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ETHICS IN THE ERA OF SUPERBUGS…

& antimicrobial resistance

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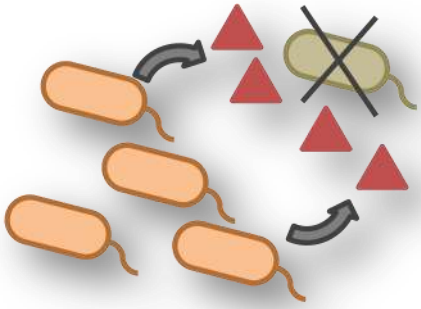
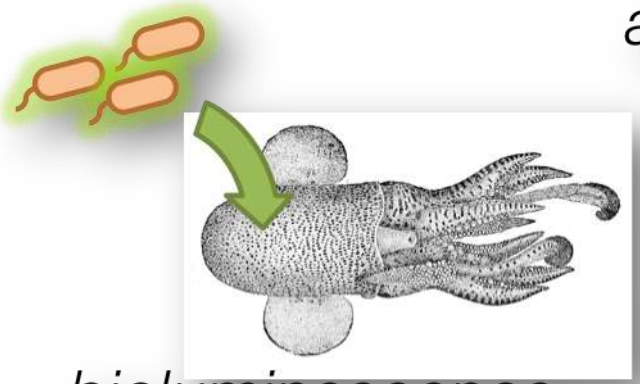
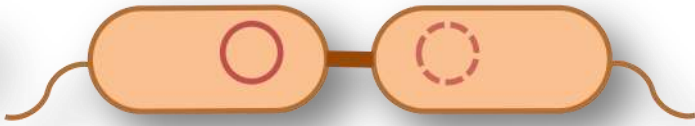


