

The role of diagnostics in the management of antibiotic resistance



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The consequences of not having fast and reliable diagnostic tools

No diagnostic tools



Blind (empirical) use of antibiotics



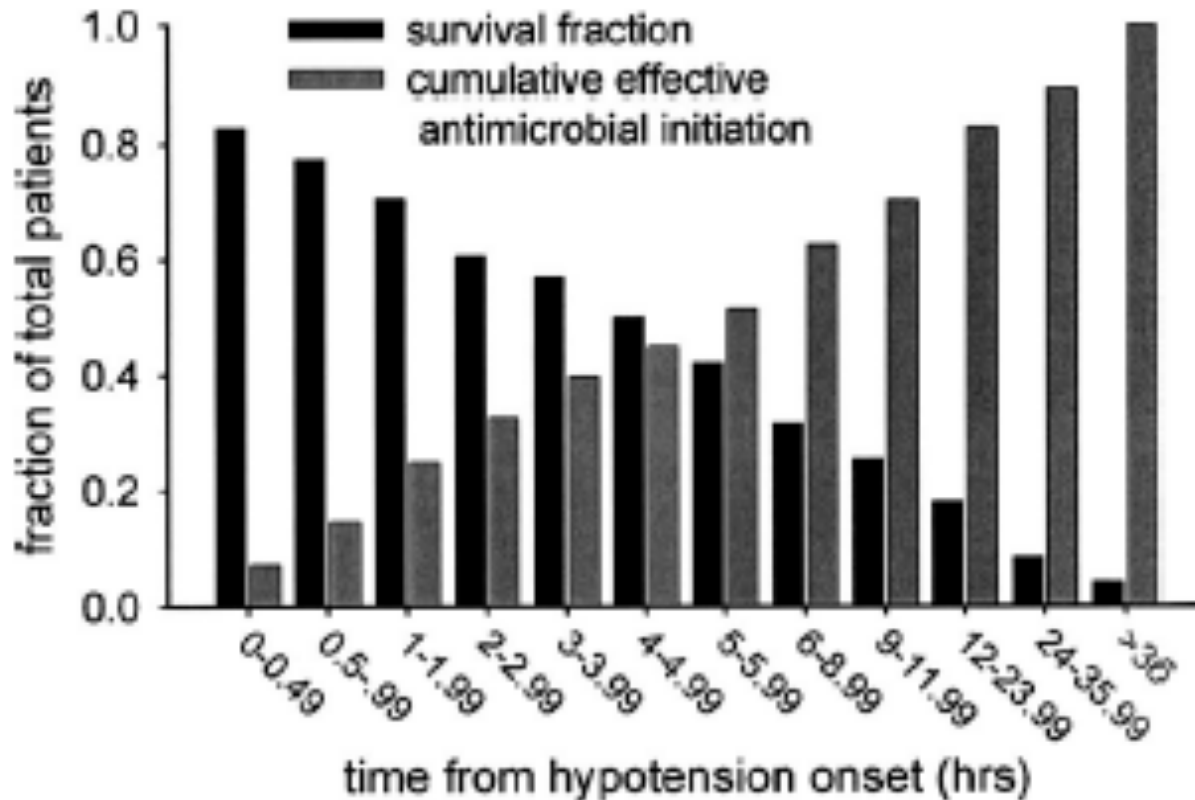
Antibiotics over and mis-use



Increasing resistance

Treatment failure

