Foresight study on European stakeholder appraisal of diagnostics to manage anti-microbial resistance

Evaluation of policy mixes in practice: What prescriptions for tackling the problem of antimicrobial resistance?

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AMR Tackling Antimicrobial Resistance

brighton and sussex medical school

Office of Health Economics Research

Overview

This research study asks:

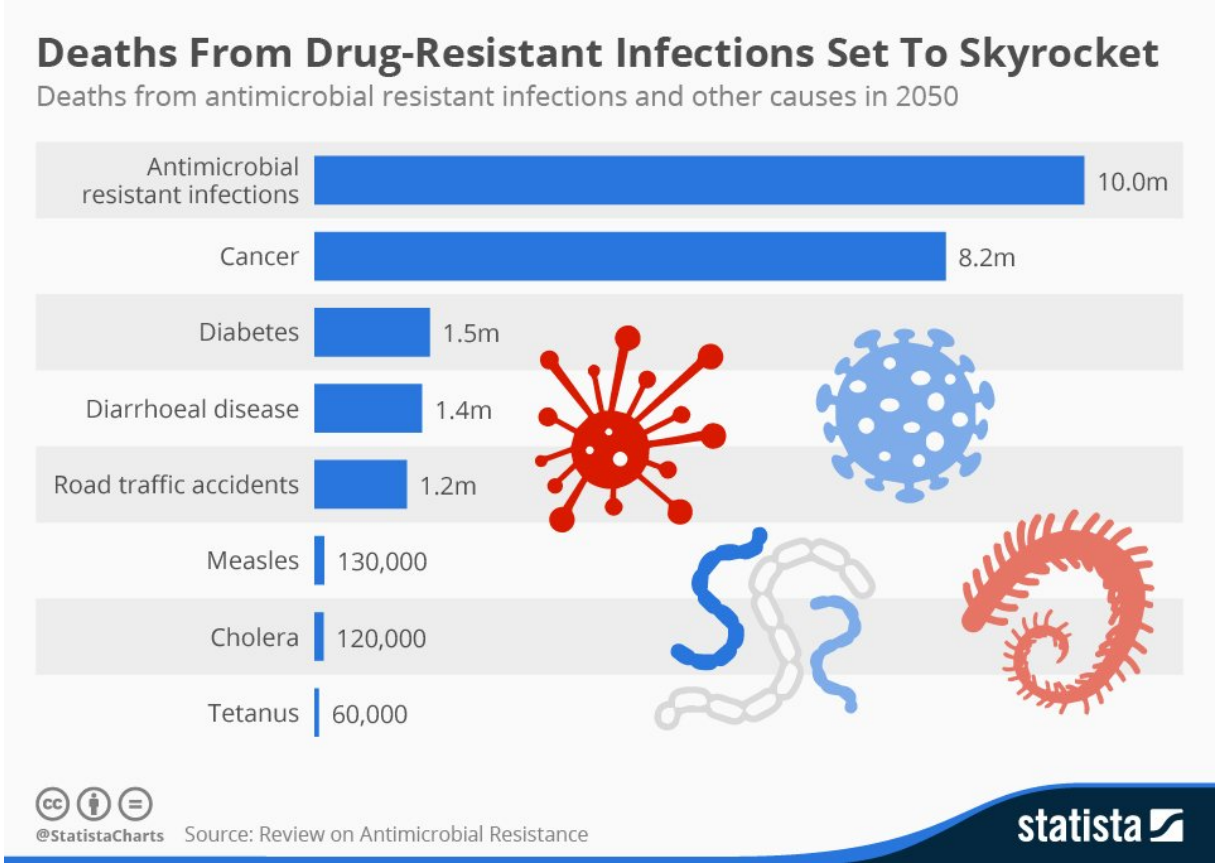
What are the policy options favoured by stakeholders to encourage the development and use of diagnostics to help manage antimicrobial resistance?

The menu for today:

1. Antimicrobial resistance and the role of diagnostic innovation
2. Research questions
3. Research method: multi-criteria mapping
4. Results: policy option ranks, pairwise comparison and qualitative insights
5. Policy mixes and conclusions

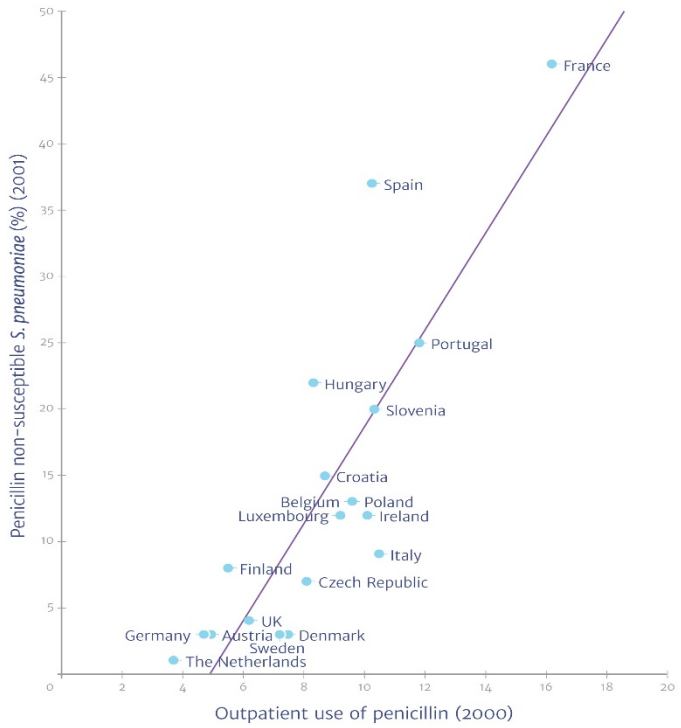
The coming “antibiotic apocalypse”

Antimicrobial resistance: Micro-organisms which cause infections survive the medicine which is intended to kill them or stop their growth



The role of diagnostics in managing antimicrobial resistance

THERE IS A HIGH CORRELATION BETWEEN ANTIBIOTIC USE AND RESISTANCE



Source: Goossens H, Ferech M, Vander Stichele R, et al. *Outpatient antibiotic use in Europe and association with resistance: a cross-national database study.* Lancet 2005; 365(9459): 579–87.