antibiotic production

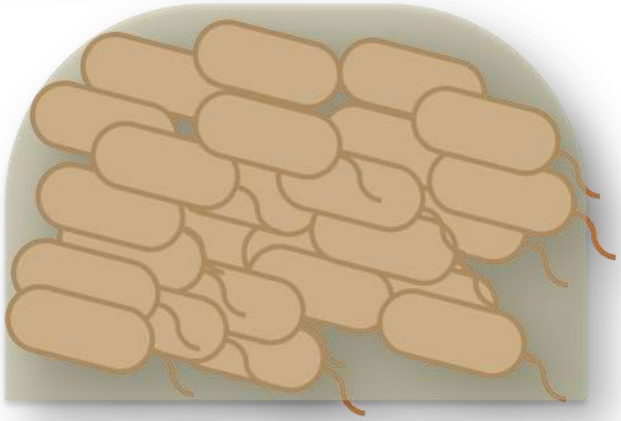


bioluminescence

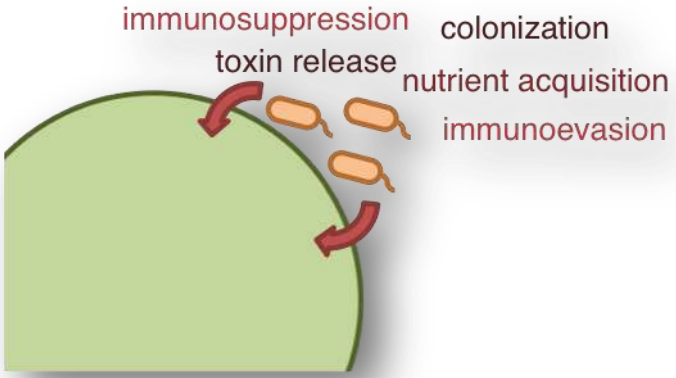
collective behaviors



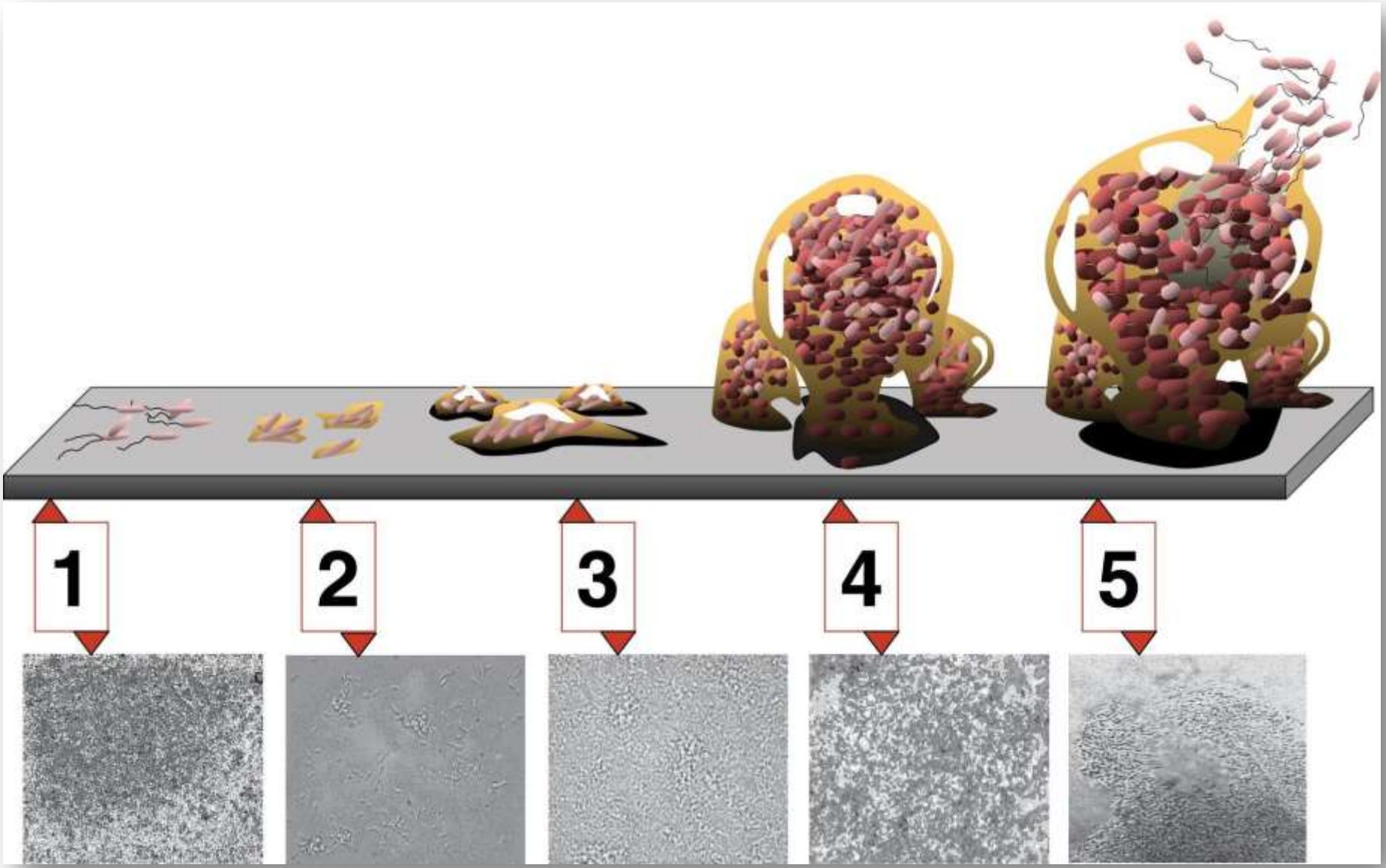
