Concentrations of oxolinic acid (OXA) were measured in the plasma, muscle, liver, and kidney of 48 Atlantic salmons (Salmo salar) 1 day after the end of an oral administration. OXA was administered over a period of 13 days to control an outbreak of winter ulcer disease in a commercial marine farm. On the basis of their behaviour, the fish were classified as healthy (n=18), moribund (n=20), or dead (n=10). There was a dramatic difference in the OXA concentrations in the healthy fish and those classified as moribund or dead. There was no evidence of bacterial infection in the 18 healthy fish, all of which were shown to be feeding. In these fish, the mean concentrations of OXA (±standard deviation) in the plasma, muscle, liver, and kidney were 0.40±0.36 mg/l, 1.0±0.71 mg/kg, 0.93±0.67 mg/kg, and 1.13±0.87 mg/kg, respectively. Within the healthy group, there were considerable individual fish-to-fish variations in OXA concentrations and the mean coefficient of variation (CV) for the concentrations in the four tissues was 77%. In contrast, all 20 moribund fish showed external lesions and 19 showed signs of systemic infection. Only 2 showed signs of feeding, and the concentrations of OXA were below the limit of quantitation (LOQ) in 68%, 85%, 70%, and 80% of the plasma, muscle, liver, and kidney, respectively. These data suggest that the major function of the therapy was to assist healthy fish to resist de novo infection and that moribund fish had gained little or no benefit from the oral administration of OXA. A numerical description of the concentration of the antimicrobial agent achieved in therapy is necessary to determine the resistance or sensitivity of the bacteria involved in the infection. The degree of fish-to-fish variation in the concentrations of OXA, both within the healthy fish and between healthy and moribund fish, presents difficulties in generating a clinically meaningful description relevant to the whole population. This issue is discussed, and it is suggested that for this application, the minimum concentration achieved by at least 80% of the treated population might represent a useful parameter for describing the concentrations of agents achieved during therapy. The plasma data from this investigation were used to estimate clinically relevant breakpoint minimum inhibitory concentration (MIC) values. The validity of these breakpoint values was discussed with reference to the outcome of the therapy and the susceptibility of the bacteria isolated from infected fish.