Reply: How do we avoid polarization of interdisciplinary research on cancer diagnosis?

First, we would like to take the opportunity to thank Andersen and colleagues for their thorough reading of our paper. We appreciate and welcome a critical dialogue that helps furthering an understanding of early cancer diagnostics.

However, our paper is a critical comment on the epidemiological reasoning that early diagnosis equals better outcomes, using anthropological and social science theory and data to underscore how the logic of early diagnosis may lead to overdiagnosis. While Andersen and colleagues criticise our focus on overdiagnosis stating that it "adds to a polarization and politicization of the field" our work is inspired by the Critical Theory tradition in which research intends to change and critique social and political practice. Having overdiagnosis as the empirical object of our inquiries, with the inevitable iatrogenesis and harm it brings, we hope to "alter the terrain on which future struggles will be waged, thus expanding the set of feasible options for future reforms" (Fraser, in Fraser and Honneth 2003, 79).

It is with regret, that we see how Andersen and colleagues read our paper as a critique of anthropological studies of cancer diagnostics. This was not the intention, rather, as we write in the paper, to highlight their work as important contributions to the more general research on early cancer diagnostics.

In their comment, Andersen and colleagues clearly demonstrate their long and in-depth research engagement with human experiences of cancer combined with studies of how biomedical practices and policy developments on risk and early diagnosis entangle with the understanding of moralities and ways of performing, doing, or living cancer in different contexts. They provide a very useful overview of the research field and a detailed presentation of both previous and recent contributions to the field, for example in the review of their book from 2023 where the shift from 'diagnosis' and 'risk' to 'anticipation of cancer' is demonstrated through empirical studies, and how this pervades the public and clinical discourse. We fully acknowledge these contributions and the important research findings and conceptualizations made by the authors. We also believe, that in the end, we are on the same page, trying to understand the logic of cancer diagnostics from an exploration of different positions and to point to structural and discursive mechanisms behind and consequences of early diagnostics - in our article though mainly through a critique of some of the widely held assumptions within epidemiology.

Andersen and colleagues make a specific criticism of our article which has to do with the sentence: *the message 'the sooner the better' is currently not being challenged by research, policy or society".* We agree that this sentence might be understood as if we are ignoring the vast number of studies in sociology and anthropology that have been engaged in critical analyses of delay and early cancer diagnostics. In our article, we refer to some of these studies and we intend to show that we are familiar with this literature overall and wish to build on it, for sure not wishing to ignore the many critical studies on early diagnosis or related issues that exist. However, we do not elaborate or discuss in our article all of these studies in detail, and overall, we concede that we may not have been clear enough that our critique is targeted at the epidemiological and medical understandings and assumptions about early diagnosis. Our aim is to highlight the unintended consequences of early diagnostics. The article's idea overall is to move forward the critical analyses so far made, summed up on page 2 in the commentary, not to say that no critical research has been done, and to try to

challenge more radically the paradigm and logic of early diagnosis. We could have made this point clearer perhaps.

Overall, Andersen et al.'s commentary has provided a strong review of their work and its relevance. We believe however that Andersen and colleagues in some examples they give from our article overread our way of referring and understanding these works somewhat, putting more into our reading than was intended. We concede that a more transparent presentation might have done credit to both the works mentioned, our argument, and the reading of it.

Concerning Andersen and colleagues' critique of Figure 1 originally by Welch & Black (2010) we disagree. Predicting the growth of cancer cells and tumours poses a significant challenge due to the diverse natural histories observed among different cancers. Few studies have been conducted where the natural progression of cancer has been observed without any intervention (Jønsson & Brodersen, 2022). For instance, research has delved into the natural history of cervical dysplasia in various contexts. Raffle and Gray (2020) provide an empirical case study on cervical screening in New Zealand, while researchers from the Mayo Clinic in Rochester observed the natural progression of lung cancer over five years in 18 screening participants (Lindell et al. 2009). These studies, along with indirect evidence from randomized controlled cancer screening trials, consistently highlight the coexistence of slow or no growth alongside more rapid tumour development. Additionally, epidemiological investigations drawing data from ongoing mammography screening programs, which have been gradually implemented nationwide, further underscore the heterogeneous growth rates of breast cancer (Lousdal et al. 2016). Some studies even suggest instances of spontaneous regression (Zahl et al. 2008). Consequently, describing cancer growth through simplistic mathematical models such as linear or exponential equations (e.g., $y=ax + b$ or $y=ax^z + b$) proves inadequate. Recognizing this complexity, it has been proposed for more than two decades that cancer growth must be conceptualized through a non-linear lens, often invoking chaos theory. Numerous scientific papers, including recent works such as that by Debbouche and colleagues (2022), have explored this notion in depth.

Using the figure, we aimed to visually demonstrate this heterogenous growth described earlier. Notably, Welch and Black did not assign units to the two axes, rendering them ordinal in our context. Hence, we interpret the directionality of the axes purely in an ordinal sense. Furthermore, the figure serves as a model intended to illustrate the varied growth rates of different cancers: some exhibit rapid growth, others progress more slowly, some remain stable, and some even regress spontaneously. Within our manuscript, we employ the terms "linear" and "linearity" akin to their semiotic significance, symbolizing a forward progression in cancer development. Consequently, we hold a differing perspective from Andersen et al., who assert that cancer growth follows an exponential trajectory.

Lastly, concerning a misreading of Tørring's book as noted on page 4, we may only apologize that we cited the wrong reference, which should have been Tørring 2014 and not Andersen and Tørring 2023.

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