Direct antimicrobial susceptibility testing

In direct antimicrobial susceptibility testing the specimen (commonly urines) is used as the source of the inoculum. Tests where positive blood cultures are used as the source of the inoculum are also included as direct tests, although they do not use the specimen directly.

The advantage of direct testing is that results may be available earlier than when the organism is isolated in pure culture before testing and this may have direct patient benefit in terms of early appropriate chemotherapy. There may be additional benefits from the ability to narrow the spectrum of therapy at an early stage.

The main disadvantage is that the inoculum cannot be effectively controlled. Also there may be mixed cultures and there may be pH variations or substances in the specimens that affect results (e.g. antimicrobial agents in urine, antimicrobial absorption materials in blood cultures). These problems may result in less reliable results than with pure cultures. EUCAST does not recommend primary susceptibility testing and any laboratory using this approach must take responsibility for ensuring that results are reliable. The following should be noted:

1. There are currently no validated methods for processing specimens to ensure that the correct inoculum is achieved.
2. Tests should be repeated on pure cultures as needed and the correlation of direct and secondary tests should be monitored so that the reliability of direct tests can be assessed.
3. In disk diffusion tests, if the inoculum is visibly light, do not report susceptible results as zone diameters may be increased leading to resistant isolates appearing susceptible.
4. Do not set up direct tests with automated systems unless approved by the manufacturer.
5. Reliable interpretation of results requires the species to be identified.
6. The objective of direct testing is to provide earlier results so there may be a temptation to read disk diffusion tests earlier than the specified 16-20h incubation. There is no evidence to support this practice but resistant results of tests read early are likely to be valid while susceptible results may be misleading.

The introduction of rapid and reliable methods for identification of bacteria and for assessing inocula would increase the reliability of direct susceptibility testing.