass miniature radiography was hailed as fast and efficient. 'Att "röntgas på löpande band"' [Assembly line X-rays], *Se*, no. 4 (1942): 26–27.

In Sweden, which retained its policy of neutrality and was not attacked or occupied during the Second World War, the first mass radiography survey for tuberculosis, limited to new military conscripts, took place in 1940.<sup>13</sup> Two years later, the Swedish National Association against Tuberculosis began its mass screening of civilians and in 1946 the Swedish Parliament decided on screening for the general population. It was voluntary, free of charge and included all persons over 10 years old. The goal was stated in military terms: screenings were about exterminating 'the enemy of the people', tuberculosis, by detecting early cases of pulmonary tuberculosis and preventing further infection among the population. Its principal weapon was the X-ray survey, based on mass miniature radiography. Both stationary and mobile units equipped with the new technology were set up. Since it was voluntary, propaganda was regarded as an important method of persuading and mobilising people to participate in the survey.<sup>14</sup>

The Mass Radiography Centre of the Medical Board in Stockholm conducted the surveys in collaboration with central and local committees appointed by the county councils. The Centre provided the X-ray apparatus and technical staff that were tasked with taking the photographs. The central committees, usually consisting of the provincial doctor, the dispensary doctor and nurse, a few politically influential persons and the governor, were responsible for organisation and administration, including the propaganda. The local committees arranged suitable facilities, invitations to participate in the surveys and also took care of the personal propaganda through home visits. Interpretation of the radiographs and statistical analysis was carried out at the Centre. The findings were reported to the central dispensaries that then contacted the positive cases detected and

took action, such as referring patients to sanatoria or lung clinics. After the mass survey in a district, its central dispensary submitted a statistical report to the Centre.<sup>15</sup>

### The Co-Evolution of Medical and Media technologies

As scholars like José van Dijck have stressed, visualising instruments used for medical diagnostics can be related to media technologies in several ways. One such aspect is that their technological developments tend to go hand in hand, meaning that innovations in one domain benefit technical advances in the other.<sup>16</sup>

This also holds for the history of mass miniature radiography. Abreu's radiographic apparatus was the first successful solution to the problem of combining two different methods that had been in use since the discovery of X-rays at the turn of the twentieth century. The first method, radiography, consisted of a photographic plate or film (but no camera) and an X-ray source that the body of the patient was placed between. It produced permanent records but the procedure was relatively expensive because of the developing and storing of the full-size images.<sup>17</sup> The second method, fluoroscopy, made use of a fluorescent screen instead of the photographic plate or film. This technique had the advantage that the doctor was able to twist and turn the patient to see his or her lung exposed from various angles. However, the moving fluoroscopic image could not be fixed or reproduced in any simple way. In addition, because of the dim image the examiners had to wear goggles so that their eyes were adapted to darkness before performing fluoroscopy. All this helped to make the images on the screen difficult to interpret.<sup>18</sup>

Since 1896, experiments had already been made to capture the fluorescent image but without working out the problems involved. The new apparatus, first used by Abreu in 1936, incorporated a camera using 35 mm film, that is, the small image format used in Leica cameras. He mounted the camera in an enclosure behind the fluorescent screen so that he could photograph the image, using a wide-angle lens and the faster film emulsions that had recently become available. After learning of the work of Abreau, radiologists in different countries experimented with standard 35 mm cameras and the available equipment to produce similar results. Some doctors were however sceptical about the usefulness of such a small image (24 × 36 mm) in comparison with the conventional larger (360 × 430 mm) film. The solution most often sought was to view the 35 mm negative through a magnifying viewer. In the course of time, different miniature radiographic devices, cameras and film sizes were introduced and incorporated into the ordinary machine park.<sup>19</sup>

The 35 mm camera was quite a recent innovation in the media landscape of de Abreau's time. Although Oskar Barnack designed the prototype Leica around 1913, mass-scale production did not begin until the mid-1920s. As has often been emphasised, the reduced size and weight of the Leica, Contax and other small image cameras was an important prerequisite for the expanding group of professional photographers looking for candid shots in outdoor surroundings. From the 1930s, and even more so in the 1940s, miniature cameras and 35 mm film were essential parts of the press photographer's equipment. In Sweden, the launch of new illustrated magazines like 'See', modelled on *Life* and *Look*, offered an important outlet for photographers' work.<sup>20</sup>