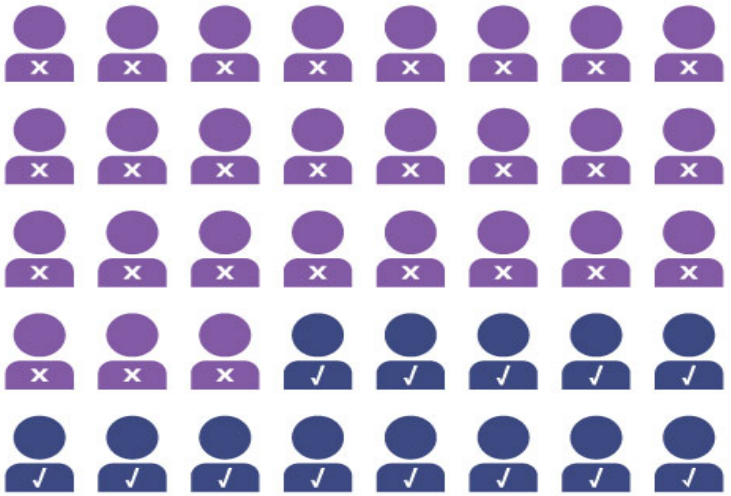
Review on Antimicrobial Resistance

RAPID DIAGNOSTICS WOULD REDUCE UNNECESSARY PRESCRIPTION

Out of 40m people who get given antibiotics for respiratory issues, annually in the US:

27m
get antibiotics unnecessarily

13m
who need antibiotics get them



Data extracted from: Shapiro D J, Hicks L A, Pavia A T, Hersh A L. *Antibiotic prescribing for adults in ambulatory care in the USA, 2007–09.* Journal of Antimicrobial Chemotherapy 2013.

Review on Antimicrobial Resistance

Research questions

Specific focus:

Prospective instrument mixes for the development and use of diagnostic tests in managing antimicrobial resistance (AMR)

We are not looking at instruments in place

Empirical question:

What are the policy options favoured by stakeholders to ensure an enhanced role for diagnostics in managing AMR?

Questions on policy mixes:

What mixes of policy instruments are favoured by stakeholders?

How compatible are the instruments seen to be?

What is the root of any incompatibilities?

Research method

Multi-criteria mapping (MCM) method to assess prospective policies

(Stirling, Mayer, 2001; Millstone, Lobstein, 2007; Morgan Jones, 2011)

1. **Selection of countries**: EU 'big 5' diagnostics markets, plus outliers in management if AMR (Netherlands – strong; Greece - weak) (ECDC, 2014).
   - To enable us to compare between systems
2. **Identify policy options / instruments**: Review of recent policy reports (1998 - 2016) in target countries and by prominent bodies developing policy options
   - To collect a comprehensive list of instruments focusing on **one** policy goal:
   - Development of new diagnostic tests, and better use of these tests
3. **Grouping of policy options**: Reduction of diverse policies into just six broad categories of policy instruments (constrained by probable interviewee fatigue)

Policy options (instruments) for diagnostic innovation

Options	Stage of innovation process	Mechanism	Role of government / private industry	Actors of focus
1. Enhance revenues	Downstream	Pulls suppliers towards the market with incentives	Government and private industry reliant	Diagnostics firms
2. Fund R&D	Upstream	Pushes new technology towards the market	Government reliant	Public and private researchers, diagnostics firms
3. Make pathways	Upstream	Signals to suppliers the needs of the market	Government and private industry reliant	Diagnostics firms
4. Government provides	Upstream / Downstream	State provision of the required goods and services	Government reliant	Healthcare systems
5. Incentivise use	Downstream	Encourages demand to grow by incentivising use	Healthcare system reliant	Clinical users
6. Protected markets	Downstream	Pulls suppliers towards the market with incentives	Private industry reliant	Diagnostics firms

Research method

4. **Interviews with key opinion leaders** (e.g. those on national committees for AMR):
   - 7-9 interviews in 6 countries – a total of **48 interviews**
   - Stakeholder groups:
   - Primary care physicians, secondary care physicians, microbiologists, patient representatives, industry representatives, pharmacists, health insurers / health technology assessors, policymakers
   - This gives perspectives on design and implementation across a variety of policy actors, including people who implement policies, and users
5. **Analysis**:
   - **Differences across groups** (i.e. countries and stakeholder groups) through descriptive statistics
   - **Pairwise comparison** of policies to identify strength of preferences
   - **Identification of recurrent issues** raised on individual policies and policy mixes and thematic analysis of these

Multi-criteria mapping (MCM) overview

MCM – a hybrid quantitative-qualitative method to 'open up' policy appraisal

An MCM interview has four main stages. The stages are:

