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Introduction

In 2000, the Significant Caries (SiC) Index was introduced to describe the 1/3 of a population with the highest caries experience (Brathall, 2000). However, it was shown recently that SiC might not be a meaningful epidemiological index in low-carries populations as individuals without caries experience might be included in SiC calculation in case of caries-free individuals exceeding 2/3 of a population (Jordan and Klingenberger, 2014).

Aim

In the era of robust caries decline in the young population in many countries, a conceptual refinement of the SiC is needed to sustain this index in describing a high caries fraction.

1. Outline of problem

Caries data for 12-year-olds were derived from the 3rd and 4th German Oral Health Studies (DMS III/IV), cross-sectional studies conducted in 1997 and 2005, respectively (Micheelis and Reich, 1999; Micheelis and Schiffner, 2006):

12-year-olds	DMS III (1997)	DMS IV (2005)
Data in parentheses: 95 % confidence interval		
Study subjects	1,043	1,383
Mean DMFT	1.7 (1.6; 1.8)	0.7 (0.6; 0.8)
SiC Index	4.1 (3.9; 4.3)	2.1 (0.0; 2.3)
Caries-free subjects	41.8 %	70.1 %

Table 1: Clinical caries characteristics and calculated indices of 12-year-olds in DMS III and DMS IV

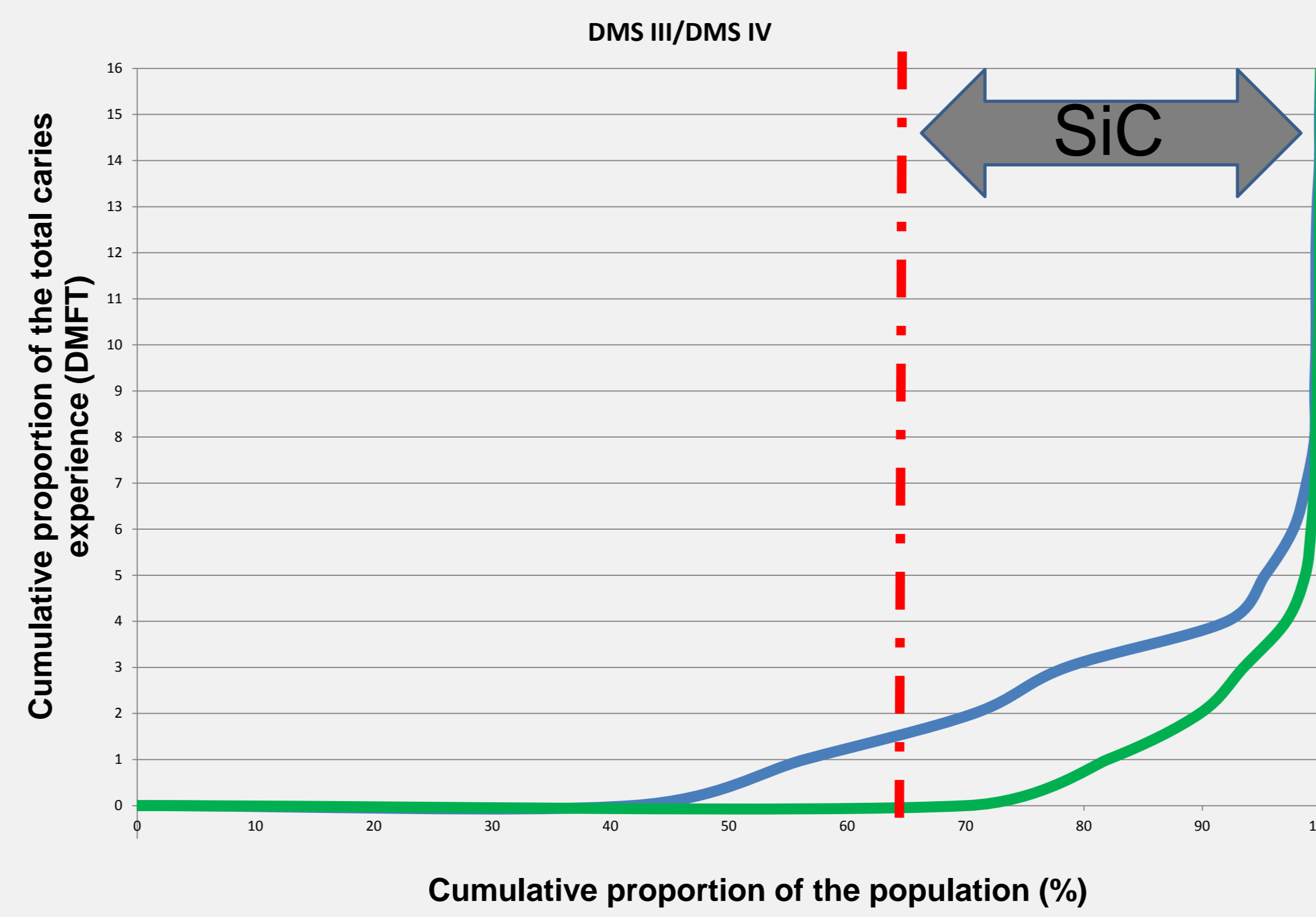


Figure 1: Caries experience Lorenz curves for 12-year-olds in: DMS III (1997) (blue line); DMS IV (2005) (green line). In DMS III, the SiC makes sense as all individuals within SiC demonstrate DMFT >0; in DMS IV, the SiC comprises also individuals without caries experience.

