In this thesis we deal with the longevity risk originating from the uncertain future evolution of mortality at adult-old ages. It may emerge in particular because of an unanticipated reduction in mortality rates. That risk is significant for annuity and pension providers. We consider a model portfolio represented by one cohort of recipients of immediate life annuities. We introduce possibilities for assessing the risk of such portfolio. A comparison of the impact of longevity risk is made with random deviations in mortality rates. We also deal with the question of solvency of the insurer by investigating the solvency capital requirement for longevity risk.