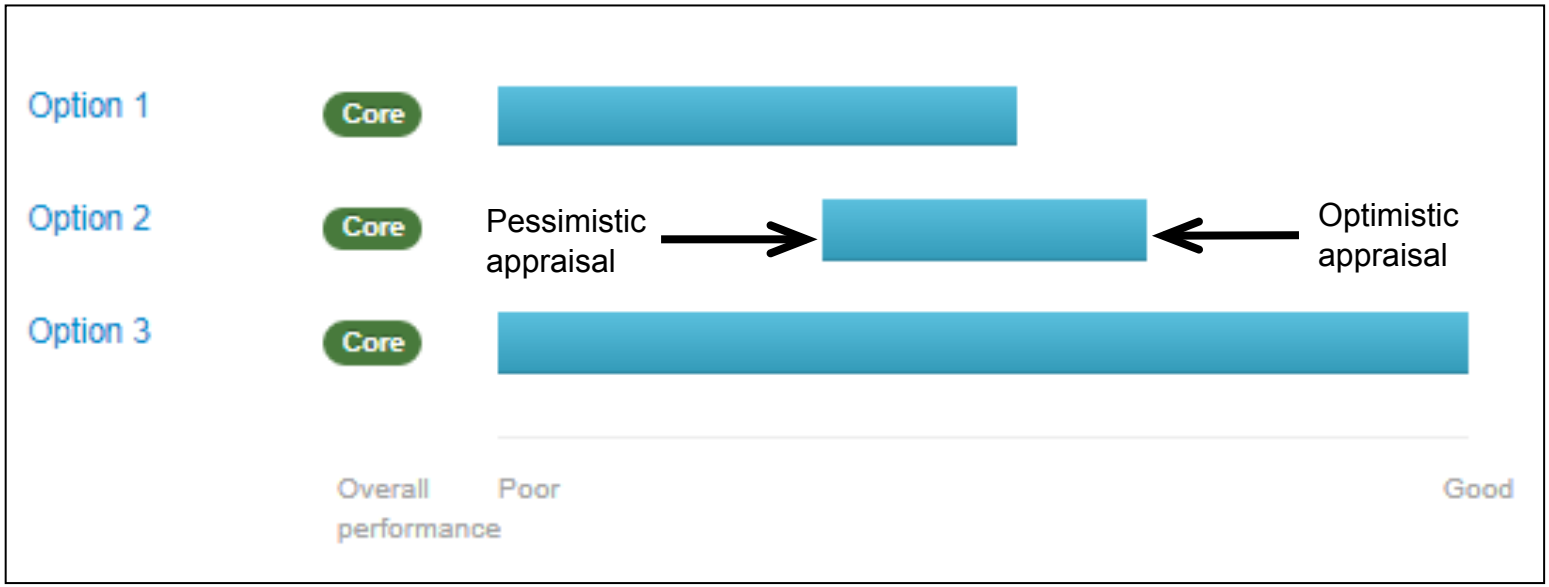
Choose options to be appraised

Define criteria to be used for appraising options

Assess scores of each option against each criteria

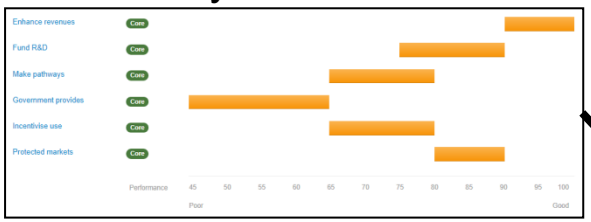
Assign weights to each criterion

MCM is structured yet flexible

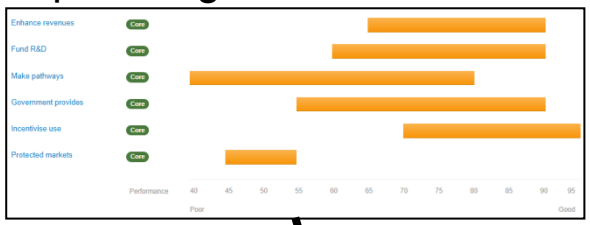


Example: an individual ranks chart in MCM

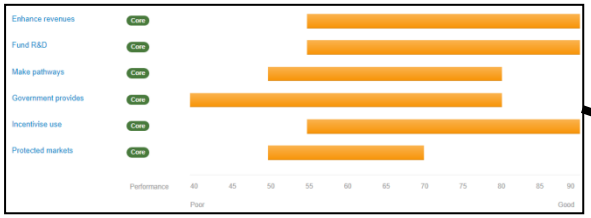
Profitability



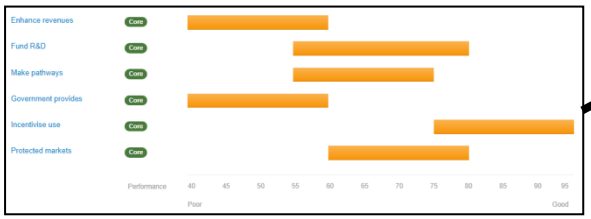
Optimising treatment



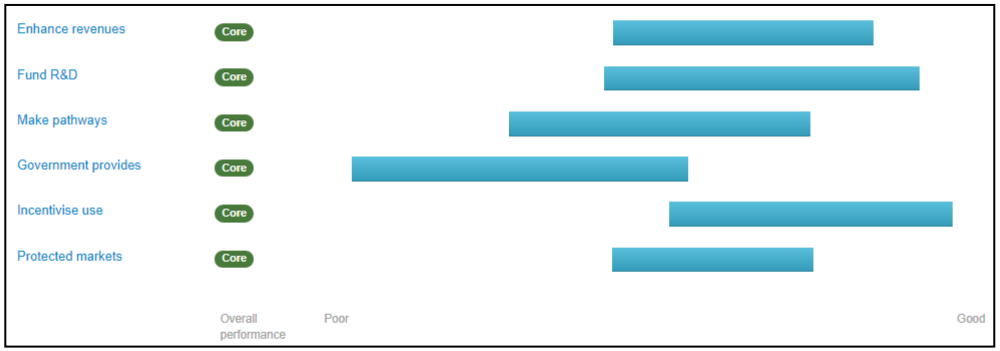
Limiting uncertainty



Will it make a change?