The miniature format imposed certain conditions on the early mass X-ray examinations. The images could not be made as sharp as conventional radiographs but on the

other hand they presented a better overview of the chest. Only coarse screening could be performed, not what the tuberculosis looked like in detail, but who had the disease and who was healthy. According to one Danish radiologist, drawing on other types of images to explain his point, the mass miniature radiograph was to be compared to a passport photo rather than a portrait taken by a court photographer. One should not demand the impossible of the new method, he concluded.<sup>21</sup>

The miniaturisation of the format resonated well with the rationalisation movement during the 1930s and 1940s. In Sweden, Taylor's ideas of scientific management were translated, first into the industrial and business context and then into housing and family life.<sup>22</sup> Medicine was also affected and the values of rationalisation were evident in the attempts to improve and implement mass miniature radiography. The development of automatic miniature cameras together with the introduction of the photo-timer made the routine use of the new technique possible in large-scale surveys. This device automated the examination so that the technician could merely place the person to be examined before the X-ray apparatus and then trip the exposure switch.<sup>23</sup> A recurring metaphor in the Swedish medical literature was to compare examinations on board the mobile units and in dispensaries with 'an assembly line'. Again and again it was repeated that efficiency and speed were characteristics of the mass X-ray surveys organised by the Medical Board.<sup>24</sup>

More specifically, the trend towards miniaturisation was also visible in the development of microfilm reproduction of archival records, books and other sources. In the emerging field of documentation and information science, microfilm was hailed as promising a solution to the problems of information overload and storage: a tool for organising and rationalising big data.<sup>25</sup> Similarly, medical professionals were enthusiastic over the capacity of the mass miniature radiographs to shrink and condense large amounts of medical information without altering its content. Storage became a simpler procedure than with the conventional radiographs.<sup>26</sup>

One effect of this co-evolution of medical and media technologies was that miniaturised X-ray images of the interior of the body were circulated widely in society. Their miniature format made the mass radiographs easily movable. For instance, the specially built buses used for rural and remote parts of the country were not only sites for taking the images but also a means of transporting them to the Mass Radiography Centre in Stockholm. This location came to serve as an information centre or, in Bruno Latour's words, a 'centre of calculation', where the data were collected, processed and analysed. The authority also produced an outgoing flow of statistics, graphs and tables that could be incorporated into new medical and public health contexts.<sup>27</sup> Moreover, the miniature images could easily be combined and circulated with other media such as magazines, newspapers, posters and films. It was in particular through the campaigns launched in connection with the surveys in various counties that images of sick and healthy lungs became more available to people at different settings. As shown below, these campaigns not only disseminated information but also helped to create links between medical and media organisations and professional groups.

### **Organisational and Professional Links between Medicine and the Media**

In addition to the technological co-evolution of X-ray apparatus and photographic equipment, the media were an integral part of the mass miniature radiography campaigns



in Sweden. Both new and old media were used in the effort to persuade people to participate in and support the surveys: lectures, pamphlets, exhibitions, advertisements, leaflets, flyers, posters, radio announcements and oral information. Furthermore, the media eagerly reported on these campaigns as is shown by the extensive material to be found in news-reels, daily papers and the illustrated press from the period.

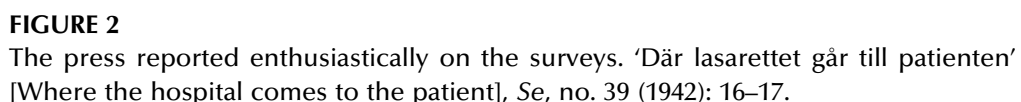
Public health was one area in Sweden where the state had early on collaborated with various civic organisations. Gradually the benefit to the state of increasing citizens' awareness of health and hygiene issues was recognised. In 1938, the State Institute for Public Health began its task of promoting preventive measures that would preserve or improve public health. The outbreak of war in 1939 also led to the formation of the State Information Board in the following year, whose role was to advise, review, identify and control the formation of opinion in Sweden, especially the press. During the 1950s, information activities within the expanding welfare state came to include more and more agencies. But even so press officers and communications departments were still an exception. Information services were usually provided as part of an agency's regular activities. This is also considered to be an explanation of the complacent position of the press towards authorities and their representatives.<sup>28</sup>

