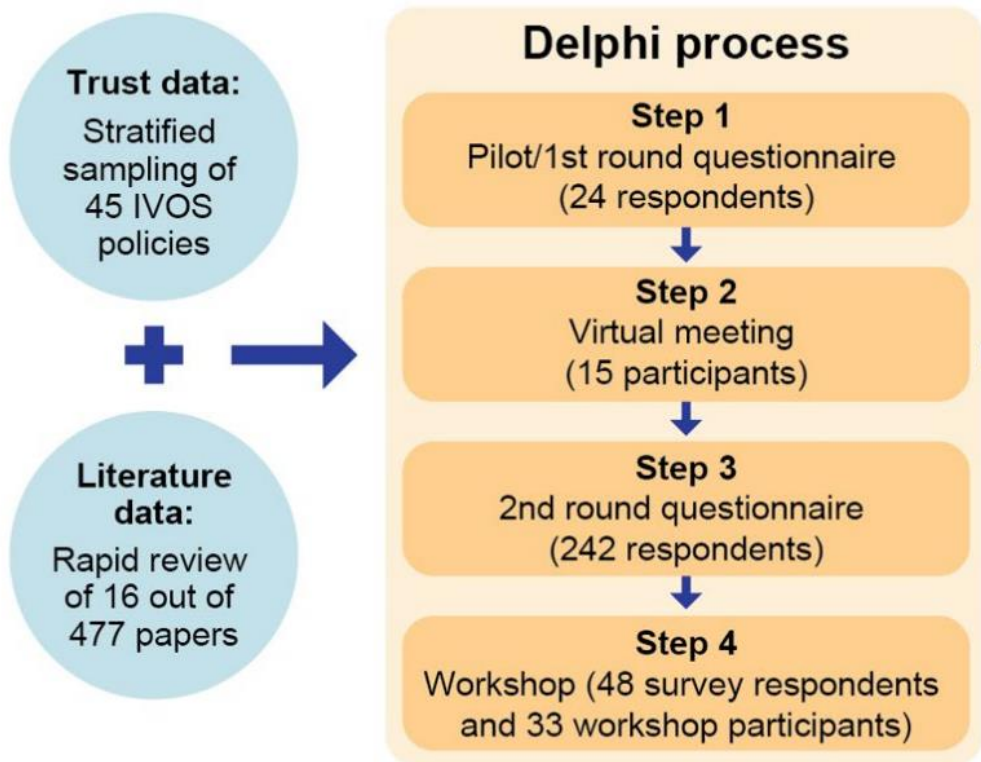




# Developing of an Evidence-Based UK-Wide Antimicrobial Intravenous-to-Oral Switch Criteria: the Delphi Consensus Process



## Step 4

Profession of respondents (UK-wide)	Count
Pharmacist (Microbiology or Infection Specialist)	65
Hospital General Physician	55
Medical Microbiologist/Infection Diseases Doctor	38
Pharmacist (General or non-Infection Specialist)	36
Nurse/Midwife (General or non-Infection Specialist)	22
Surgeon	8
Nurse (Antimicrobial Stewardship)	8
Allied Health Professional	3
Nurse (Infection Prevention Control)	3
Physician Associate	1
Healthcare Scientist	1
Specialist Pharmacy Technician	1
Dentist or Dental Nurse	1
<b>Total</b>	<b>242</b>

# National IVOS criteria for early switch

Guidance

## National antimicrobial intravenous-to-oral switch (IVOS) criteria for early switch

Published 1 November 2022

Contents

Timing of intravenous (IV) antimicrobial review

Clinical signs and symptoms

The national antimicrobial intravenous-to-oral switch (IVOS) criteria for early switch contains 24 IVOS criteria categorised into 5 sections. This criteria was co-produced through a UK-wide consensus process involving 279 multidisciplinary participants.