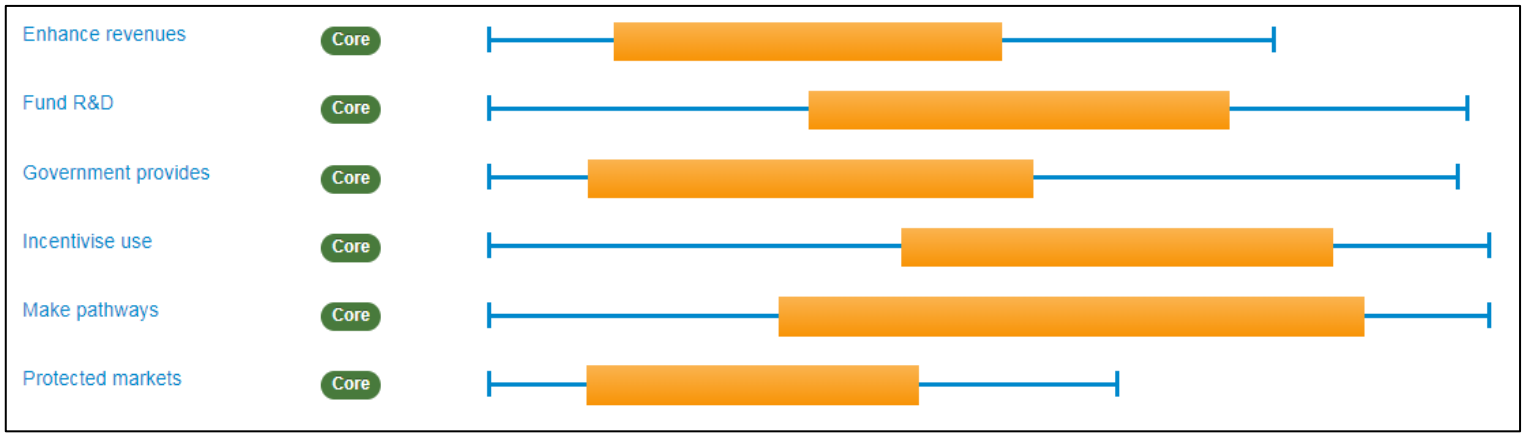
Aggregated weighted ranks



MCM charts are always accompanied by qualitative comments

UK ranks showing relative preferences

Ranks for core policy options for UK stakeholders

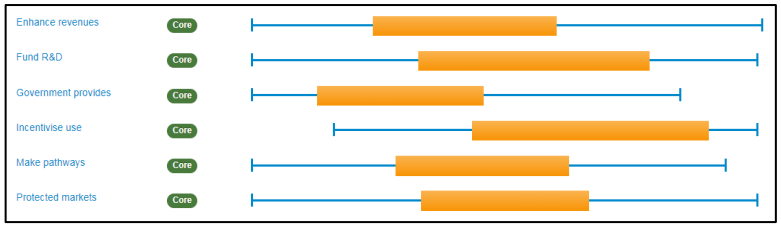


Blue extrema – any policy option has been judged as best or worst by at least one stakeholder

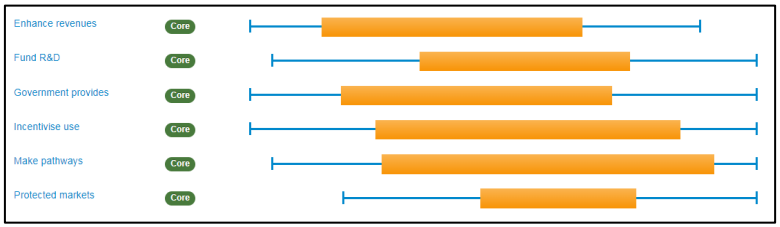
Orange bars – despite uncertainties, make pathways, incentivise use and fund R&D are most favoured. Government provides, protected markets and enhance revenues are less favoured.

