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LETTER TO THE EDITOR

Letter to the Editor: Response to Cox (2018)

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This letter is in response to the comment by Cox (2018), who appeared to be concerned by the figures we presented to participants about the residual risk for ovarian cancer after bilateral risk-reducing salpingo-oophorectomy (RRSO). We agree with the fact that the presence of a residual cancer risk after prophylactic surgery is an important element of discussion during post-test genetic counseling and the subsequent decision-making process. However, at present, we don't have robust evidence of these figures in real-life high-risk programs. For this reason, we decided to take a conservative approach and, as hypothesized by Cox, we used "…the 80% reduction in risk for ovarian cancer reported in Finch et al. (2014), in conjunction with the lifetime risks reported by Mavaddat et al. (2013)", instead of using lower figures.

Specifically, we first considered risk figures in Mavaddat et al. (2013), who estimated the average cumulative risks for ovarian cancer by age 70 to be 59% for *BRCA1* carriers and 16.5% for *BRCA2* carriers. We rounded percentages (60% for *BRCA1* and 20% for *BRCA2*, respectively), as it is known that integers are perceived as more believable and are better remembered (Witteman et al. 2011) and that likelihood perceptions are fuzzy (e.g., Reyna and Brainerd 1995). Second, we considered the 80% reduction reported in Finch et al. (2014). Finch et al. (2014) state that "Preventive oophorectomy was associated with an 80% reduction in the risk of ovarian, fallopian tube, or peritoneal cancer in *BRCA1* or *BRCA2* carriers and a 77% reduction in all-cause mortality" (Finch et al. 2014, abstract, p. 1549). A meta-analysis by Marchetti et al. (2014) confirmed the efficacy of RRSO in reducing the risk of ovarian cancer by approximately 80%.

We applied the 80% risk reduction to 60% and 20%, respectively, and obtained the residual risks percentages. Indeed, from the psychological literature on risk perception, we know that people are often confused by this type of information, referred to as relative risk (e.g., Cameron et al. 2009; Gigerenzer et al. 2007). In the experimental material, we paid attention to present numbers in such a way that participants understood them at best; therefore, we presented both the relative risk reduction (80%) and the absolute risk reduction information, i.e. we calculated the resulting risk. Let's take a look at the calculation more closely: among 100 hypothetical *BRCA1* carriers, 60 will be diagnosed with cancer (Mavaddat et al. 2013); RRSO does not eliminate this risk, but reduces it by 80% (Finch et al. 2014). Therefore, among 60 *BRCA1* carriers, 48 will avoid cancer and 12 will still be diagnosed with it. The same works for *BRCA2* (80% out of 20; 16 carriers will avoid cancer and 4 still be diagnosed with it).

Thus, in our experimental material, when describing RRSO, as an available risk management option, we used the following: "…RRSO significantly reduces the risk of getting a cancer, even if it does not eliminate it completely. The risk of ovarian cancer decreases from 60% (20%) to 12% (4%), that is 12 (4) *BRCA1* (*BRCA2*) carriers who underwent RRSO, will nonetheless be diagnosed with an ovarian cancer…"

Finally, our results showed that the type of mutation (*BRCA1* vs. *BRCA2*) was not retained in the final model of variables predicting the preference for surveillance over surgery. As described in the discussion section (Gavaruzzi et al. 2017, p. 1149), this means that participants' choice was neither predicted by the risk figures associated with the mutation (i.e., 60% vs. 20%), nor by the residual risk figures (i.e., 12% vs. 4%). Although this might be surprising, there is a wealth of research on judgment and decision-making that we reviewed in our discussion that showed that risk perception is far from detailed and precise (Cameron et al. 2009; Gigerenzer et al. 2007; Kahneman and Tversky 1979; Lotto et al. 2014; Prelec 1998; Reyna and Brainerd 1995; Reyna 2008; Slovic et al. 2007). Moreover, our predictive model included subjective risk perception, further supporting our interpretation.

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In conclusion, we feel confident that the preference for surveillance over preventive surgery observed in our study is not attributable to the residual risk figures reported in our information material. However, we agree with Cox that the residual cancer risk after prophylactic surgery is an important element of discussion during post-test counseling. Efforts need to be made both to obtain real-life estimates of this risk as well as to improve the quality of communication about risk figures that constitute the basic information elements of decision-making.

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