### 24 criteria categorised into 5 sections

- Timing of intravenous (IV) antimicrobial review
- Clinical signs and symptoms
- Infection markers
- Enteral route
- Special considerations

Available on [gov.uk](https://www.gov.uk)

### Based on the National Antimicrobial IVOS Criteria

Co-produced through a UK-wide multidisciplinary consensus process involving 279 participants

#### Why use this IVOS decision aid?

IVOS is an important antimicrobial stewardship intervention.<sup>1,2</sup> Research evidence confirms several IVOS benefits, including decreased risk of bloodstream and catheter-related infections, reduced equipment costs, carbon footprint and hospital length-of-stay, increased patient mobility and comfort, and released nursing time to care for patients.<sup>3,4</sup>

#### When to use this IVOS decision aid?

The audit standard recommended for the implementation of this decision aid is that all patients on intravenous (IV) therapy should be reviewed promptly from first dose of IV antimicrobial with formal review completed within 48 hours and daily thereafter, unless clearly documented exemptions.

#### Does your patient have an infection that may require special consideration?

Infections that may require special consideration include: deep-seated infections, infections requiring high tissue concentration, infections requiring prolonged intravenous antimicrobial therapy or critical infections with high risk of mortality.

To note: on specialist advice, an IVOS within 48 hours may still be indicated for some patients with these infections.

Infections for special consideration include, but are not limited to, those listed below:

• bloodstream infection	Y/N	• osteomyelitis	Y/N	If <b>YES</b>	→ check for clearly documented plan or seek specialist advice
• empyema	Y/N	• severe or necrotising soft tissue infections	Y/N	If <b>NO</b>	→ continue
• endocarditis	Y/N	• septic arthritis	Y/N		
• meningitis	Y/N	• undrained abscess	Y/N		

#### 1a. Enteral route

1.1. Is the patient's gastrointestinal tract functioning with no evidence of malabsorption?	Y/N	If <b>NO</b>	→ reassess in 24 hours
1.2. Is the patient's swallow or enteral tube administration safe?	Y/N	If <b>YES</b>	→ continue

#### 1b. Enteral route continued

1.3. Are there any significant concerns over patient adherence to oral treatment?	Y/N	If <b>YES</b>	→ reassess in 24 hours
1.4. Has the patient vomited within the last 24 hours?	Y/N	If <b>NO</b>	→ continue

#### 2. Clinical signs and symptoms

2.1. Are the patient's clinical signs and symptoms of infection improving?	Y/N	If <b>YES</b>	→ continue
		If <b>NO</b>	→ reassess in 24 hours

#### 3. Infection markers

3.1. Has the patient's temperature been between 36-38°C for the past 24 hours?	Temp: .....	Y/N	If <b>NO</b>	→ reassess in 24 hours
3.2. Is the patient's Early Warning Score (EWS) decreasing?	EWS: .....	Y/N		
3.3. Is the patient's White Cell Count (WCC) trending towards the normal range?*	WCC: .....	Y/N	If <b>YES</b>	→ prompt or assess for switch
3.4. Is the patient's C-Reactive Protein (CRP) decreasing?*	CRP: .....	Y/N		

#### PROMPT FOR SWITCH:

Nursing/pharmacy teams to prompt prescriber or infection specialist to consider IV to oral switch.

#### ASSESS FOR SWITCH:

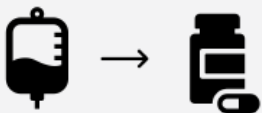
Prescriber or infection specialist to consider IV to oral switch. Identify whether a suitable oral switch option is available, considering for example oral bioavailability, any clinically significant drug interactions, patient allergies or contra-indications.

Intravenous antimicrobial initiation:	Date: __/__/__	Time: .....	Name: .....
IVOS first assessment (daily thereafter):	Date: __/__/__	Time: .....	Name: .....
IV to Oral Switch:	Date: __/__/__	Time: .....	Name: .....

\* To note: These infection markers could also indicate inflammation or be affected by for example, steroid treatment, 'Prompt for switch' or 'Assess for switch' may still occur if they are the only markers not met.

#### References

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# IV to oral switch in the East of England: barriers and enablers

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## INTRODUCTION

The East of England are the highest prescribers of IV antibiotics. This project uses quality improvement methodology to identify barriers to/enablers for IV to oral switch (IVOS) and behaviour change theory to develop supportive tools.