Ranks by country

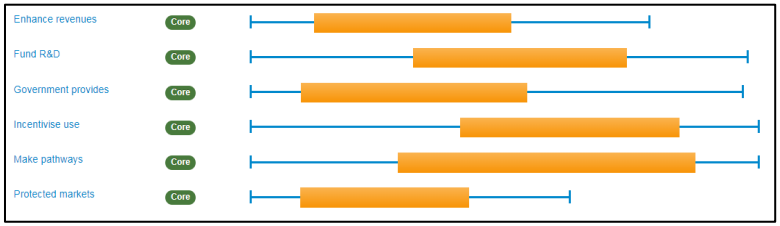
The Netherlands



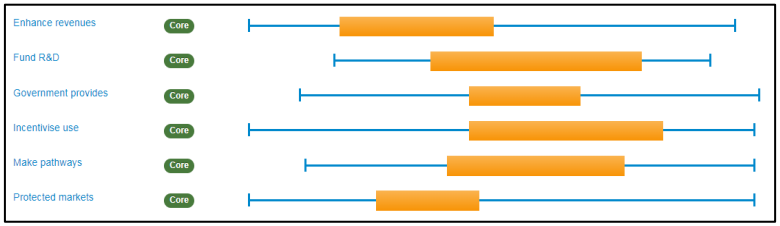
Greece



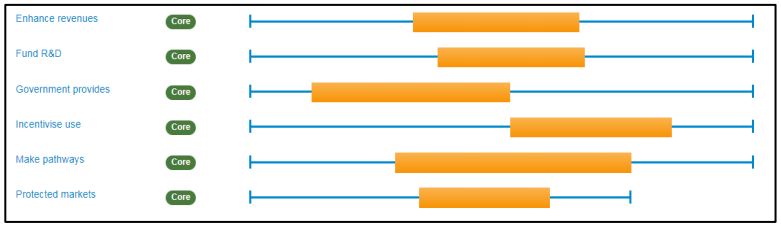
UK



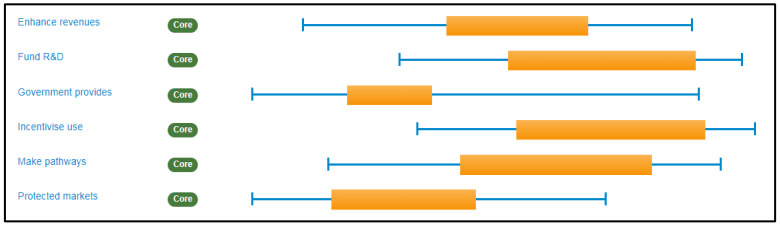
Spain



Italy

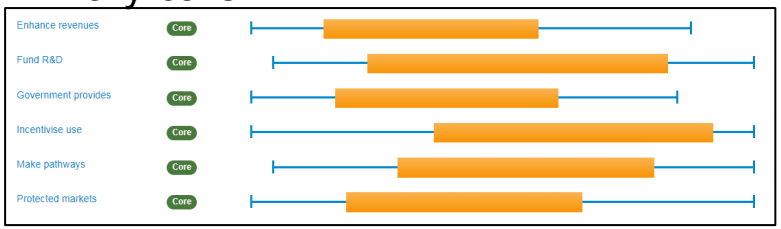


Germany

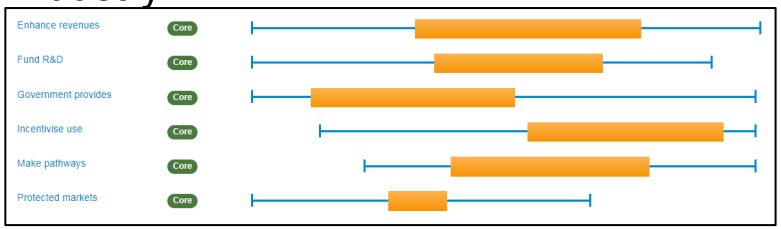


Ranks by stakeholder

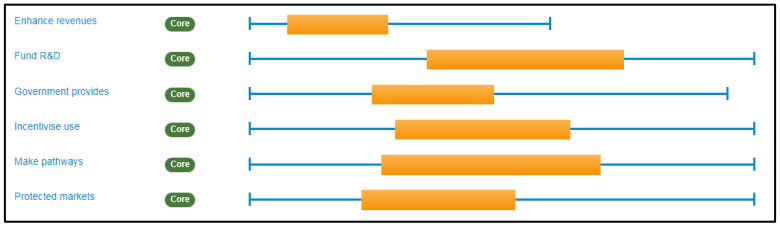
Primary care



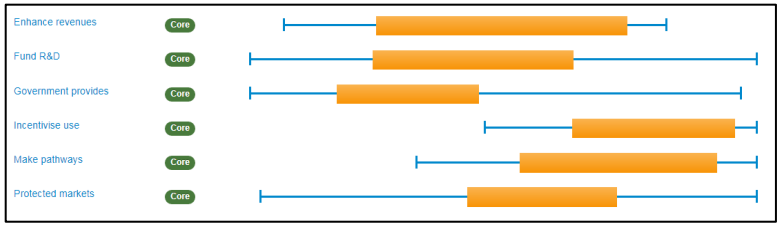
Industry



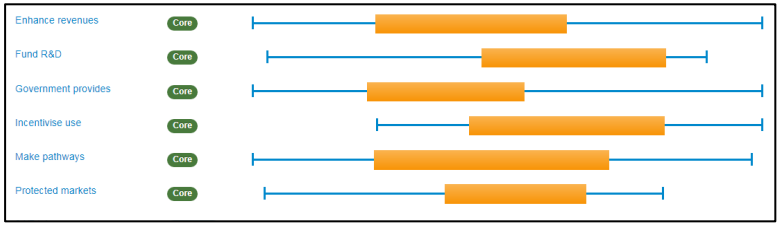
Secondary care



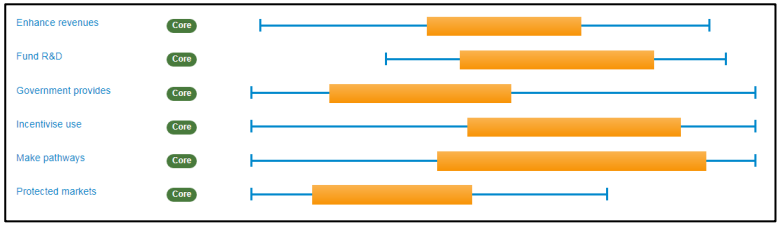
