



## LETTERS TO THE EDITOR

### Screening for thyroid disease in pregnancy<sup>☆</sup>



### Cribado de la enfermedad tiroidea en el embarazo

Sir,

I have read the article entitled “Cost-effectiveness analysis of universal screening for thyroid disease in pregnant Spanish women”.<sup>1</sup> In this article the authors use a decision model with an unusual number of variables to state that “switching from selective risk-based screening to universal screening could save the Spanish health system 2,653,854 euros”.

With regard to methodology, the reliability and accuracy of the result of any analytical procedure depends not only on the suitability of the model, but also, particularly, on the accuracy and reliability of the factors involved. Apart from the fact that the decision model delineated in Fig. 1 appears to lack the initial node, or that the probability assignment is questionable because it corresponds to non-Spanish populations, the utilities assigned by the authors (taken from a prior article<sup>2</sup> which took them in turn from other articles which should of course be criticized too) are, in my opinion, completely inadequate: if we give a model the minimum value, 0, to death and the maximum value, 1, to an euthyroid state, it makes no sense for untreated symptomatic postpartum thyroiditis to be assigned a value of 0.81. It should be noted that in a decision model, by assigning to a result a cardinal utility  $u$  ranging from 0 to 1, the person making the decision assumes that that result might just as well be obtained by playing the lottery where the result of maximal utility 1 is obtained with a probability  $u$  and the result of minimal utility 0 with a probability  $1 - u$ .<sup>3,4</sup> Thus, if the article is to be believed, for a pregnant rational decision-maker there is no difference between having untreated symptomatic postpartum thyroiditis or playing the lottery (or rather Russian roulette) with a probability of 0.81 of being euthyroid and a probability of 0.19 of dying. Should we ask endocrinologists if they think that this is an

adequate way of assigning values? The value of assignment could have been changed, maybe between 0.996–0.999, or the reference framework of the utilities could have been modified.<sup>4</sup>

As regards the results, the section starts with the following statements: “The probability of spontaneous abortion in a pregnant woman was 4.12% for universal screening, 4.52% for risk-based screening, and 4.57% for no screening. Preterm delivery was also seen more commonly with the no screening (5.65%) and risk-based screening (5.63%) options. Universal screening therefore prevents 0.4–0.45% of miscarriages, and 0.22–0.24% of preterm deliveries”. I am not sure that a cause-effect relationship may be derived from these differences in frequency (calculated, not observed), but let us accept this conclusion for the moment. If we accept the data, screening does not “prevent 0.4–0.46% of miscarriages”, but rather prevents miscarriage in 0.40–0.45% of pregnant women, that is, prevents from 8.8% to 9.8% of miscarriages (it is not possible to correctly recalculate the percentage of preterm miscarriages “prevented” because “observation” has been omitted in universal screening).

I have the clinical certainty that pregnant women benefit from TSH measurement in the first laboratory tests during pregnancy, and the medical and social certainty that screening is cost-effective for the Spanish health system (just as I think, for example, without the need for any formal model, that it is “cost-effective” to devote most of the time on a first visit to listening to the patient, rather than filling in data in the computer). This certainty is based on the fact that the costs of TSH measurement in a middle-high level public healthcare system are more than compensated for by the health benefits derived from the diagnosis of occult thyroid disease in pregnancy. And if a compulsive saver still had to be convinced a relatively simple formal model could be designed, with probability and utility assignments within ranges acceptable to all the actors involved, that would show this beyond any doubt (with no need to use complex probabilistic models, nor even to invoke those jacks of all trades which QALYs have become).

The authors of this article appear to have been inspired by a study on thyroid disease screening in pregnancy conducted in the setting of a healthcare system with different structural characteristics.<sup>2</sup> Three actors are involved in decision-making in a public system: society as the manager of the resources provided by all to meet costs, healthcare

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experts using their knowledge to assign the probabilities of uncertain events and the characteristics of alternative results, and society again, this time as a receiver of health care and, thus, responsible for the assessment of utilities. In systems based on private management and profit, private companies themselves are added as a fourth actor since they have utilities in decision-making which are different and often antagonistic to those of society overall. This difference should be critically considered by experts in healthcare economics. To put it as simply as possible, a copy and paste adaptation of the two types of systems just does not work.<sup>4</sup>

## References

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## Reply letter: Screening for thyroid disease in pregnancy<sup>☆</sup>



### Carta respuesta: cribado de la enfermedad tiroidea en el embarazo

Sir,

We have read with much interest L. Valdivielso's letter, especially those comments relating to scientific aspects of our paper, which will undoubtedly contribute to increasing our knowledge regarding the costs of thyroid disease in pregnant Spanish women.

As regards methodology, this letter suggests that the accuracy and reliability of the results may be inadequate. Among other aspects, it is suggested that the decision model delineated in Fig. 1 apparently lacks the initial node. Further reading makes it clear that the first screening performed on the hypothetical cohort of pregnant women is based on the measurement of peroxidase antibodies (anti-TPO). A rapid and simple calculation between the two types of anti-TPO ( $0.11 + 0.89 = 1$ ) makes it evident that the initial node would correspond to the total group of pregnant women considered.

On the other hand, the assignment of probabilities and utilities used (which, as noted in the letter by L. Valdivielso, have been widely used in previous articles) is also questioned. However, these two parameters are confused and interchangeably used in his reasoning. In order to clarify the difference between these two terms, I refer to reference<sup>1</sup> of L. Valdivielso). With regard to the "Estimation of probabilities", it should be noted that once the model is decided upon, the available information should be used with objectivity when the probabilities are assigned, with care being taken not to confuse reality with desire, nor the probability of the event with the utility

of the outcome. As regards the "Assignment of utilities", it should be noted that unlike the assignment of probabilities, when utilities are assigned, the data provided by observation or external guidelines should be disregarded and one should think for oneself. Utility is a parameter unique to each person and his or her personal universe. The replacement of utility by other more reproducible, "objectifiable" parameters alien to the individual factor does not affect the demands of restricted rationality, but it is unacceptable when we try to address problems with wider rationality.

In addition, the example of a "standard lottery" is proposed which, although based on the so-called theory of expected utility,<sup>2</sup> is "a difficult technique for the subjects surveyed, and values could be contaminated by the risk aversion of the surveyed subjects".<sup>3</sup> The term "Russian roulette" is inappropriate in our view. We therefore think that the values of both probabilities and utilities assigned in our article are perfectly justified.

As regards the results, although it is true that the 8.8–9.8% decrease in women who have a miscarriage could be considered adequate in relative terms, we think that the absolute term approximation, resulting in a 0.4–0.46% reduction, is much more adequate for this study. In addition, the observation regarding universal screening has not been omitted, but is implicit in the data on preterm deliveries and the absolute reductions associated with universal screening.

Finally, we should like to state that the L. Valdivielso's conviction that the benefits of TSH measurement do not require a formal cost-effectiveness analysis goes against the principles of evidence-based medicine.<sup>4</sup>

## References

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