

# UNMET NEEDS OF CATARACT SURGERY IN SPAIN ACCORDING TO INDICATION CRITERIA. EVALUATION THROUGH A SIMULATION MODEL

X Castells<sup>1,2</sup>, M Comas<sup>1</sup>, R Román<sup>1</sup>, D Minassian<sup>3</sup>, A Reidy<sup>4</sup>, J Mar<sup>5</sup>, JM Quintana<sup>6</sup>  
 1: Hospital del Mar-IMIM, IMAS, Barcelona, Spain. 2: Universitat Autònoma de Barcelona, Spain.  
 3: Institute of Ophthalmology, London, UK. 4: London Metropolitan University, UK  
 5: Hospital Alto Deba, Mondragón, Spain. 6: Hospital de Galdakao, Galdakao, Spain

## BACKGROUND

In the last few years, indication criteria for cataract surgery have become wider due to the introduction of less invasive technologies, which have decreased surgical risk and have improved the level of benefit from surgery. A consequence of this change in indication criteria is the great variations found in the level of visual impairment of operated patients. Despite the increase in the rates of cataract surgery in most Western countries, there is a significant unmet need for surgery, explained by the widening of the indication criteria and the ageing of the population. Some population-based studies that analyze prevalence of cataract show that an important proportion (30%) of the population older than 65 would benefit from surgery. These studies found a weak association between waiting list and unmet needs. Our objective was to analyze the impact of applying different indication criteria for cataract surgery on the volume of population with unmet needs and their visual acuity level, and on the number of additional surgeries needed to prevent the cataract backlog from increasing.

## METHODS

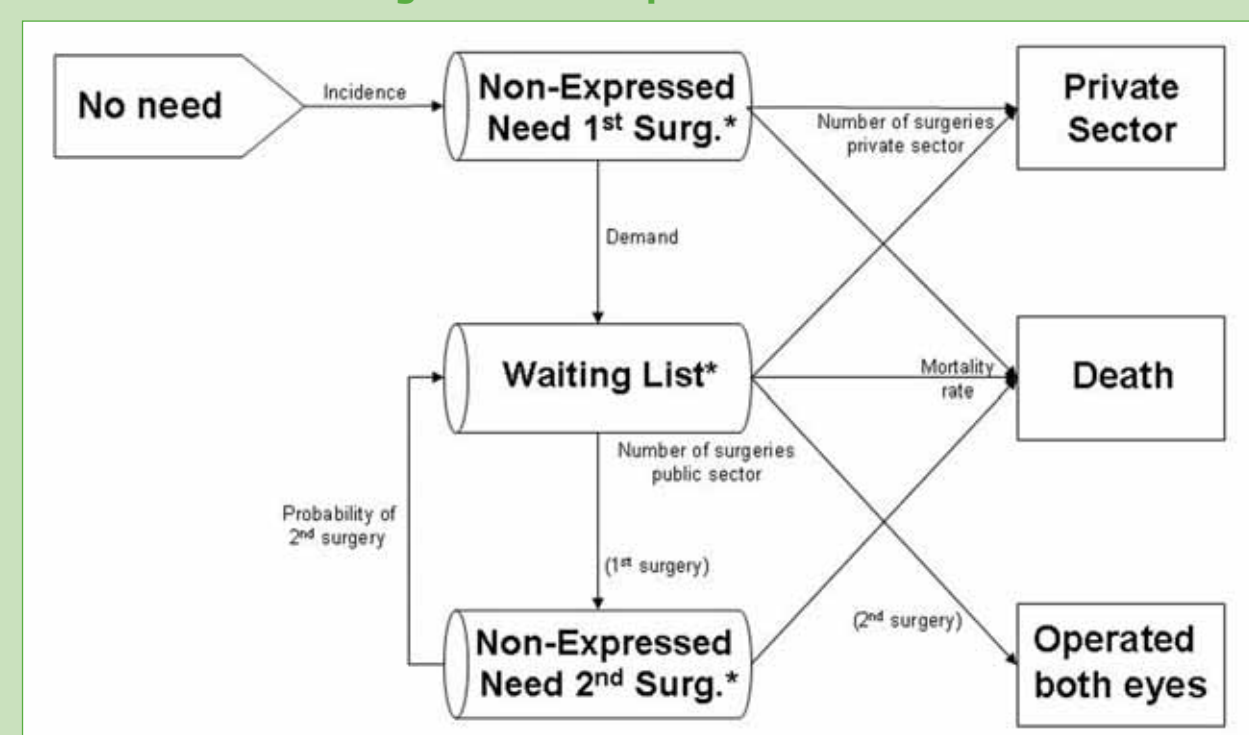
The study population was the general population aged 50 years or older at risk of needing cataract surgery of five Spanish regions (Andalusia, Aragon, the Basque Country, the Canary Islands and Catalonia), which account for 18.68 million people (almost half the population of Spain).

Criteria for surgical indication were defined as any lens opacity under a given threshold of visual acuity. Different scenarios of worse eye visual acuity thresholds (0.5, 0.4 and 0.3 Snellen lines) were compared.

A discrete-event simulation model was used to project the volume of unmet needs through a 5-year horizon. The components of the model represented the stages through which the target population would pass during the cataract process, that is: no need of surgery, need of surgery, surgery (in the public and the private sector) and death. The transitions between stages would represent concepts such as incidence or demand (figure 1). Need for surgery was divided into "Non-Expressed Need" (explained below) and "Expressed Need" or, equivalently, "Waiting List". "Non-Expressed Need" represented the population that, even if they met the indication criteria, they are not included on a waiting list for several reasons (no perception of need, inaccessibility, preferences, variations in clinical practice). Expressing need was considered equivalent to the following process: requesting surgery, being indicated for surgery and being included on a waiting list of the public health system.