Pharmacists



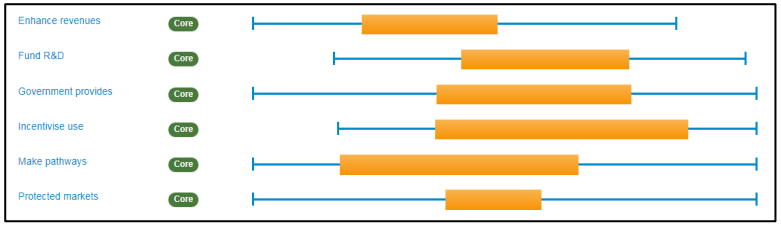
Microbiologists



Policymakers

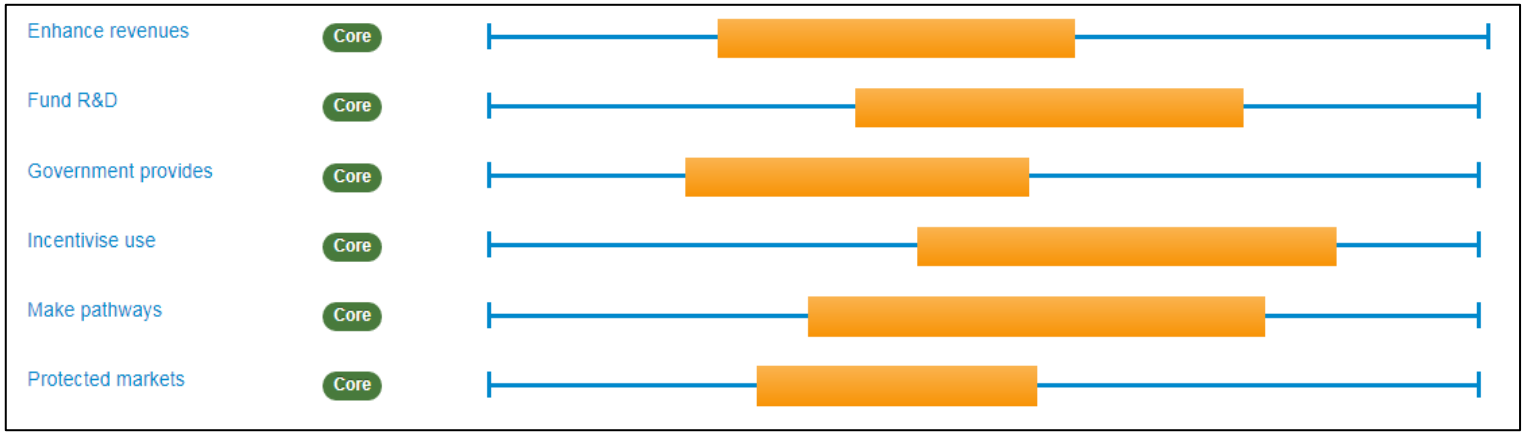


Health insurers / health technology assessors



Overall ranks showing relative preferences

Ranks for core policy options for all countries and all stakeholders

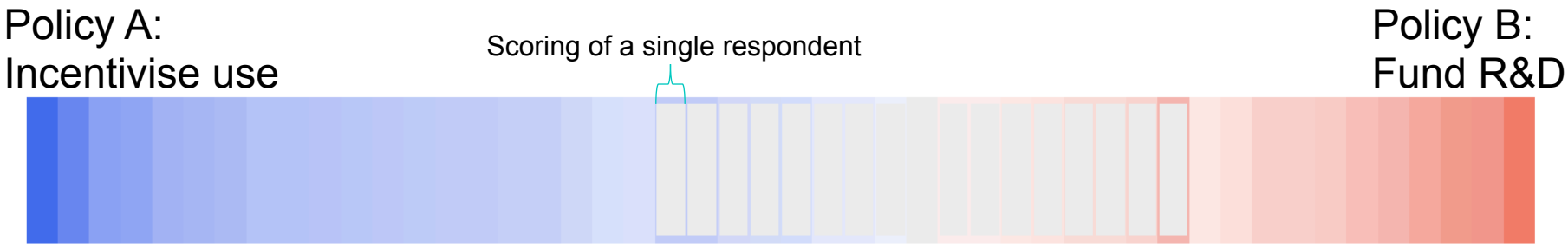


Despite uncertainties, **incentivise use is the most favoured policy option**, followed by make pathways and fund R&D. Government provides, protected markets and enhance revenues are less favoured.

