



## Infection Intelligence Platform (IIP)

# Sepsis Clinical Decision Support Tool

### Study team:

William Malcolm, Siân Robson, Charis Marwick, Kim Kavanagh,  
Siân Finlay, Meghan Bateson, Alison Cockburn & Andrea Patton



## Background

Sepsis is a common problem and is associated with a significant risk of mortality.

Initial treatment includes early and **appropriate** empiric antimicrobial therapy.

*Considerations in the choice of antibiotic: risk factors in the patient, local prescribing guidelines, drug availability.*

Engagement with clinicians identified the need for a tool to support this choice.

*Part of IIP's work to support day-to-day requirements of clinical staff.*

*In line with national schemes to reduce inappropriate antimicrobial use.*

The aim of this project was to scope the possibility of developing a clinical decision support tool for initial management of sepsis.



## Project outline

- 1) Review possible definitions of sepsis, risk factors, treatments, outcomes and other existing models/tools. Decide what to include in the model.
- 2) Extract some data, check data quality and finalise the detail of the measures.
- 3) Create and test model(s) that will form the basis of the tool.

# What's been done so far

1) *Review definitions of sepsis, risk factors, treatments, outcomes and other models/tools. Decide what to include in the model.*

A study group of Clinicians, Pharmacists, Statisticians and Analysts was formed.

A literature review was conducted into the issues above.

The content of the model was decided after discussions with study group members and a review of the data available through the IIP.



**Cohort the tool is to be used for:**

Patients with suspected sepsis.

**Sepsis definition for the model:**

Patients with blood culture data (+/-).

**Outcome of the model:**

Likelihood that a patient with a given combination of risk factors will be resistant to these drugs/groups:

- 1) amoxicillin, gentamicin and metronidazole
- 2) co-amoxiclav
- 3) co-amoxiclav and gentamicin
- 4) ciprofloxacin
- 5) ciprofloxacin and gentamicin
- 6) piptaz
- 7) piptaz and gentamicin

**Risk factors**

Category	Measures	Source
Sepsis episodes	Date of current admission. Organism and source of positive cultures from previous 12 months.	ECOSS
Demographics	Current age, sex and social deprivation (SIMD quintile).	ECOSS
Antimicrobial resistance	Resistance to antimicrobials used to treat sepsis in previous in blood cultures from the previous 12 months.	ECOSS
Antibiotic exposure	Antibiotic name, date, number of items and defined daily dose from previous 12 months.	PIS
Comorbidity	Conditions contributing to a Charlson score from previous 5 years. Number of BNF paragraphs for items prescribed in previous 12 months. Immunosuppression, diabetes.	SMR01
Hospitalisation	Number and duration of admissions in previous 12 months.	SMR01

## What's been done so far

*2) Extract data, check data quality and finalise detail of measures.*

In ECOSS positive blood culture data, groups of organisms were matched with the drugs they should have susceptibility test results for.



A full extract of blood culture data (including negative samples) is being sought from HPS and is pending governance approval.



Completeness of reporting of susceptibility testing for each drug and organism combination will be assessed in these data.





## What we plan to do next

*3) Create and test model(s) to form the basis of the tool.*

### Two models:

An “ideal” model with data that can be accessed from the national datamarts.

A “realistic” model with data that a clinician can access on a ward.

### Three analysis stages:

- 1) Investigation of associations between risk factors and resistance in 2/3 of data.
- 2) Assessment of how well the model predicts these associations in 1/3 of data.
- 3) Creation of a tool that computes the risk of resistance to the antimicrobials, given a specific combination of risk factors.



## Summary

- The aim was to scope the possibility of creating a decision support tool for initial management of sepsis.
- Background research, discussions and decisions about the content of the tool progressed well.
- Next steps will involve obtaining and analysing data and building draft models.
- A potential destination for decision support tools could be the SAPG Antimicrobial Companion app.

**Acknowledgments:** William Malcolm, Charis Marwick, Kim Kavanagh, Siân Finlay, Meghan Bateson, Alison Cockburn & Andrea Patton

