

The critical need of new antibiotics

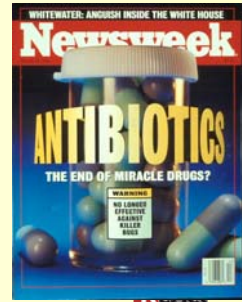
Prof. Otto Cars
Uppsala University
Sweden

China-Sweden Conference on Antibiotic Resistance
Beijing, April 28, 2009

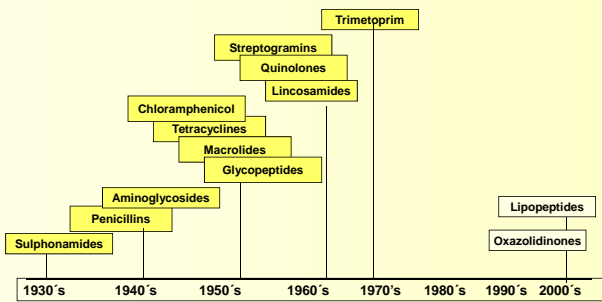


September 1928

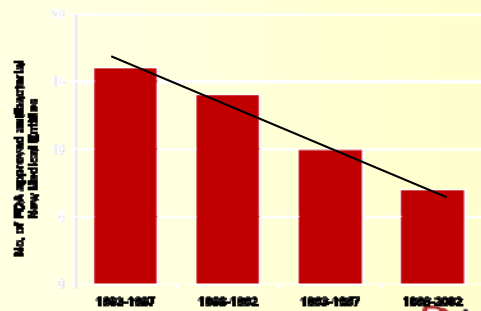
60 years later...



The discovery of new antibiotics



Antibacterial New Molecular Entities (NMEs) Approved by the FDA for Use in the U.S., 1983-2002 (topical drugs excluded)

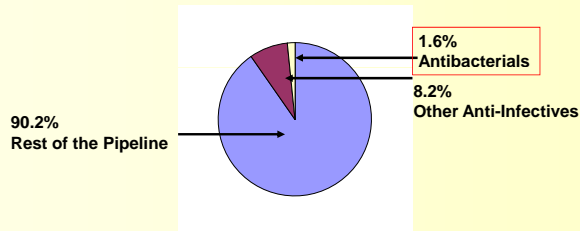


Source: Norberg P, et al. Antibacterial drug resistance [background paper Priority Medicines for Europe and the World, 2004.



Antibacterials in the Pipeline

New Molecular Entities Publicly Disclosed in R&D Programs
Of the World's 15 Largest Pharmaceutical Companies



Source: Adapted from Spellberg
2004



3rd-gen. cephs-R
Gram-neg. bact.

↓
Carbapenems

↓
Colistin-S only
Gram-neg. bact.

↓
Colistin

↓
Pan-resistant
Gram-neg. bact.

**Colistin-resistant
(pan-resistant)
bacteria already
appearing in many
countries**

Source: Falagas ME, Kasiakou SK. *Clin Infect Dis* 2005;40:1331-41.
Michalopoulos AS, et al. *Clin Microbiol Infect* 2004;11:115-21.



Appeal for new antibiotics after resistant E.coli infections treble

An increase in infections that are resistant to all known antibiotics is threatening Britain and the world, unless ways can be found to develop and bring new drugs, public health experts warned yesterday.

Fear has been heightened by a British girl born in southern Ghana with E.coli, and an ill toddler in central Australia, which can cause serious illness and death.



More antibiotic development needed warns Health Protection Agency

10 September 2008

Ahead of its annual conference next week, the Health Protection Agency is warning about the need for new



Some reasons for lack of antibiotic innovation

- **Antibiotics not as profitable** as drugs to treat chronic diseases
- **Pharma industry consolidation:** fewer people in fewer companies doing antibiotic research
- **Major scientific challenges** = financial risk
- **Highly genericised market** – overall price is low
- **Push to reduce use** to tackle resistance – reduces size of market
- **Clinical drug development costly** for antibiotics
- **Inevitability of resistance** limits antibiotic lifespan – limits duration in market place



Net Present Value by Drug Class

Project therapeutic class	Risk-adjusted NPV x \$1,000,000
Musculoskeletal	1,150
Neuroscience	720
Oncology	300
Vaccines	160
Injectable antibiotic (Gm+)	100

Source: Projan, 2003



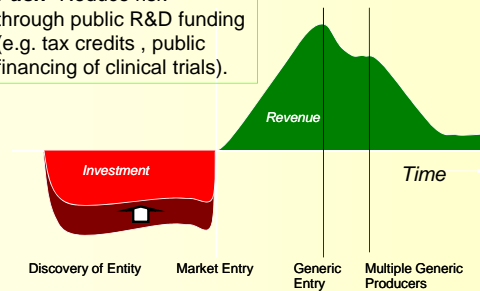
Current Situation: Need for Urgent Action

- Though new research is being done, it will not be sufficient to meet need
- Consequences = increasing numbers of sick and untreatable patients and deaths associated with lack of effective antibiotics – already visible
- Prognosis for five to ten years = grave
- Anti-infectives now face similar funding difficulties as neglected diseases

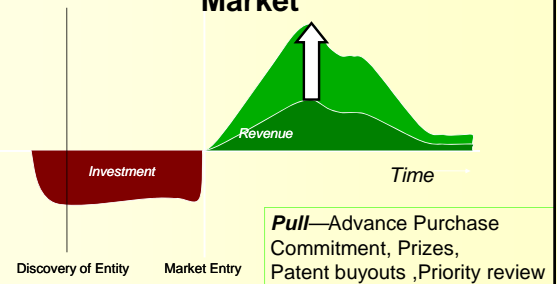


Diminishing R&D Risk

Push--Reduce risk through public R&D funding (e.g. tax credits, public financing of clinical trials).



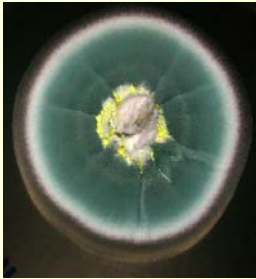
Reducing Risk of Resource-Limited Market



Pull--Advance Purchase Commitment, Prizes, Patent buyouts, Priority review



What could be learnt from the R&D of penicillin?



- 1929: Fleming's discovery of penicillin
- 1940: Florey and Chain's crucial experiment
- 1941 on: Committee on Medical Research assists to scale up penicillin production
- 1944: Twenty-one firms produce penicillin

Source: http://boti.botany.wisc.edu/Toms_fond/images/pen-colony.jpg



Gap analysis

- ECDC will produce a report on the *"Needs"*
- &
- EMEA/ReAct will produce a report on the antibacterial *"Pharmaceutical Pipeline"*



Production of a **Technical Report** for the European Commission



Preparing for the Swedish Presidency of the EU

Ministry of Health and Social Affairs, Sweden

FIRST ANNOUNCEMENT

! Innovative Incentives for Effective Antibacterials !

Regulatory incentives
Financial incentives
Research strategies: Antibiotics and diagnostics



"We may look back at the antibiotic era as just a passing phase in the history of medicine, an era when a great natural resource was squandered, and the bugs proved smarter than the scientists"

Cannon G. 1995