Use of different look-back periods in defining incident acute myocardial infarction have an impact on observed number and time trends: a CVDNOR project

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Background

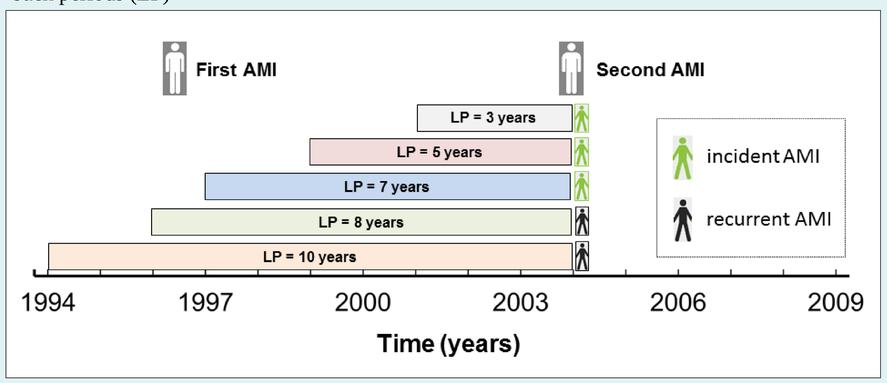
A common method to identify incident (first) acute myocardial infarction (AMI) in large patient administrative data systems is by retrospectively excluding previous AMIs for the same individual during a fixed time period (look back period [LP])

The optimal length of the LP is not known

Different LPs have different degree of accuracy in identifying an incident AMI (Fig 1)

We conducted this study to investigate whether differences in LP length influences the number and time trends of incident AMIs

Figure 1. Defining an acute myocardial infarction (AMI) as 'incident' by using different look back periods (LP)



Materials and Methods

All AMI events in Norway;

- hospitalizations (ICD9:410, ICD10: I21, I22)
- out-of-hospital coronary deaths (ICD9:410-414, ICD10:I20-I25)

in individuals ≥25 years during 1994-2009 were retrieved from the 'Cardiovascular Disease in Norway 1994-2009' (CVDNOR) project

Incident AMIs during 2004-2009 were identified using LPs of 10, 8, 7, 5 and 3 years

For each LP, we calculated time trends in incident AMI rates (incidence rate ratio - IRR) for year 2009 versus 2004 using Poisson regression analyses

LP=10 years was considered the 'gold standard' to which results from other LP were compared using post estimation tests based on seemingly unrelated estimations

Analyses were conducted separately for younger (25-64 years) and older (65+ years) adults

Results

Effect of LP on the number of incident AMIs (Table1)

Younger adults

Using a LP=10 years, we identified 24 903 incident AMIs

LPs of 8, 7, 5 and 3 years overestimated the number of incident AMIs by 1.5%, 2.4%, 4.0% and 7.1%, respectively (all p<0.001)

Older adults

Using a LP=10 years, we identified 67 325 incident AMIs

LPs of 8, 7, 5 and 3 years overestimated the number of incident AMIs by 2.6%, 4.0%, 7.4% and 12.6%, respectively (all p<0.001)

Table 1. Number of incident AMIs during 2004-2009 defined using different LPs

LP	Incident AMIs	Difference*
	25-64 years	
10 years	**24903**	-
8 years	25266	+ 1.5%
7 years	25494	+ 2.4%
5 years	26005	+ 4.0%
3 years	26681	+ 7.1%
	65+ years	
10 years	**67325**	-
8 years	69050	+ 2.6%
7 years	70014	+ 4.0%
5 years	72329	+ 7.4%
3 years	75784	+ 12.6%

* Relative difference to LP= 10 years (given as percentage)

Effect of LP on time trends of incident AMI rates (Figure 2)

Younger adults

No changes in AMI rates when a LP=10 years was applied (IRR=1.015; 95% CI, 0.980-1.056)

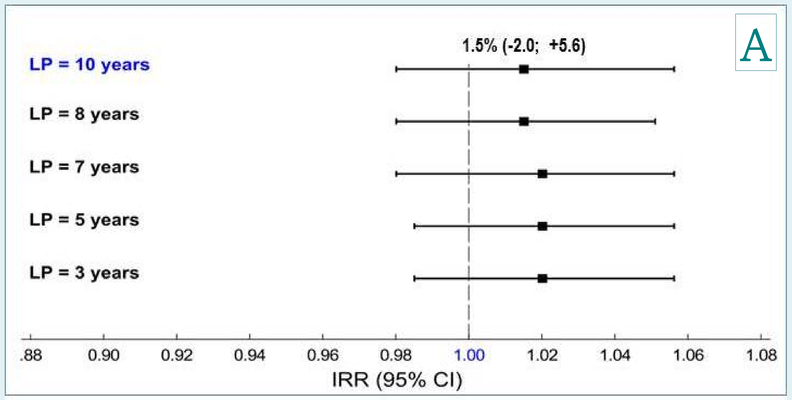
The same results were observed when LPs of 8, 7, 5, and 3 years were applied

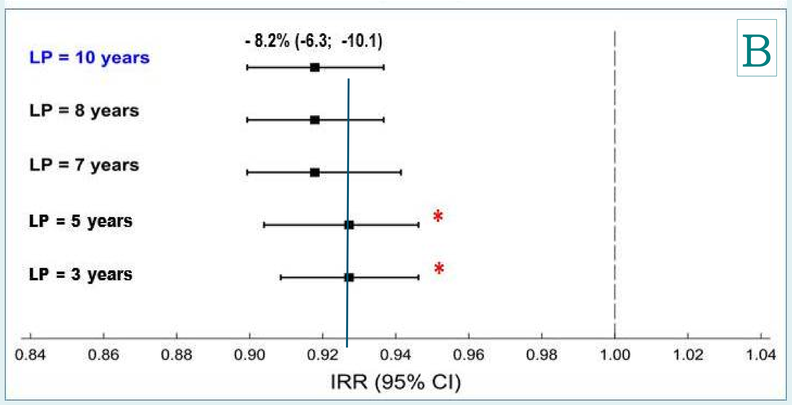
Older adults

A decline of 8.2% in AMI incidence rates during 2004-2009 was observed when a LP=10 years was used

The decline was smaller for a LP=5 years (7.3% *vs*. 8.2%; p=0.02) and a LP=3 years (7.1% *vs*. 8.2%; p=0.03)

Figure 2. Changes in acute myocardial infarction (AMI) incidence rates during 2004-2009 according to different look back periods (LP) used to identify incident AMIs





IRR: Incidence rate ratio between years 2009 and 2004 among younger adults (A) and older adults (B)

* Significantly different from results for LP=10 years

CONCLUSION: By applying short LPs to identify incident AMIs, we overestimate the number of incident AMIs and obtain different time trends

These effects are more noticeable among older compared to younger adults

The authors of this work
do not have any conflict of interest to declare