

Antimicrobial Stewardship

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Evolution drives the emergence and proliferation of microbes resistant to antimicrobials

The emergence of resistance is **specific to each microbe and each antimicrobial**.

The proliferation of resistant microbes is dependent on the **rate of transmission** of microbes between hosts, the **degree of selective pressure** exerted by the antimicrobial, and the **fitness cost** of the resistance mechanism for the microbe.

Antimicrobial stewardship is intended to:

1. Ensure that patients receive the benefits of antimicrobial therapy now
2. Improve the chances that patients will be able to receive the benefits of antimicrobial therapy in the future.

Antimicrobial stewardship assumes importance because of the expectation that for some organisms the proliferation of antimicrobial resistant strains will result in the frequent occurrence of infections that cannot be effectively treated, because in the future:

1. there will be high levels of resistance to currently available antimicrobials
1. new antimicrobials will not have been developed in time to resolve the problem

Antimicrobial stewardship therefore encourages:

1. use of antimicrobials only when there is a significant benefit
2. use of the antimicrobial which will confer the benefit but provide the least selective pressure for the proliferation of resistance.

Rupeni Poata is an 8 year old boy with a sore throat. He has an older brother with a history of rheumatic fever.

Antibiotic stewardship encourages:

1. antibiotic treatment of acute *S. pyogenes* pharyngitis

but does not encourage antibiotic treatment of pharyngitis caused by a viral infection.

Rupeni Poata is an 8 year old boy with a sore throat. He has an older brother with a history of rheumatic fever.

Antibiotic stewardship encourages:

2. treatment of acute *S. pyogenes* pharyngitis with penicillin

but not does not encourage treatment of *S. pyogenes* pharyngitis with cephazolin

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Ramona Mahana has acute leukaemia. She has recently had chemotherapy and her bone marrow temporarily has been severely damaged. She has “no” white blood cells in her blood. She now has a fever and an E. coli sensitive to cefuroxime has been grown from two blood cultures.

Antibiotic stewardship encourages:

antibiotic treatment of her E. coli bacteraemia with cefuroxime

but not does not encourage treatment of her neutropenic fever with meropenem plus vancomycin.

Lionel Tamahori is concerned about mastitis in his dairy cows when they cease milking.

Should all his cows be given intramammary antibiotics?

Should the intramammary antibiotic given, to some or all of his cows, be active against only the most common pathogens, or against “all” potential pathogens?

Should the intramammary antibiotic given be one that has a long period of low concentrations in the duct fluid?

Effective antibiotic stewardship requires:

1. A knowledge of what microbe is probably, or actually, causing the disease
2. A knowledge of the benefit provided by antimicrobial treatment
3. Some concern about the future in relation to the present (“dilemma of the commons”)
4. Some champions to encourage a potentially unpopular cause.

Antibiotic stewardship committees

Microbiologist

Infectious diseases physician

Pharmacist

Major end users

Antibiotic stewardship methods

Guidelines

Audit

Education

Restriction

Incentives