The media strategy of the Medical Board demonstrates how also medical-media relations were actively produced. The Board collaborated with the National Association Against Tuberculosis to provide the central committees with some general information and propaganda to be circulated. Even so it was considered advantageous to adapt the propaganda to local conditions and supplement it with other kinds of printed material and oral persuasion. For this reason, efforts were made to involve the local associations of the trade unions, the Red Cross, the Home Guard, the Women's Voluntary Defence Organisation and others. The Medical Board in particular stressed that competition and local patriotism could be used as a spur to achieve the goal of 100% national participation in the surveys.<sup>29</sup> This strategy of engaging local stakeholders and resources in the campaigns seems to have had its counterpart in the United Kingdom, while the United States relied rather on a central organisation to produce spectacular campaigns.<sup>30</sup>

As part of the media strategy employed by the Medical Board, the organisers often engaged journalists on local newspapers during the campaigns. These reporters wrote about the upcoming surveys in advance, attempting to create interest among the local population in the events. They then covered the implementation and contributed stories, interviews, photographs, cartoons and columns in the newspapers. They received financial remuneration for this and were therefore acting temporarily as both journalists and government officials at the same time.<sup>31</sup> This departure from the proclaimed journalistic professional value of impartiality does not appear to have met any objections at the time. Interestingly, during the whole period the use of the word 'propaganda' by the Swedish Medical Board as well as the press had positive connotations, in contrast to its association with manipulation and distortion in other national contexts.<sup>32</sup>

One concrete example of this collaboration between the Medical Board and associated interest organisations on the one hand and on the other hand the press was the creation of a poster used in the campaigns for the surveys in various counties. Although the heading simply stated 'Public notice' this was a comparatively lavish product. It had two columns of text and featured two photographs displaying the exterior and interior of a

The mass miniature radiography survey was one instance when these tensions came to the fore. In 1951, several newspapers featured a humorous story about a whole busload



**FIGURE 2**  
The press reported enthusiastically on the surveys. 'Där lasarettet går till patienten' [Where the hospital comes to the patient], *Se*, no. 39 (1942): 16–17.



**Meddelande**

till  
**Allmänheten**



Folksjukdomen **tuberkulos** kräver ett stort antal offer bland vårt lands befolkning och av erfarenhet vet man att denna sjukdom ökar i kristid

Tuberkulosen är en smygande sjukdom, som i början av sitt förlopp ej behöver ge några sjukdomstecken, som äro märkbara för den smittade. Endast genom röntgenundersökning kan då sjukdomen avslöjas.

För att sjukdomen skall kunna upptäckas i tidigt stadium, då behandlingen ger de bästa resultaten, måste därför även personer, som känna sig fullt friska, undersökas.

**Alla personer över 10 år få kostnadsfri röntgenundersökning av lungorna i MEDICINALSTYRELSENS SKÄRMBILDSBUSS, som besöker denna ort på senare angivna tider**



**Av största vikt är att alla undersökas!**

Kungl. Medicinalstyrelsen

Kalmar läns Norra och Södra landsting  
Centralröntgenheten för skärmbildsundersökning

FIGURE 3

The photograph from the interior of the bus had been taken from a story in the popular magazine 'See' (cf. Figure 2). 'Meddelande till Allmänheten' [Public Notice], Kalmar: Kalmar Läns Norra och Södra landsting, 1948.

of people being misdiagnosed with tuberculosis. The event was said to have resulted from an insect straying into the apparatus causing a spot on the X-ray images that the doctors had first read as signs of disease but then realised there were something wrong with the film.<sup>36</sup> The head of the Mass Radiography Centre was not at all amused by the story and he made a complaint to the Swedish Press Council. According to him, the publications had resulted in lower participation rates in the survey. As a result of this complaint the newspapers involved had to apologise officially for the reporting.<sup>37</sup> Even if this example cannot be taken as evidence of a new recalcitrant attitude among journalists, it does show that medicine was not always seen as an area to be protected from criticism, a trend that would be more pronounced in the 1960s.<sup>38</sup>

The mass X-ray surveys in Sweden were productive not only in establishing and negotiating organisational and professional relationships between medicine and the media but also in 'making up people', a phrase established by Ian Hacking to describe the historical process in which new categories of people are created and in various ways respond to these labels.<sup>39</sup>

### Constructing Experts, Patients and the Public

In other terms, a third aspect of the co-production of medicine and the media is the mutual constitution of doctors and other members of society. As Kirsten Ostherr has discussed, medical visualisations from the earliest days of anatomical illustrations to the X-ray and today's latest high-tech imaging devices have helped to mediate relations between doctors and patients, experts and lay people.<sup>40</sup> By focusing on the mass miniature radiography in Sweden, it is possible to show how these and related categories of people were brought forth in a specific time and place.