conjugation



biofilm formation



virulence factors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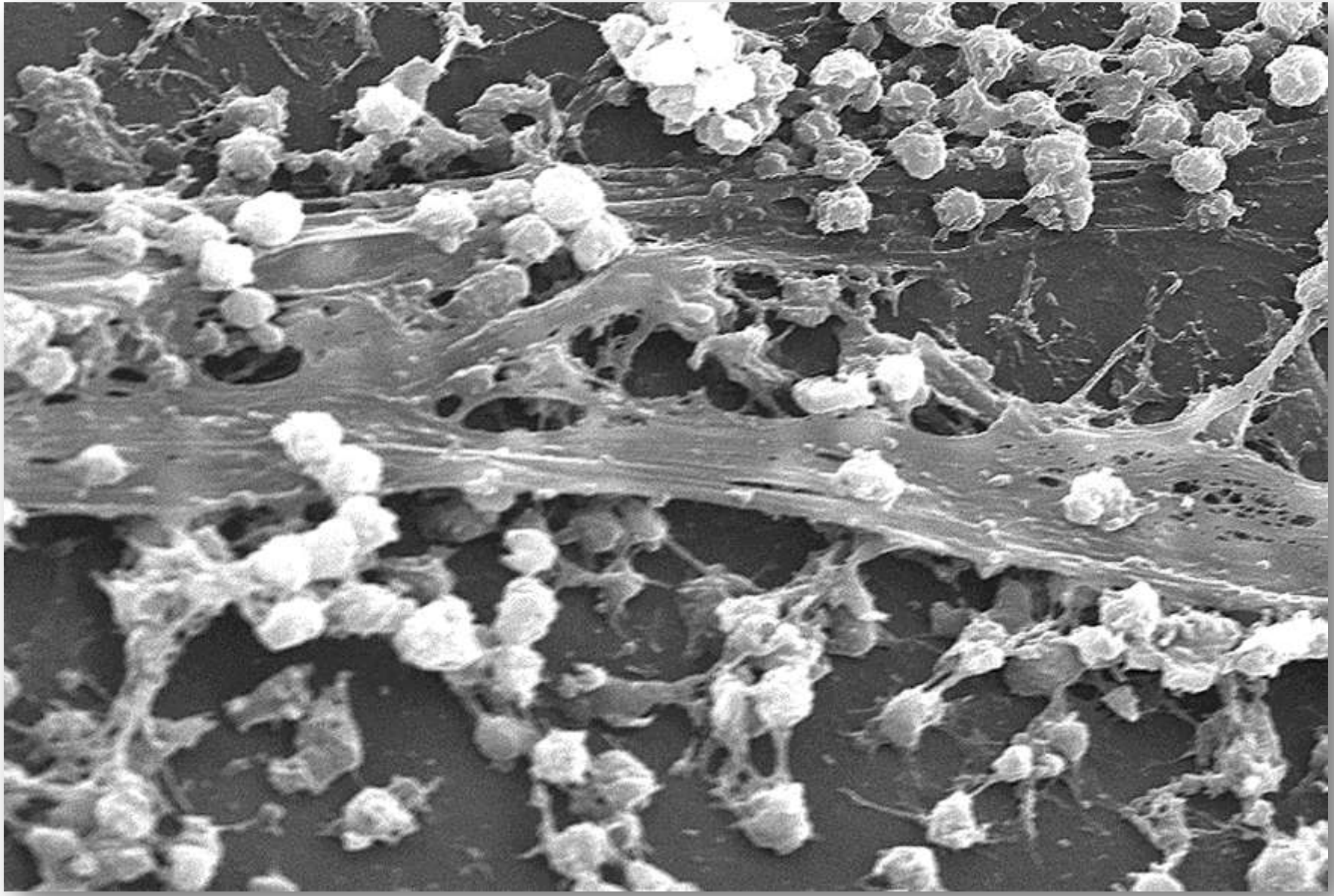
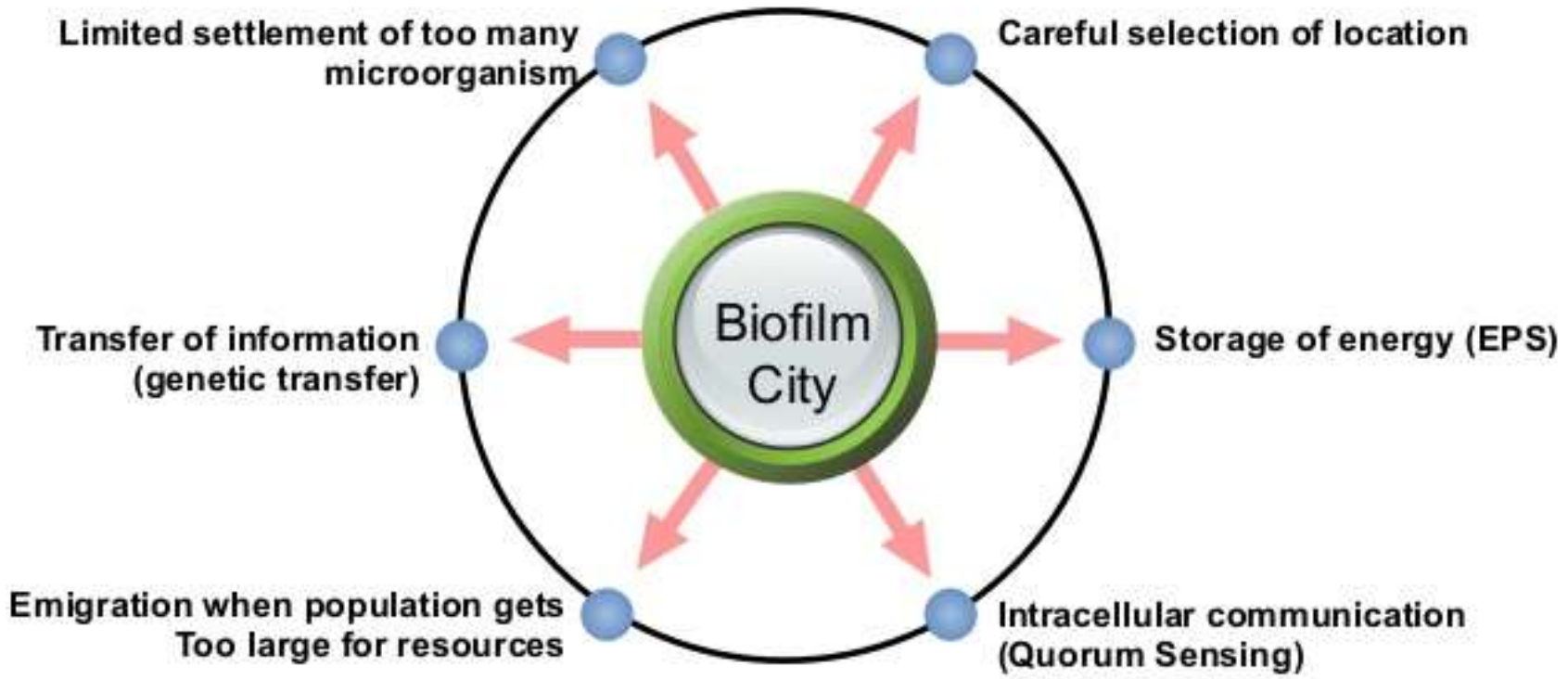