This is **contrary to one popular policy narrative that we should enhance revenues** to encourage industry to develop diagnostics to help tackle AMR because the market is not rewarding enough

Incentivise use ranks more highly than enhance revenues, however you slice the data

Pairwise preferences

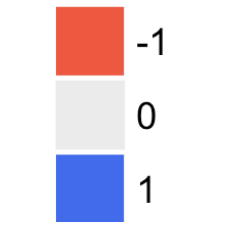


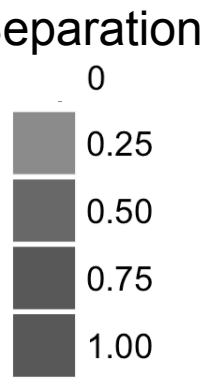
Direction of preference (colour):

1 : being that Policy A is preferred to policy B,
(Optimistic A>= to Optimistic B, Pessimistic A>= Pessimistic B, Mean A>Mean B)
-1 : being that Policy B is overall preferred to policy A,
(Optimistic A<= to Optimistic B, Pessimistic A<= Pessimistic B, Mean A<Mean B)
0: being that we cannot we cannot infer a difference (all other cases)
Outline colour only shows the comparison between means

Separation (shading):

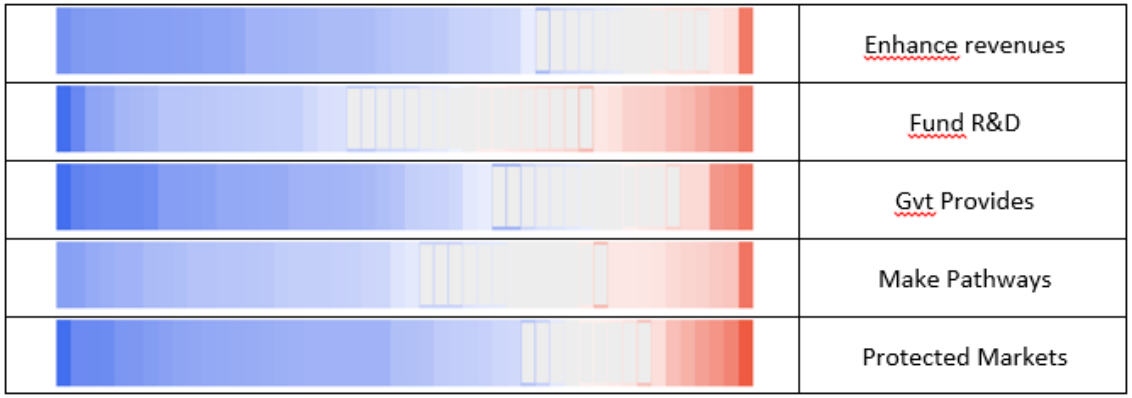
How much do the two bars overlap, how distinct is the preference?



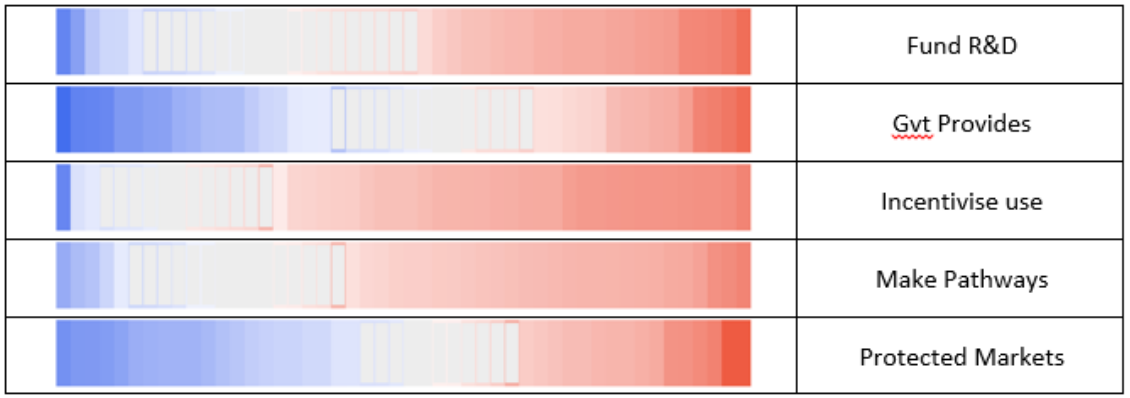


Pairwise comparison of incentivise use and enhance revenues

Incentivise use



Enhance revenues



Incentivise use is favoured compared to other policy options. Enhance revenues is not favoured compared to incentivise use, make pathways or fund R&D.

Why is incentivise use preferred?

A selection of qualitative insights:

- It is **cost beneficial**: “This helps to save money. If you do diagnostics in a proper way, you administer less drugs, you use the right one, and in this sense the diagnostic part of the story is much less expensive than administering multiple drugs.” Italian pharmacist
- It **improves patient outcomes**: “If it works, we're using the right tests, getting the right outcomes and getting the right treatments.” Dutch secondary care clinician
- It is **fast**: “Things may already be available so this makes it quick. This is the first intervention you can make. The result - to reduce the consumption of antibiotics - the quantitative goal is reached quicker.” Spanish policymaker
- It is also acceptable, sustainable, and it improves awareness, education and training

Why is enhance revenues not preferred?

A selection of qualitative insights:

- It is **not cost efficient**: “It could be expensive but not cost efficient for example if there's no benefit for the patient.” Dutch primary care clinician
- It is **not acceptable**: “This is less acceptable for health care providers. It could be a waste of money. The level of scrutiny given on these proposals is too low and not in a good way. It is not the industry that is going to decide whether the test is effective.” UK health technology assessor
- There is **distrust of the private sector**: “If you give space to companies, especially multinationals, they go just to develop the market but not other things. They want to maximise their profits. It’s a market but it’s not meeting needs.” Greek pharmacist
- It also does not prevent the spread of resistance, does not improve the standard of evidence, does not ensure collaboration, and does not improve awareness

Policy mixes

Which policy options would you invest in?

- Most interviewees identified their top 2 to 3 ranked policy options as the best ones to invest in, most of the time this was **incentivise use, fund R&D and make pathways**

Which policy options work well together and which are in conflict?

