Based on different estimation methods, mortality attributable to atrial fibrillation (AF) has been demonstrated to increase over time in developed countries, reaching a share ranging from 1% to 5% of overall deaths. To assess the whole burden of AF-associated mortality, all diseases mentioned in death certificates of subjects aged ≥45 years resident in the Veneto Region (Northeastern Italy) were analyzed for the 2008 to 2013 period. The prevalence of common chronic co-morbidities was compared between deaths with mention of AF and a sample of age-matched deaths without reported AF. The disease was mentioned among conditions contributing to death in 25,834 subjects, corresponding to 9.8% of all regional deaths. Rates of AF-associated mortality were higher in men and increased steeply with age, being above 1 per 100 among residents aged ≥85 years. Compared with non-AF-associated deaths, the strongest associations were observed between AF and hypertensive diseases (prevalence ratio 1.62, 95% CI 1.57 to 1.67), cardiac valve disorders (2.43, 2.25 to 2.61), cardiomyopathies (1.93, 1.70 to 2.19), cerebrovascular diseases (1.55, 1.50 to 1.60), and chronic obstructive pulmonary disease (1.49, 1.42 to 1.57). AF-associated mortality resulted higher than previously reported, probably due to aging of the population with multiple predisposing diseases, an increased recognition of AF among the elderly, and a raised awareness of certifying physicians about the importance of AF. Analyses of all diseases mentioned in death certificates underscored the interaction of AF with several other circulatory and respiratory disorders in pathologic networks leading to an increased risk of death.