Survival of patients depends on time to effective antibiotics

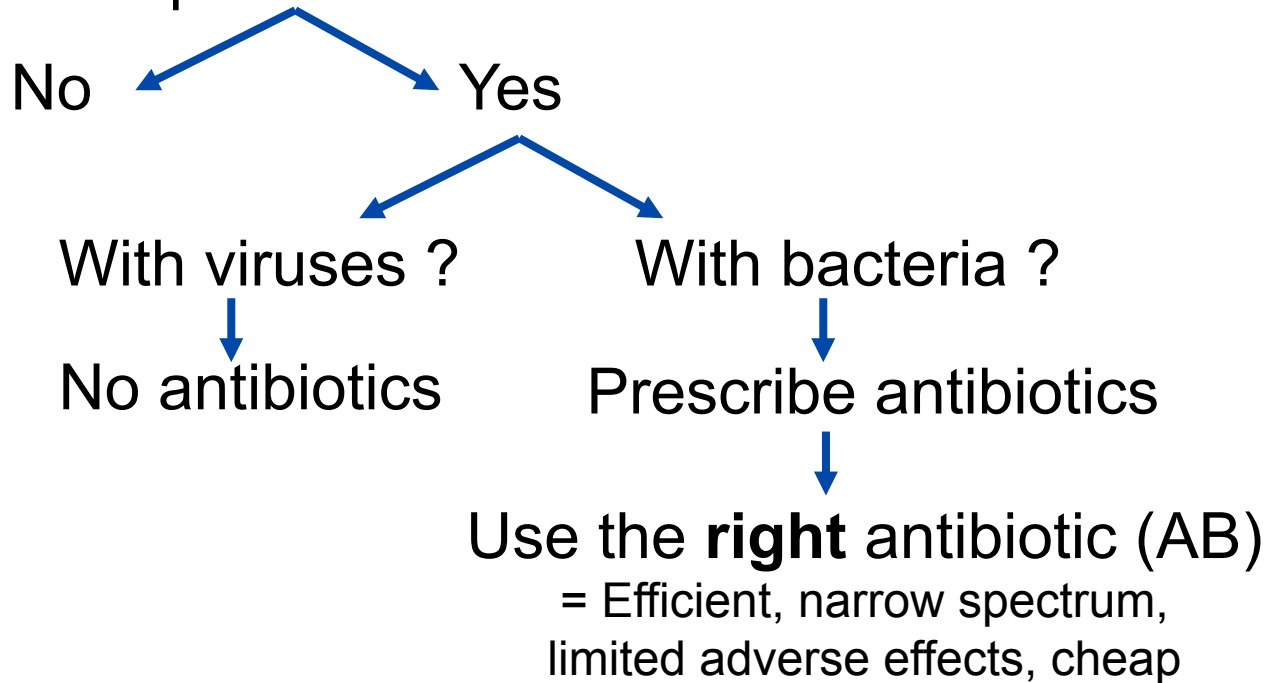


Kumar *et al.* 2006. *Crit Care Med.* Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock

Clinical challenges

- Prescribe antibiotic only when bacterial infection is confirmed
- Use the right and efficient antibiotic

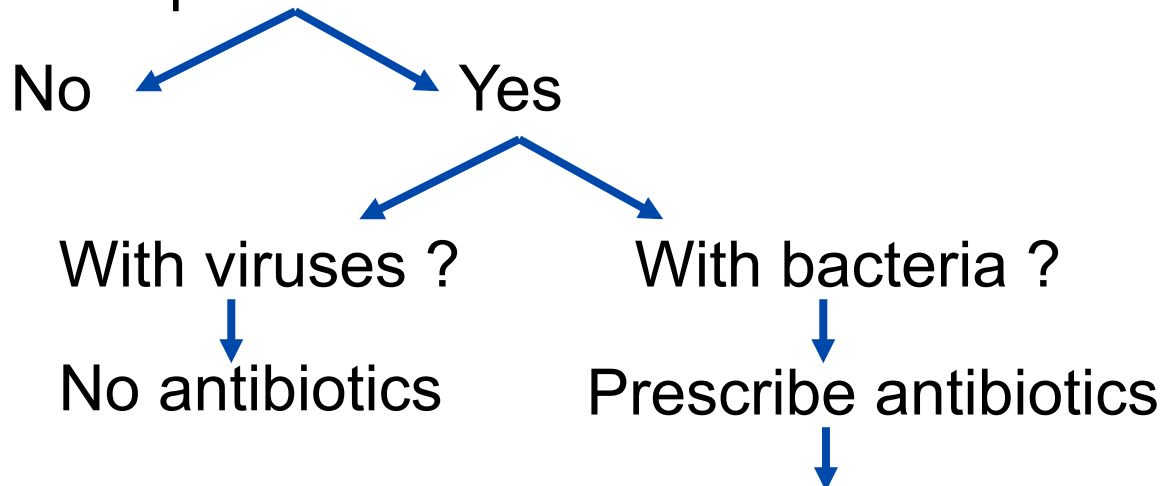
Is the patient infected?



