



## Critical Implications of NT-pro BNP in Underwriting Type 2 Diabetics

N Terminal-pro Brain Natriuretic Peptide (NT-pro BNP) is produced by cardiac muscle cells (myocytes) in response to cardiac wall stress and to ischemia as well. NT-pro BNP has been shown to predict all-cause mortality in individuals without history of heart disease. This has been found in both insurance<sup>1</sup> and general<sup>2</sup> populations. It has also been found to improve future cardiovascular risk estimation when considered along with classic cardiovascular risk assessors.<sup>3</sup> Since the cause of death in individuals with peripheral vascular disease and cerebral vascular disease is due to coronary atherosclerotic heart disease (CAD) at least fifty percent of the time—and is due to an even greater percent of CAD in those with diabetes, it is logical that assessment of NT-pro BNP values might provide valuable information when underwriting these impairments.

Although approximately three fourths of type 2 diabetics will die from a cardiac cause they are also more likely to present with atypical symptoms of CAD. They are likely to have more extensive and diffuse atherosclerosis even in the absence of symptoms. Myocardial ischemia is present in about one fifth of asymptomatic type 2 diabetics. In those mildly symptomatic for CAD, myocardial ischemia has been found present on myocardial perfusion scintigraphy (MPS) in about one half. NT-pro BNP levels obtained in these patients, just prior to their MPS, were found to be significantly higher in those type 2 diabetics demonstrating ischemia on MPS relative to those where MPS did not demonstrate ischemia.

### KEY INFORMATION FOR UNDERWRITERS

In type 2 diabetics NT-pro BNP testing may help identify individuals...

- Unlikely to have myocardial ischemia
- With relatively lower mortality risk
- NT-pro BNP levels were strong indicators of future overall and cardiovascular mortality, and these associations with risk are independent of traditional risk factors

	Median NT-pro BNP pg/mL	Range pg/mL
Myocardial ischemia present	183	64 - 324
No myocardial ischemia	88	23 - 207

An NT-pro BNP value > 180 pg/mL is an independent predictor of myocardial ischemia in type 2 diabetics (odds ratio = 2.49). However, this level for detecting myocardial ischemia has better specificity (72%) than sensitivity (52%).<sup>4</sup>

A Danish study<sup>5</sup> that followed a group of type 2 diabetics for fifteen years found that plasma NT-pro BNP levels were strong indicators of future overall and cardiovascular mortality, and that these associations with risk were independent of traditional risk factors, known coronary atherosclerotic heart disease and elevated urinary albumin excretion (29% had microalbuminuria and 15% had macroalbuminuria). When compared with the first tertile (lowest third) of NT-pro BNP results, the hazard ratios for all cause mortality were 1.70 for the second and 5.19 for the third tertiles. The lower and upper tertile limits were, respectively, 41 ng/L and 103 ng/L and the median NT-pro BNP values were 23, 62 and 231 ng/L respectively.

Tertile	Mean age (years)	Percent female	Median NT-pro BNP (ng/L)	Mortality ratio (%)	EDR/K
First	50	44	23	130	8
Second	54	71	62	174	17
Third	58	75	231	356	64

Mortality methodology per Pokorski<sup>6</sup> and Winsemius.<sup>7</sup>  
Danish expected population mortality per: [www.mortality.org](http://www.mortality.org).

Mortality ratios and excess death rates reveal a decided difference between the first and third tertiles of NT-pro BNP results in type 2 diabetics as is graphically represented in Figure 1.

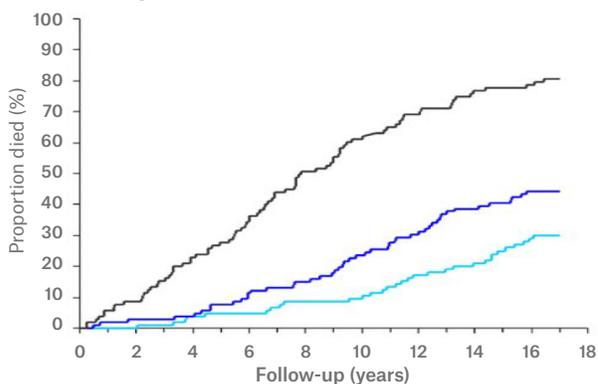


Figure 1<sup>5</sup>

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Although individuals with type 2 diabetes are statistically likely to die from CAD, they are less likely to present with typical symptoms. Determination of NT-pro BNP values in type 2 diabetics has been shown to indicate those having relatively less, and relatively greater risk for extra mortality due to CAD making this a helpful test to obtain in this population where significant CAD may be present, but undetected.

## Key Summary Points

- Although approximately three fourths of type 2 diabetics will die from a cardiac cause they are also more likely to present with atypical symptoms of CAD
- An NT-pro BNP value > 180 pg/mL is an independent predictor of myocardial ischemia in type 2 diabetics
- NT-pro BNP levels in type 2 diabetics were strong indicators of future overall and cardiovascular mortality, and that these associations with risk were independent of traditional risk factors

## References:

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