## METHODS

A working group was convened to support the project with regular meetings and good representation from regional trusts. A literature search was undertaken, existing IVOS resources (for example posters and flowcharts) were collated, and a stakeholder workshop was held. At the workshop, professional groups came together to identify barriers (using Ishikawa diagrams)<sup>1</sup>, enablers and motivators to IVOS. In trust/Integrated Care System (ICS) groups, attendees reviewed existing IVOS resources and developed action plans using the Behaviour Change Wheel with the Theoretical Domains Framework.<sup>2</sup>



Over **70%** of attendees found the workshop **'very' or 'extremely'** useful for their everyday practice

- Anti-Microbial Stewardship (AMS) Pharmacy Technicians and one AMS Nurse
- Infection Prevention Control (IPC) Nurses
- Junior Doctors
- Microbiologists and Senior Doctors
- Nurses (generalist)
- AMS Pharmacists

Figure 1: Findings of post-event survey: (34% response rate, n=17, 50 attendees)

Figure 2: List of professionals attending stakeholder workshop

In the post-event survey, workshop attendees particularly highlighted learning about the link between IVOS and the **green agenda**, and learning about tools for IVOS.

## RESULTS

The most common barriers identified in both literature review and workshop were **operational** (e.g., time/staff/resource pressures) and **cultural** (e.g., hierarchy, etiquette). All professional groups identified patient factors, training factors, staffing issues and review difficulties as challenges. Workshop attendees most identified **technology** as an enabler, followed by AMS pharmacy staff and expert advice. Different professional groups focused in some cases on different barriers/enablers – for example, AMS pharmacists/IPC nurses highlighted **cultural** barriers more regularly, and AMS pharmacists identified **buy in** and **relationships/team working** as an enabler.

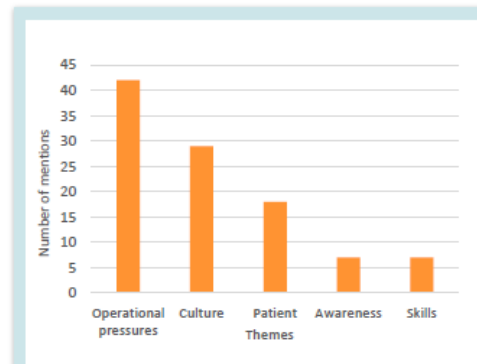


Figure 3: Barriers: times mentioned at workshop, grouped into themes, all professional groups

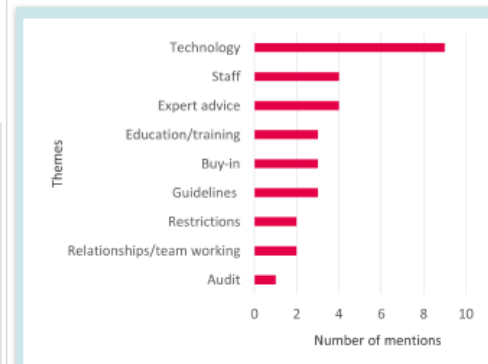


Figure 4: Enablers: times mentioned at workshop, grouped into themes, all professional groups

- Printed materials** (e.g. cards, stickers)
- Tech** (e.g. electronic reminders)
- People** (e.g. in-person reminders)
- Education, training, audit & feedback**
- Multicomponent interventions** combining these elements

Figure 5: Summary of findings of literature review on effective interventions for IVOS

The literature review suggested that the following can be effective for improving timeliness of IVOS in hospitalized adults: **printed materials** (e.g. pocket cards, stickers); **tech** (e.g. electronic reminders); **people** (e.g. in-person reminders); **education, training, audit & feedback**; **multicomponent interventions**.

Trust/ICS action plans contained a range of interventions, from IVOS champions to audit. We identified intervention functions associated with these. The most common were **environmental restructuring, persuasion, and education**.

## SUMMARY / CONCLUSION

We have gained valuable insights into the challenges and barriers to IVOS at the regional level. Three tools were most requested by event attendees for regional development: a clinical decision tool, a poster, and a flowchart. We are now developing supportive regional tools that fit with this demand and with functions identified in plans.