2. Potential scenarios

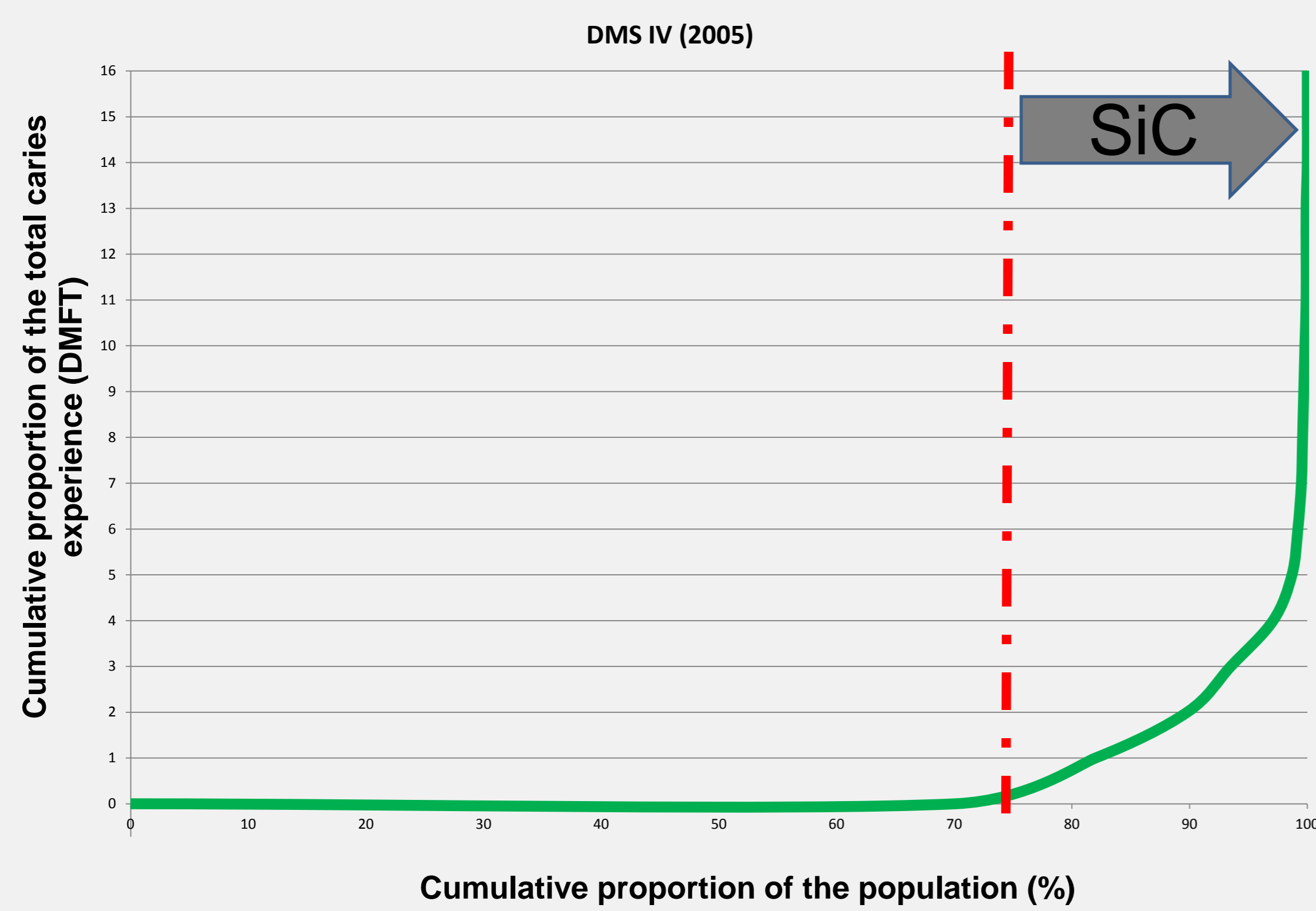


Figure 2: Shifting the cut-off rightwards, here 75 %

Other authors proposed e.g. a SiC10 with a cut-off at 90 % (Armfield et al., 2010)

