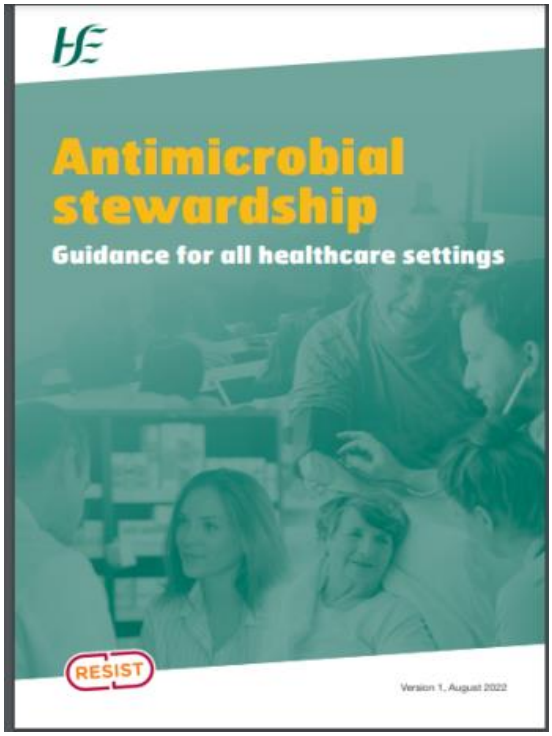
Intravenous to oral switch information sheet



HSE AMRIC antimicrobial stewardship guidance for all healthcare settings advises that intravenous to oral switch is a key point of care intervention to promote good antimicrobial stewardship (AMS). Good AMS involves recognising situations when intravenous antimicrobial therapy can be switched to oral and when oral antimicrobial therapy needs to be escalated to intravenous therapy. This toolkit aims to provide local AMS teams with resources to promote intravenous to oral switch (IVOS) in acute hospitals.

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Background

Oral antimicrobial therapy should be prioritised for patients over intravenous therapy whenever possible. Oral antimicrobial therapy has many advantages for the patient, staff, hospital and the environment.

- ✓ Reduce risk of bloodstream and catheter-related infections
- ✓ Increase patient mobility and comfort
- ✓ Reduce length of stay
- ✓ Release nursing and clinician time to care for patients
- ✓ Reduce use of single use plastics used to administer IV antimicrobials
- ✓ Reduce total cost of therapy

AMS teams should have a system in place for identifying patients whose antimicrobial therapy may be suitable for intravenous to oral switch (IVOS).

IVOS criteria for antimicrobial therapy

The following five criteria should be considered when assessing a patient for suitability for an IVOS of antimicrobial therapy.

1. Timing of intravenous (IV) antimicrobial review

- Most infections can be managed safely and effectively using the oral route
- For antimicrobials with excellent oral bioavailability, the oral route should be used from the outset, once the oral route is considered reliable. See Table 1
- If initial therapy with IV antimicrobials is required, it may be possible to switch to oral antimicrobial agents before 24 – 48 hours if the patient is responding well to treatment
- IVOS should be considered within the first 24 - 48 hours of the first dose of IV antimicrobial being administered
- If IVOS does not occur within the first 48 hours, a daily review thereafter should be undertaken with documentation of the treatment plan
- When reviewing a patient's antimicrobial for an IVOS, it should be considered if antimicrobial therapy is still indicated. If it is no longer indicated i.e. an infection has been ruled out, antimicrobial therapy should be stopped.

2. Clinical signs and symptoms

- Are the patient's signs and symptoms of infection improving?
- Is the patient haemodynamically stable (heart rate and blood pressure are stable) or INEWS score decreasing?

3. Infection markers (if available) are improving

- Are laboratory infection markers (if available) improving?
- It should be considered that infection markers could also indicate inflammation or be affected by, for example steroid treatment. An IVOS may still be considered if the C-reactive protein and white cell count are not decreasing or have not been repeated in a patient that is clinically improving.

4. Oral route

- The patient's gastrointestinal (GI) tract must be functioning with no evidence of impaired oral absorption. Conditions that may result in impaired oral absorption are shock, severe or persistent nausea, vomiting, diarrhoea, active GI bleeding, obstruction or ileus, high enteral tube output and shortened GI transit time (malabsorption, short-gut)
- The patient has safe swallow or an enteral tube available for administration
- A suitable oral formulation is available, considering oral bioavailability, clinically significant drug interactions or patient allergies. The choice should be guided by microbiological sample results if available
- It is important to consider the formulation of the oral antimicrobial and the site of infection as different formulations can have different oral bioavailabilities, for example tablets compared to suspensions. Consult with a pharmacist for advice if required
- There are no significant concerns over patient adherence to oral treatment.