In the first instance, the doctors had to train their abilities to distinguish between the sick and healthy lungs on the X-ray images. This knowledge resulted in the classification of individuals as healthy or recovered but also as patients considered to require further examination at a dispensary.<sup>41</sup> Thus in the process of scrutinising the X-ray images, the tuberculosis patient deemed to need healthcare and a stay in a sanatorium was constituted. These patients were familiar from earlier medical literature but the new distance between the person examined (at the bus or dispensary) and the member of the Centre's staff interpreting the image added to the anonymity of the sick person.

But equally important, the expert role of the radiographic interpreters had to be actively created. Even if radiology was an established medical discipline in the early 1940s, the radiologists and lung doctors who were keen on adapting the new radiographic method had to convince colleagues that their findings on the basis of miniature images were as sound as interpretations of conventional radiographs. Internationally, several reports pointed out observer error due to overlooking or misinterpreting active pulmonary lesions and thus the loss of significant diagnoses. In the late 1950s, Hanns J. Bauer, one of the doctors at the Centre in Stockholm, conducted an investigation involving the staff who showed discrepancies between different interpreters and their opinions and evaluations of pathological findings. Various psychological factors such as fatigue, for example, were identified as influencing a doctor's concentration during the work itself, even if it was temporary. Like others before him, Bauer suggested that parallel interpretation could do much to reduce such sources of error.<sup>42</sup>

These problems were however not discussed with the general public. Instead, for instance, when the Swedish film company Svensk filmindustri's nationally distributed newsreel *SF-journalen* reported on the X-ray surveys the board of doctors at the Centre in Stockholm were portrayed as authoritative interpreters of the mass miniature radiographs.<sup>43</sup> These experts were, then, considered to view the miniature radiographs differently from the lay public, who had to be educated to understand the meaning of the images. A common approach by the editors of 'See' and other magazines was to place two X-ray images alongside each other, one showing a diseased and the other a healthy lung. In this way, their readers could judge the difference for themselves and, if they had participated in the examinations, relate their own experience to what they saw in the pictures.<sup>44</sup>

However, 'the public' was a category that also had to be created. As Michael Warner has stressed, the concept of the public is a fiction that does not exist outside rhetorical appeal. This form of address has a dual character: it is both impersonal—it is aimed at 'all'—and personal in the sense that individuals can feel part of that public, in specific

situations.<sup>45</sup> Similarly, the way the propaganda addressed 'the public' reflected the Medical Board's explicit goal of targeting all those living within the nation's borders. But it nevertheless became clear that the propaganda was directed towards specific demographic and occupational groups. For instance, the educational film *Medan det ännu är tid* (While there is still time) contained a scene where a doctor persuades an elderly man to be examined on board the X-ray bus. This sequence had its origins in the assumption that older people were more reluctant to participate in the survey than younger ones while they were still seen as a risk group.<sup>46</sup>

Another example is a poster showing a parent with two children with the caption 'Protect your children through X-ray examination and think about your own safety as well'. This was expected to convince those who were reluctant to participate in the survey that they should do so for the sake of their children, and also make employers demand a certificate showing that they had participated in the survey from nannies and maids working in private homes.<sup>47</sup> Interestingly, two women who came to the X-ray bus during the survey in the county of Ångermanland stated that 'the children had left them no rest', but when invited to the examination room they left.<sup>48</sup> Following Warner, this propaganda materials and testimonies can be viewed as examples of how the survey's public was created in the very moment when it was addressed.

This means therefore that there was a category of people who objected to being examined: the 'objectors'. The Medical Board took great pride in reporting that Sweden was one of the most successful countries when it came to participation rates.<sup>49</sup> The objectors attracted considerable attention and caused headaches. Who were they and why did they not heed the notice? Several doctors initiated their own investigations to answer these questions. Willi Mascher, for example, came to the conclusion that the objectors came from every social class and educational background and invoked the most diverse reasons:

'Apart from pure pretext, there were allusions to the concept of freedom, religious concerns, demands for payment (!) and opposition to a measure initiated by society. In one municipality even the midwife and the community home help refused to take part!'<sup>50</sup>

Mascher and others were convinced that there was an overrepresentation of tuberculosis among the objectors and that the true reason for not attending was fear of discovery of the disease. This was, however, never confirmed.<sup>51</sup>