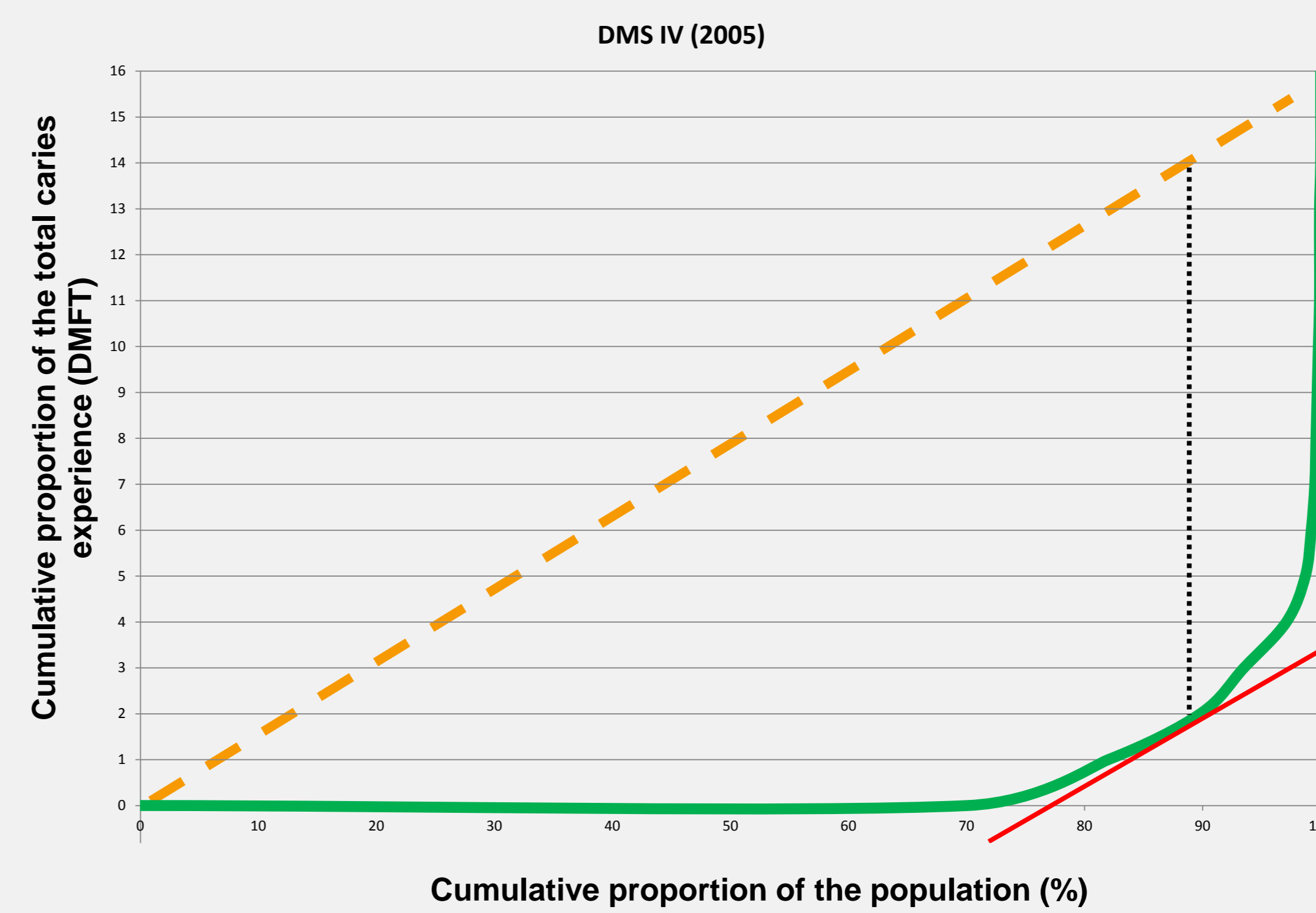


Figure 3: Drawing a tangent (red) on the Lorenz curve (green), parallel to the angle bisector of axes of abscissae and ordinates (yellow) to identify reproducible coordinates for an individual SiC

PROS	CONS
simple procedure	arbitrary
	as caries-free subjects increase, new cut-off might be inoperative again

PROS	CONS
individual calculation of a high-risk DMFT	complicated procedure
not including caries-free subjects	

3. Proposal for solution: dynamic Significant Caries (dSiC) Index and procedure

Step	Procedure
1	DMFT values are listed ascendingly after a basic univariate analysis
2	All caries-free subjects are capped and are not included in the calculation
3	The remaining subjects are used calculating a mean DMFT = dSiC
4	dSiC is presented as follows: extent (1st value in %); severity (2nd value as mean DMFT)