5. Infections that may require an individualised patient treatment plan for administration of antimicrobial(s).

There is evidence that oral therapy can be considered for part or all of the course of treatment for some infections traditionally managed with intravenous treatment for

the entire duration of therapy for example endocarditis, osteomyelitis, bacteraemia, intra-abdominal infection and complicated urinary tract infection.

It is reasonable to consider oral therapy for osteomyelitis, bacteraemia, and endocarditis when all of the following criteria are met:

- The patient is clinically and haemodynamically stable
- Pathogen and susceptibility are known and an oral option is available which achieves good levels at the site of infection
- Surgical or procedural source control has been achieved, if possible, with no persistent bacteraemia
- The patient is likely to be able to tolerate and absorb oral medications
- A published regimen is available with clinical outcomes data for targeted pathogens
- There are no psychosocial or logistical reasons to prefer intravenous therapy.

It is important to note that good AMS also involves recognising situations when oral antimicrobial therapy needs to be escalated to intravenous antimicrobial therapy.

****If in doubt discuss with local Microbiology, Infectious Diseases Team or Antimicrobial Pharmacist****

The antimicrobials included in Table 1 are often referred to as agents of excellent oral bioavailability, i.e. have an oral bioavailability of ≥90%. Ciprofloxacin is quoted as having 70-80% oral bioavailability and appropriate dose adjustments can overcome this slightly lower bioavailability. For these antimicrobials the oral route should be used from the outset, once the oral route is considered reliable (see oral route information above).

Table 1 Antimicrobials with excellent bioavailability by the oral route.

Check for any food or drug interactions when switching to oral antimicrobials as the absorption of the antimicrobial may be affected (i.e. reduced or delayed) which would impact the efficacy of the antimicrobial. Seek Pharmacy advice in relation to same if required.

Antimicrobial	Oral Bioavailability
Ciprofloxacin	70-80%*
Clindamycin	90%
Co-trimoxazole	70-90%
Fluconazole	>90%
Fusidic Acid	91%
Isavuconazole	98%
Levofloxacin	99-100%
Linezolid	100%
Metronidazole	100%
Rifampicin	70-90%
Voriconazole	96%

References: Sanford Guide 2024 & *Martindale the Complete Drug Reference accessed online 4/09/2024

Table 2 Recommended oral agents when switching from IV to oral antimicrobials

- Doses included are for normal renal & hepatic function
- Doses are for oral capsules/tablets unless otherwise specified. Note: in some cases oral bioavailability for suspension can differ from tablets/capsules
- Review drug and food interactions. Some antimicrobials need to be taken on an empty stomach for better absorption
- Doses may need to be adjusted according to severity of infection
- *See BNF, SmPC or seek pharmacist advice regarding dose adjustments*

IV Antimicrobial	**Oral Switch Option**
Amoxicillin 500mg – 1g every 8 hours	Amoxicillin 500mg – 1g every 8 hours
Benzylpenicillin 1.2g-2.4g every 6 hours	Amoxicillin 500mg – 1g every 8 hours or phenoxymethylpenicillin 666mg every 6 hours (Calvepen®) OR 500mg every 6 hours (Kopen®)
Cefuroxime	Oral cefuroxime is not advised due to poor oral bioavailability. Oral options may be available according to indication and microbiological sample results. Discuss with microbiology/infectious diseases/antimicrobial pharmacist if necessary
Ceftriaxone	There is no direct oral alternative. Oral options may be available according to indication and microbiological sample results. Discuss with microbiology/infectious diseases/antimicrobial pharmacist if necessary
Ciprofloxacin 400mg every 12 hours	Ciprofloxacin 500mg-750mg every 12 hours
Clarithromycin 500mg every 12 hours	Clarithromycin same dose
Clindamycin 600mg – 1.2g every 6 hours	Clindamycin 300mg - 450mg every 6 hours
Co-amoxiclav 1.2g every 8 hours	Co-amoxiclav 625mg *(500mg/125mg)* – 1g *(875mg/125mg)* every 8 hours
Co-trimoxazole	Co-trimoxazole same dose
Flucloxacillin 1-2g every 6 hours	Flucloxacillin 500mg - 1g every 6 hours
Fluconazole	Fluconazole same dose
Levofloxacin	Levofloxacin same dose
Linezolid 600mg every 12 hours	Linezolid same dose
Metronidazole 500mg every 8 hours	Metronidazole 400mg every 8 hours
Piperacillin-tazobactam	There is no direct oral alternative. Oral options may be available according to indication and microbiological sample results. Discuss with microbiology/infectious diseases/antimicrobial pharmacist
Rifampicin	Rifampicin same dose
Voriconazole	Patients > 40kg Voriconazole 400mg every 12 hours for 24 hours (if loading dose is required) then 200mg every 12 hours. In patients <40kg contact antimicrobial pharmacist for advice