- In particular **incentivising use and funding R&D** were most often identified as working well together
- **Government provides** was identified as being in conflict with **enhance revenues and protected markets**

Towards some conclusions

- MCM interview data can be used to produce ranks charts and pairwise comparisons of policy options, accompanied by rich qualitative insights
- In this study there are similarities and differences between different countries and stakeholder groups
- Yet, however you slice the data, by country or by stakeholder group:
- **Incentivise use, fund R&D and make pathways are more favoured**
- **Government provides, protected markets and enhance revenues are less favoured**
- **In particular, incentivise use is ranked more highly than enhance revenues and this is in contrast to the policy literature**

Acknowledgements

The research presented in this paper is ongoing. We are grateful for advice from our advisory board members and pilot subjects as well as the support of our anonymous interviewees.

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Data from MCM

Quantitative data

- Optimistic scoring
- Pessimistic scoring
- Overall optimistic and pessimistic scoring per interviewee per option
- Weights for criteria

Qualitative data

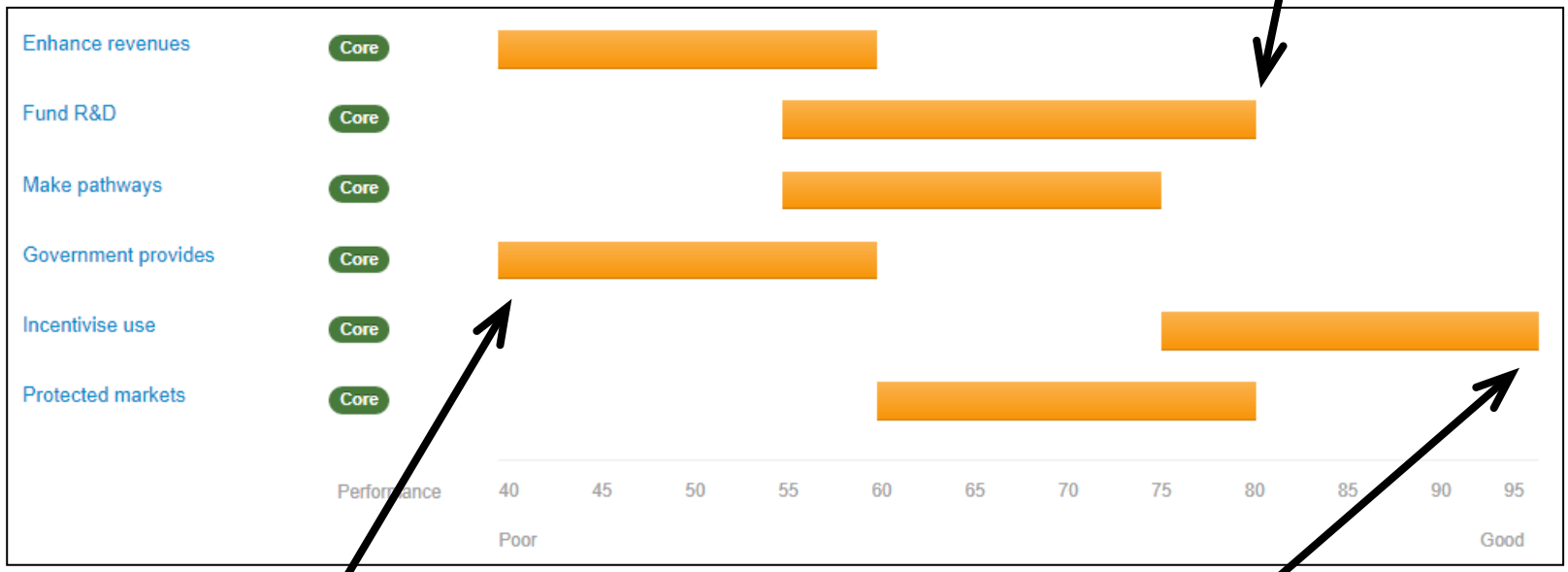
- Different stakeholders
- New options
- Criteria
- Comments about optimistic and pessimistic scores
- Comments about policy mixes

An example criterion: Feasibility
Typically interviewees appraise 2-5 criteria

Example: an individual criterion in MCM

Criterion: Will it make a change?

If a really innovative test came out of R&D, very rapid diagnosis and resistance patterns, this would really make a difference.



Government are not well equipped to do this. Government is not often flexible and service-directed. Sometimes they do excellent things but often they are far behind.

This would make a difference. Diagnostics are having a tough time because reimbursement systems are not creating the right conditions and that would require a major change in the incentives but it could also really turn things around.

National context

- Despite some patterns persisting however the data is sliced, national context was perceived as very important. For example:
- Dutch stakeholders were aware that AMR is relatively well managed in the Netherlands. In the Netherlands make pathways was relatively less favoured largely because pathways are already in place.
- Greek stakeholders were aware that AMR is relatively poorly managed in Greece. In Greece there was more uncertainty expressed for all the policy options due to economic and political uncertainty. Protected markets was relatively more favoured because it is already there and does not depend on financial investment or on the political situation. The fragmentary nature of Greek healthcare system was seen as an obstacle.
- German Stakeholders compared themselves to the Dutch but suggested that it is harder to implement these policies in Germany because of the size and complexity of the German healthcare system.
- Italians identified a need for collaboration, raising awareness, education and training. Stakeholders identified the added complexity of the differences between the North and South of Italy and regional autonomy.
- The UK has a national health system but stakeholders still identified rolling out policies to all as difficult due to the way the different parts of the system are organised.