Clinical challenges

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Is the patient infected?



Use the **right** antibiotic (AB)
= Efficient, narrow spectrum,
limited adverse effects, cheap
Keep the AB choice → maintain the AB
efficiency and Control resistance

Additional areas in need of diagnostics

- Surveillance
 - Trends and magnitude of resistance
- Collecting burden data
 - Estimating costs
- Clinical trials (new antibiotics)
 - Finding correct patient groups



Council Conclusions on innovative incentives for effective antibiotics

*2980th EMPLOYMENT, SOCIAL POLICY, HEALTH AND
CONSUMER AFFAIRS Council meeting*

Brussels, 1 December 2009

- explore ways to promote further public-private partnerships between industry, academia, non-profit organisations and the healthcare system to facilitate research into new antibiotics, strategies for use of currently available antibiotics and diagnostic methods;
- ensure the development and use of integrated strategies to diminish the development and spread of antibiotic resistance as well as healthcare-associated infections and their consequences, encourage healthcare institutions to have structures in place as well as ensuring effective coordination of programmes focusing on diagnosis, antibiotic stewardship and infection control;

Current usage of diagnostic tools is low!

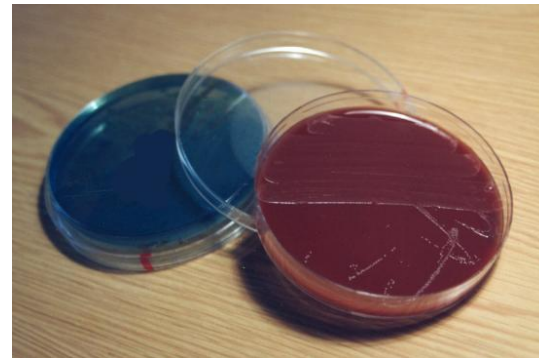
- Industrialized countries
 - **2%** of health expenses but influence **60–70%** of health decisions
- Developing countries
 - Spending on diagnostics ranges from negligible to **6%**

Peeling and Mabey 2010. Point-of-care tests for diagnosing infections in the developing world

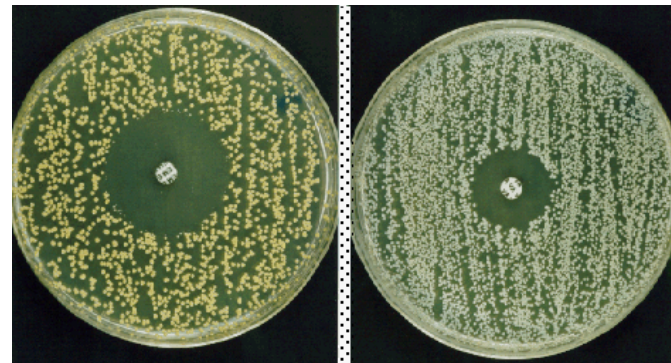
Lewin Group 2005. The value of diagnostics: innovation, adoption and diffusion into health care.

The standard method has not changed for 50 years!

