Management of bacterial infections is becoming increasingly difficult due to the rising frequency of strains that are resistant to many current antibiotics. New types of antibiotics are, therefore, urgently needed. Virulence factors or virulence-associated phenotypes such as adhesins and biofilm formation are highly attractive targets for new drugs. Specific adhesion provides bacteria with target selection and prevents removal by hydrodynamic flow forces. Bacterial adhesion is of paramount importance for bacterial pathogenesis. Adhesion is also the first step in biofilm formation. Biofilm formation is particularly problematic in medical contexts because biofilm-associated bacteria are particularly hard to eradicate. Several promising candidate drugs that target bacterial adhesion and biofilm formation are being developed. Some of these might be valuable weapons for fighting infectious diseases in the future. Here we use illustrative examples, mainly from the enterics, to demonstrate the principles.