KAIST

How is a Biofilm like a CITY?




cw


GOOD INTENTIONS
bad results

The war on superbugs

Addressing the issue of antibiotic resistance

With his discovery of penicillin, Alexander Fleming helped pave the way for the golden era of antibiotics, which began full force in the 1950s as more of these bacteria-fighting drugs were developed and prescribed. Many in the public and within health care alike thought the war against potentially harmful microbes was won.

But not Fleming, who warned that antibiotic misuse could lead to resistance. He was right.

Source: CDC Threat Report 2013

Now it is clearly evident that the unnecessary or inappropriate use of these drugs is the single, most important factor leading to antibiotic resistance. In fact, a new report from the Centers for Disease Control and Prevention (CDC) estimates that more than two million people in the United States are sickened each year with antibiotic-resistant infections leading to some 23,000 deaths.

"We have a real phobia of germs in this country, and it's been setting us up for this resistance," said renowned environmental health expert Barbara Sattler, DrPH, RN, FAAN, a professor at the University of San Francisco, and an ANA member. "And we're not developing a whole slew of new antibiotics [to counter resistance], because there is not a lot of money in it."

For some time, the American Nurses Association (ANA) and many nurse advocates have been signaling for more judicious use of antibiotics, including in agricultural practices. This fall, CDC Director Tom Frieden expressed his great concern about the rise of "superbugs."

The issue also was the focus of a recent PBS "Frontline" episode, called "Hunting the Nightmare Bacteria," which led to even more media attention. The episode followed three cases, including a hard-to-track outbreak of highly resistant Klebsiella pneumoniae carbapenemase (KPC) at the National Institutes of Health (NIH) Clinical Center.

Nurse infection preventionists Linda Goss, MSN, APRN, CIC, COHN-S, and Mary Lou Manning, PhD, CRNP, CIC, FAAN, also expressed their concern about the rise of highly resistant bacteria, most notably, carbapenem-resistant enterobacteriaceae (CRE). CRE can spread its resistance to other bacteria, are resistant to all or nearly all available antibiotics, and can be fatal in certain types of patients. (KPC is part of the CRE family of micro-organisms.)

CDC: AMR to the US economy annually*

$20 billion in direct health care

$35 billion in lost productivity

UK government: death toll of AMR

300 million people 2050

financial loss $100 trillion**

Antibiotics Can't Keep Up With 'Nightmare' Superbugs

Listen to the Story

We're used to relying on antibiotics to cure bacterial infections. But there are now strains of bacteria that are resistant to even the strongest antibiotics, and are causing deadly infections. According to the CDC, "more than 2 million people in the United States every year get infected with a resistant bacteria, and about 23,000 people die from it," journalist David Hoffman tells Fresh Air's Terry Gross.