Day 1: Obtaining a pure culture.
Species determination by biochemical testing



Day 2: Testing for antibiotic resistance

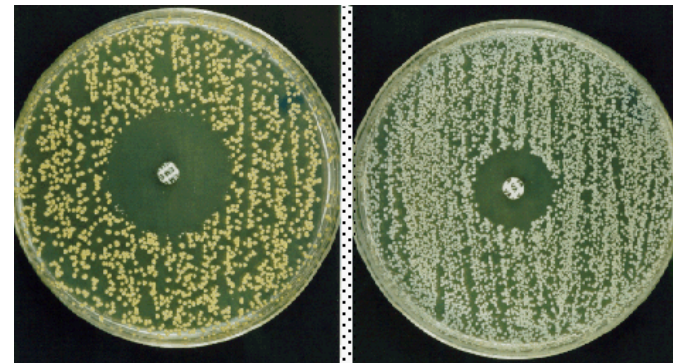


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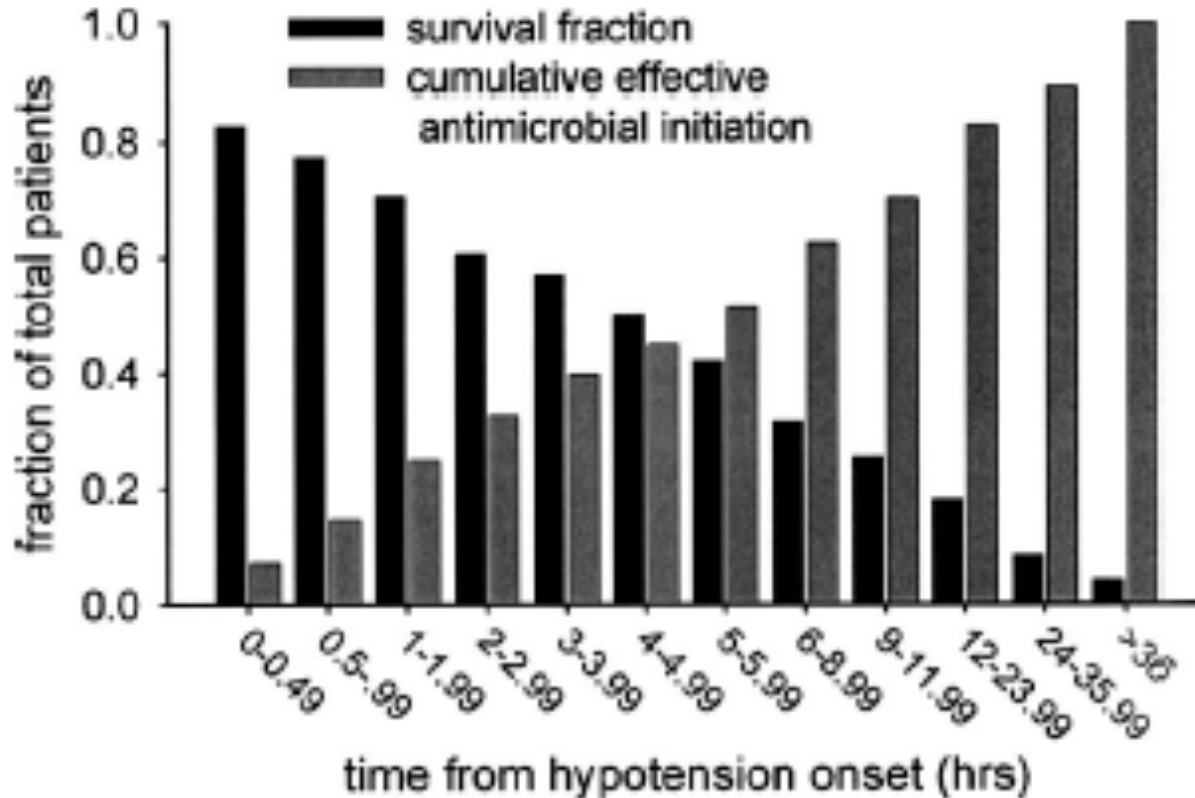


Day 2: Testing for antibiotic resistance



OUTDATED!

Survival of patients depends on time to effective antibiotics



Kumar *et al.* 2006. *Crit Care Med*. Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock

Slow and ancient diagnostics are compromising patient safety



What can we do about it?