Apart from the creation of these categories, given the difficulty of accessing the richness of past audience experiences it is not easy to know much about how individuals experienced the survey on board the buses or in other medical locations. The stories in the press were, as already indicated, far from neutral eyewitness accounts. For instance, in a story published in 'See' the event of an X-ray bus visiting the village of Hulu in the south of Sweden was described as an opportunity for festival, reuniting people who had not seen each other for years and where new friends were made.<sup>52</sup> In contrast, in retrospective stories people emphasise the feelings of discomfort that they experienced when examined. For instance, one person says that:

We were forced to undress above the waist and given a card to hold. Then, one by one, we had to climb into the bus, proceed to a sort of cage and then lift our shoulders in an unnatural position and hold our breath while there was a rattle in the unit. Not nice.<sup>53</sup>

As others have discussed in detail, the 1960s was a period when media audiences and patient groups became more vociferous and concerned regarding medicine and the medical profession.<sup>54</sup> The wavering interest in participating in the X-ray surveys in Sweden can be related to this changed scenario. In one report, the Medical Board noted that the '[m]ass examination system' usually meant that no special consideration could be taken of individuals, and that such a 'system now seems more out of date'. At the same time the number of people with tuberculosis was in constant decline. In 1970, the Mass Radiography Centre was closed down and its operations transferred to the county councils.<sup>55</sup> Five years later, the BCG vaccination was no longer given to all but only administered to people considered to be at high risk.<sup>56</sup>

## Conclusion

This paper has addressed mass X-ray screenings for tuberculosis in Sweden as a rich historical case for examining the relationship between medicine and the media in Sweden during the Second World War and up to 1970. As I have shown, medicine and the media interacted at several levels. Firstly, mass miniature radiography (like traditional radiography) was developed through the pairing of old X-ray technology with new photographic technology. What was specific for this innovation, however, was that it produced miniature radiographs of the lungs. This characteristic speeded up the examinations and made it easier to circulate images of the inside of the body in society generally. Secondly, the campaigns staged to mobilise people into participating in the surveys helped to link medical and media organisations and professional groups. Boundaries for what the press could write on medical matters were constantly established and negotiated. Thirdly, the mass miniature radiography survey helped to mediate relations between doctors and patients, experts and lay people, sick and healthy people, participants and objectors. Taken together, these three aspects shed light on processes of mediatisation and medicalisation during the twentieth century. Visual media became increasingly important to medicine at the same time as medical images flooded culture and people's everyday lives.

How can media history and the history of medicine intersect? As Kelly Loughlin has stressed, rather than looking for medicine in the media and, I would like to add, the media in medicine, we should think in terms of medicine *and* the media.<sup>57</sup> This linkage should allow our analyses to broaden the categories 'medicine' and 'the media' and make us more sensitive to how these have been co-produced and negotiated in different ways over time and space. But moreover it may be fruitful to focus less on the separation of the two spheres and rather consider communication and mediation as basic elements for both medical and media worlds.

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## Notes

1. For a recent overview of this literature, see Bryder, Condrau and Worboys, "Tuberculosis and Its Histories."
2. Jülich, "Bussar och bildtrafik."; Levitt, "TB, Glasgow and the Mass Radiography Campaign in the Nineteen Fifties"; McCuaig, *The Weariness, the Fever, and the Fret*; Welshman, "Compulsion, Localism, and Pragmatism."
3. For Scandinavia, see Vallgård, "Governing People's Lives"; Berg, *Den gränslösa hälsan*. Berridge covers public health in Britain during the period after 1945 in *Marketing Health*.
4. According to Hjarvard, "mediatisation" is the process in which all the more spheres of culture and society are related to and influenced by the media. See Hjarvard, *The Mediatization of Culture and Society*. A critical discussion is provided by [Jülich, "Transdisciplinära varianter och strategier."]. "Medicalisation" is commonly understood as a process by which human conditions are transformed into medical problems. For a recent discussion, see Clarke et al., ed., *Biomedicalization*.
5. Berridge and Loughlin, eds. *Medicine, the Market and the Mass Media*; Loughlin, "Your Life in Their Hands"; Nathoo, *Hearts Exposed*.
6. For the term "co-production", see Jasanoff, ed. *States of Knowledge*.
7. This argument is similar to the discussion about the term "popular science" in Topham, "Introduction."
8. Abreu, "Collective Fluorography."
9. Holfelder, "Einsatz und Tätigkeit der Röntgenreihenbildnertruppe der SS in Mecklenburg." These surveys are discussed briefly by Proctor, *The Nazi War on Cancer*, 87–9.
10. Anon. "Att 'röntgas på löpande band.'"
11. Ongre, "Abreugrafi og starten på skjermbildefotograferingen i Norge."
12. Bynum, *Spitting Blood*, Chapter 8.
13. For a problematisation on the notion of Sweden's neutrality see, for instance, Lettevall, Somsen and Widmalm, eds. *Neutrality in Twentieth-Century Europe*.
14. Anon. "Medicinalstyrelsens förslag om allmän skärmbildsundersökning"; Mascher: *Ett dråpslag mot folkfienden tuberkulos*.
15. Nelson, "Den allmänna skärmbildsundersökningen av svenska folket."
16. van Dijck discusses X-ray imaging in *The Transparent Body*, 9. The co-evolution of X-ray imaging and cinema has also been studied by Jülich, "Media as Modern Magic."
17. Eisenberg, *Radiology*, 51–6.
18. Jülich, *Skuggor av sanning*, Chapter 9.
19. Abreu, "Collective Fluorography"; Eisenberg, *Radiology*, 200–3.
20. Panzer, "Introduction." 19–25.
21. Anon. "Passfoto – på röntgen," 26.
22. Björck, *Folkhemsbyggare*, 124–140.
23. Eisenberg, *Radiology*, 203.
24. See, for instance, Berg, "Lungröntgen och skärmbild"; Langlet, "Röntgenfotos för 5 öre!"; Anon. "Skärmbildsfotografering – senaste nytt i tuberkulokampen"; Anon. "Att 'röntgas på löpande band.'"
25. For a recent discussion, see Gitelman, *Paper Knowledge*, Chapter 2.