Next steps:

1. Offering support to trusts/ICs to **develop/implement** their plans and encouraging the use of **Plan Do Study Act** cycles.
2. Development of **regional tools** including a clinical decision tool in MicroGuide and a range of visual materials including posters, lanyards and an infographic
3. Ongoing monitoring of **progress/impact**, for example regional % IV vs oral antibiotic prescribing. Preliminary data from Define shows improvement (from 28.1% in June to 27.8% in August)
4. A second workshop to **share successes/tackle cultural issues**

## ACKNOWLEDGEMENTS

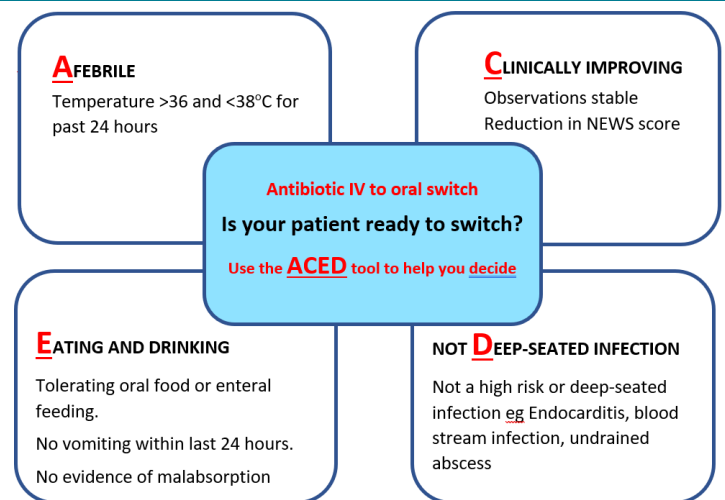
We would like to thank members of the East of England IV to Oral Switch Project Working Group, and the following individuals: Ella Casale (UKHSA); Eleanor Harvey (UKHSA); Dr Smita Kapadia (UKHSA); Balwinder Bolla (ULH NHS Trust)

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2. Version used available in: [https://ktcanada.org/wp-content/uploads/2016/03/Susan-Michie-slides\\_nov\\_12\\_2015.pdf](https://ktcanada.org/wp-content/uploads/2016/03/Susan-Michie-slides_nov_12_2015.pdf) [accessed: 29/08/2022]



# Draft Infographics and other resources



## Timely IV to Oral Switch (IVOS)



### The benefits of timely IV to Oral Switch

**Why switch from IV to Oral antibiotics?**

**IVOS can:**

- reduce length-of-stay
- reduce adverse events
- free up nursing time to care
- reduce the use of broad spectrum IV antibiotics
- reduce risk of line complications and healthcare associated infections

**Oral antibiotics:**

- have a lower carbon footprint
- are more cost effective

**Thought bubbles:**

- "This tube in my arm is uncomfortable. I want go to home"
- "I wish I had more time to care for my patients"
- "I want to help my patient get well and be discharged as soon as possible"
- "I'm concerned about my patient's exposure to broad-spectrum antibiotics"

Use the UKHSA IVOS criteria for early switch

**Infections**  
Patients having an IV catheter are 18 times more likely to develop a hospital- acquired bacteraemia

**Carbon footprint**  
The carbon footprint for some IV antibiotics is 67 times larger than for oral antibiotics

**Dosing errors**  
The overall probability of making at least one dosing error for IV is estimated to be 73% (McDowell S, 2010)

**Reduce length of stay**  
Timely IVOS intervention can reduce hospital length-of-stay by 1-2 days (Mouwens A, 2020; Ehrenkrantz NJ, 1992)

**Free up nursing time**  
IVOS can free up nursing time to care  
Jenkins A et al, University Hospitals of Birmingham, Queen Elizabeth Hospital

**Less adverse events**  
IVOS for rapid discharge reduced adverse drug reactions by over 10%

**Patient preference**  
75% of patients preferred the oral route for antibiotics (Bamford, K 2011)

**Reduce exposure to broad-spectrum antibiotics**  
Opportunity for up to 10% reduction in exposure to broad-spectrum IV antimicrobials

**Cost effective**  
10% reduction in use of intravenous doses (replaced by oral doses) would save over £10 million for the NHS per year

Use the UKHSA IVOS criteria for early switch