Bloodstream infections (BSI) are a major cause of mortality, morbidity and medical cost, but few population-based studies have concomitantly evaluated BSI incidence and mortality. Data on BSI episodes reported to national, population-based surveillance by all clinical microbiology laboratories in Finland during 2004–07 were linked to vital statistics. Age-, sex and microbe-specific incidence and mortality rates were calculated. During 2004–07, 33 473 BSI episodes were identified; BSI incidence increased from 147 to 168 per 100 000 population (average annual increase, 4.4%; p <0.001). Rates were highest among persons ≥65 years and <1 year, and higher among male patients than female patients (166 versus 152 per 100 000). The most common aetiologies were Escherichia coli (27%) and Staphylococcus aureus (13%). Among male patients, 52% of BSI were caused by gram-positive bacteria compared with 42% among female patients (p <0.001). Of the deaths, 32% occurred within 2 days, 70% were among people aged 65 years or more and 33% were caused by E. coli or S. aureus infections. The BSI mortality rate increased from 19 to 22 per 100 000 (average annual increase: 4.0%, p 0.01). Among people aged 25 years or more, the mortality rate was 1.4-fold higher in men than women (34 versus 25 per 100 000 population). Overall excess annual mortality from BSI in the population was 18 per 100 000. The substantial BSI burden among the elderly and among adult men highlights the need for developing and implementing effective interventions, particularly for BSI caused by E. coli and S. aureus. One-third of BSI deaths occurred early, emphasizing the importance of early identification and treatment.