The parameters of the model were estimated from several sources, including administrative and research databases. As there is no primary data on the prevalence of cataracts in Spain, the North London Eye Study (NLES) data was used. The NLES is a population-based study on the prevalence of eye diseases in North London.

Figure 1: Conceptual model.



\*Prevalence of need is divided among these 3 states.

## RESULTS

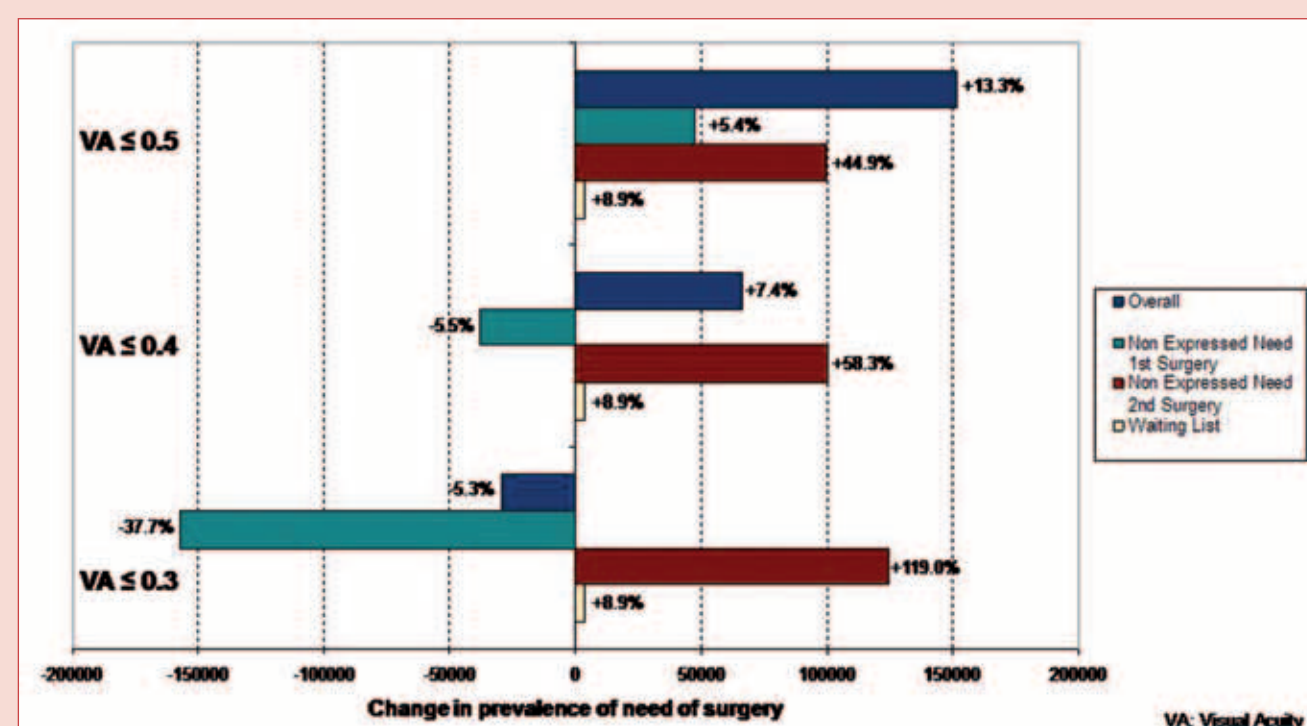
The volume of population's unmet needs of surgery decreased by 5.26% and increased by 7.41% and 13.25% when visual acuities of 0.3, 0.4 and 0.5 were used, respectively (figure 2). Non-expressed need for second-eye surgery was the group which increased the most in the three scenarios. The increment in the cataract surgery rate needed to prevent the cataract backlog from increasing was 60% for a 0.5 threshold and 50% for a 0.4 threshold. For bilateral cataract, the most frequent level of visual acuity was between 0.3 and 0.4 when the threshold was 0.5 or 0.4 (table 1). The distribution of worse eye visual acuity for the aphakic cases showed that visual acuity of 0.1 or less was most frequent regardless of the indication criteria.

Table 1: Visual acuity distribution among the population with prevalence of need of surgery defined according to different indication criteria for visual acuity. Data source: North London Eye Study (n=1,425).

	Bilateral cataracts			Aphakia (one eye operated)				
	N	VA≤0.5	VA≤0.4	VA≤0.3	N	VA≤0.5	VA≤0.4	VA≤0.3
VA≤0.1	58	12,2%	15,0%	26,6%	17	32,7%	34,0%	44,7%
0.1<VA≤0.2	87	18,4%	22,5%	39,9%	15	28,8%	30,0%	39,5%
0.2<VA≤0.3	73	15,4%	18,9%	33,5%	6	11,5%	12,0%	15,8%
0.3<VA≤0.4	168	35,4%	43,5%		12	23,1%	24,0%	
0.4<VA≤0.5	88	18,6%			2	3,8%		

VA: Visual acuity of the worse eye. The percent in columns add up to 100%.

Figure 2: Five-year evolution of prevalence of need of surgery, divided by states and by different visual acuity thresholds for indication criteria.



## CONCLUSIONS

Given current incidence, surgery rates and life expectancy, a substantial increase in the need for surgery is expected in the next 5 years, mainly due to the increase in the need of second-eye surgery. The lower level of worse eye visual acuity found in aphakic patients with unmet needs, raises the question on whether indication criteria should take into account the visual acuity of the better eye, as it is closer to the actual need of the patient.

Our results suggest two recommendations. On one hand, to increase the cataract surgery rate. On the other hand, to include prioritisation at the indication stage, however, future research is needed to characterise levels of need in individuals not requesting surgery, as they represent a substantial proportion of population.

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