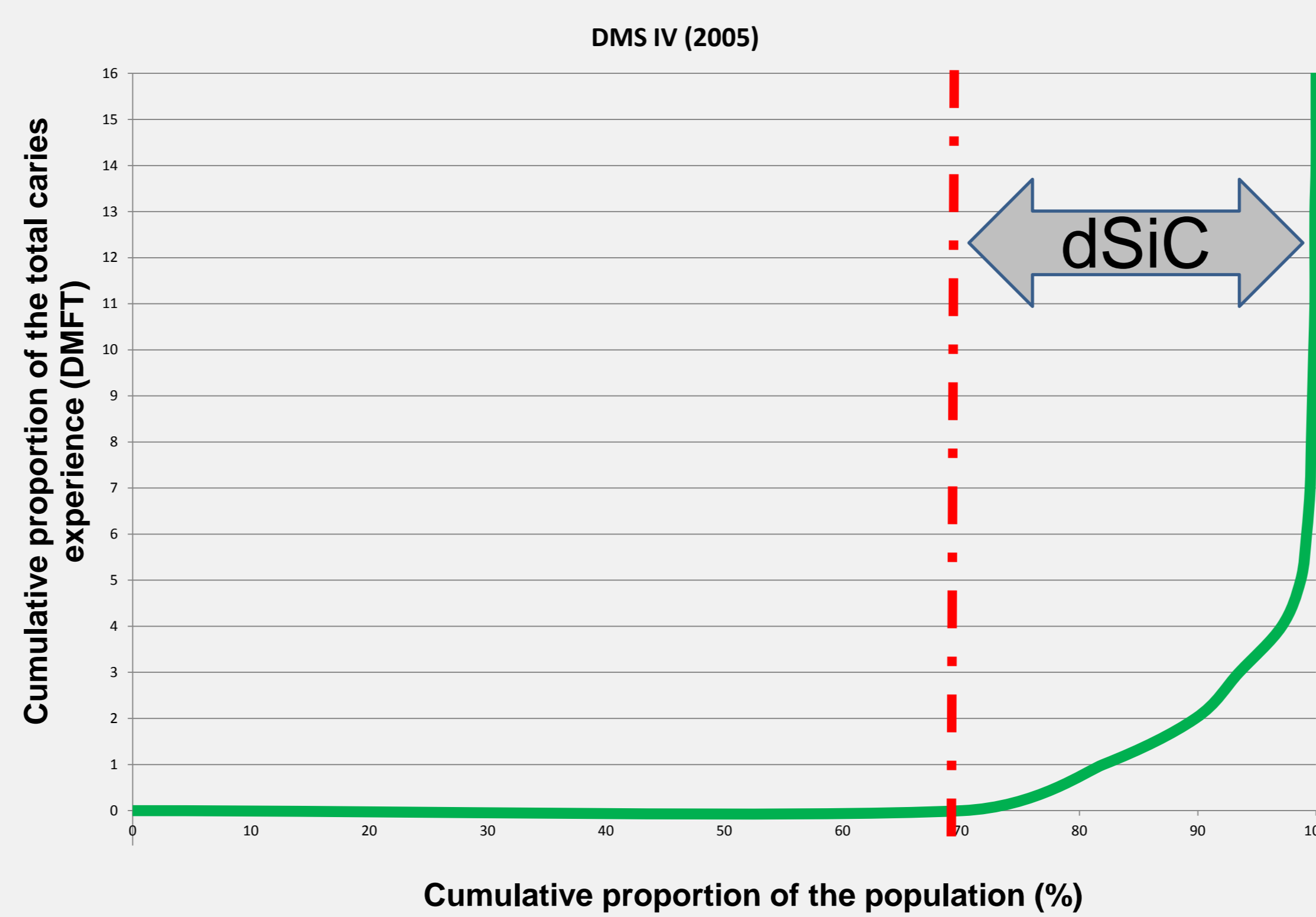


Figure 4: Individual cut-off for a dynamic Significant Caries (dSiC) Index at DMFT >0

PROS	CONS
simple procedure	-
dSiC includes information concerning extent and severity of the high caries risk group	

12-year-olds	DMS III (1997)	DMS IV (2005)
Study subjects	1,043	1,383
Mean DMFT	1.7	0.7
SiC Index	4.1	2.1
dSiC Index	58.2 % (extent); 3.0 (severity)	29.9 % (extent); 2.4 (severity)
Caries-free subjects	41.8 %	70.1 %

Table 2: Clinical caries characteristics and calculated indices of 12-year-olds in DMS III and DMS IV including dSiC

Conclusion

dSiC might be used as an alternative to SiC if more than 2/3 of a population are caries-free. dSiC includes information on the percentage of subjects with caries experience (1st value) and the mean DMFT of this percentage (2nd value). In this respect, dSiC can be interpreted as an index presenting key numbers of extent and severity of caries experience in a population.

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