26. Nelson, "Den allmänna skärmbildsundersökningen av svenska folket."
27. This is discussed in Jülich, "Bussar och bildtrafik," 108–109. For the term "centre of calculation," see Latour, "Visualization and Cognition."
28. Kjellgren, *Staten som informatör eller propagandist?* 117–36.
29. Anon. "Medicinalstyrelsens förslag om allmän skärmbildsundersökning"; Nelson. Letter, August 7, 1950.
30. This may indicate different national "styles" in health education campaigns. Cf. Toon, "Cancer as the General Population Knows It," 117–18. The campaign in Glasgow in 1957–1958 was however staged "in true Hollywood fashion," see Levitt, "TB, Glasgow and the Mass Radiography Campaign," 11.
31. "Bussar och bildtrafik," 111–114.
32. Wollaeger, *Modernism, Media, and Propaganda*.
33. "Meddelande till Allmänheten." poster.
34. Anon. "Där lasarettet går till patienten."
35. The publicity strategies of the Swedish Medical Association are discussed in Jülich, "Picturing abortion opposition in Sweden."
36. Anon. "Hel busslast 'lungsjuka' på skärmbild."
37. Wegelius. Letter, January 10, 1952; Extract from the minutes, held at the meeting of the Swedish Press Council in Stockholm, March 20, 1952.
38. Cf. Nathoo, *Hearts Exposed*, 33–4.
39. Hacking, "Making up People." I make no claim to contribute with a more completed study from this perspective.
40. Ostherr, *Medical Visions*, 17–19.
41. Cf. Bowker and Leigh Star, *Sorting Things Out*, Chapter 5.
42. Bauer, *The Observer Error in Multiple Interpretation of Photofluorograms*.
43. See, for instance, SF 1156 (April 5, 1943); SF 1184 (November 8, 1943). Also see, for a later period, the news television programme *Aktuellt* (September 9, 1958). These films can be accessed through The Royal Library, Sweden.
44. See, for instance, Eiworth and Collin, "Buss på TBC!"
45. Warner, *Publics and Counterpublics*, Chapter 2.
46. *Medan det ännu är tid* (Martin Söderhjelm, 1952). For a recent discussion on tuberculosis films, see Boon, "Lay Disease Narratives, Tuberculosis."
47. "Skydda barnen." poster.
48. Kristofferson, "Med Nationalföreningens skärmbildsbuss i Ångermanland," 79.
49. Nelson. Letter, February 27, 1947.
50. Mascher, "Skärmbildsundersökningen i Södermanlands län."
51. Also see Källqvist, "Tuberkulosmorbidity hos skärmbildsvägrare."
52. Eiworth and Collin, "Buss på TBC!"
53. Upplands-Bro Kulturhistoriska Forskningsinstitut, poster.
54. Nathoo, *Hearts Exposed*, Chapter 2.
55. Jülich "Bussar och bildtrafik," 121.
56. Puranen, *Tuberkulos*, 479.
57. Loughlin, "'Your Life in Their Hands,'" 186.

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