Many people are familiar with the type of resistant infections often acquired in hospitals, caused by MRSA, the acronym for methicillin-resistant Staphylococcus aureus. But most people don't know about the entirely

*Centers for Disease Control and Prevention, 2013
** O'Neill, 2014

Life in the post-antibiotic era is going to suck…

Greatest single jump in average human lifespan

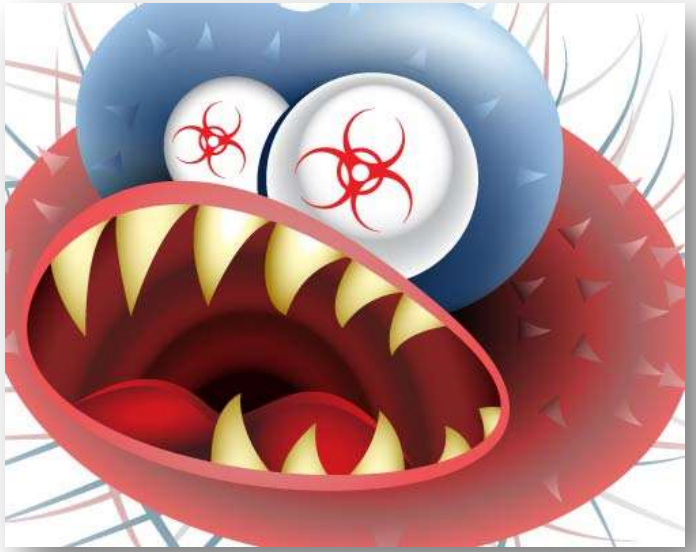
in the recorded history of medicine…

BUT after 80 years

antibiotic over-use

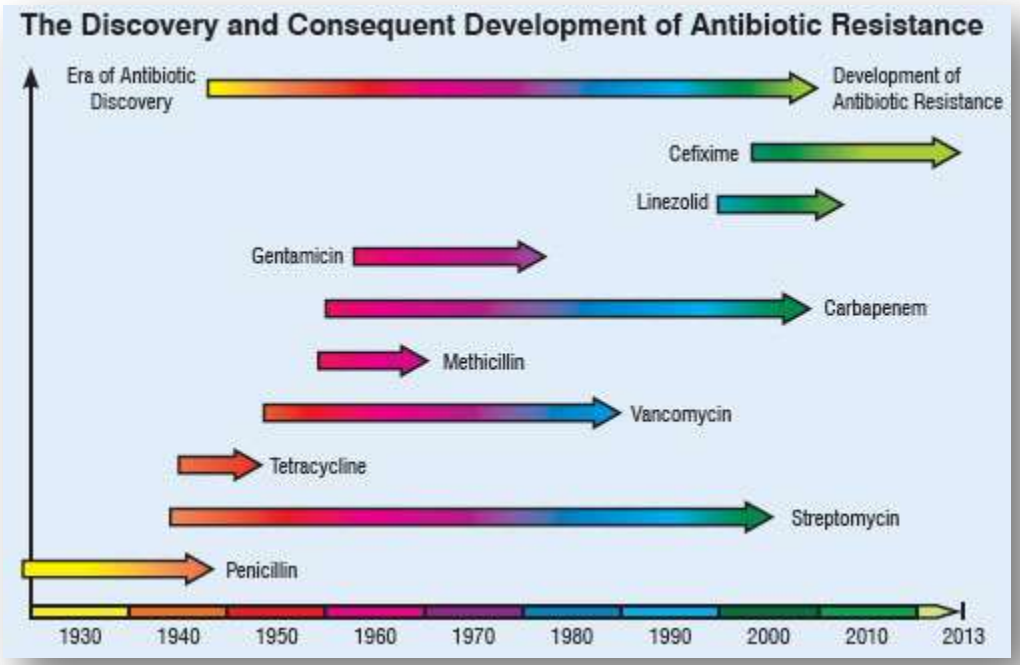
regulatory hostility

corporate indifference



“Post-antibiotic era”

Reality: minor scrapes and sore throats will become life-threatening events



Drugs will eventually fail

Drugs are not magic bullets

Just stop-gap measures

….the industry's obligation to be ethical…

…promises of specific benefits to consumers…

When you promise or claim that using an antimicrobial product will protect health, are there issues of right and wrong?

There certainly are…

Herman s. Ethics and personal care. Chemical reaction, GCI August 2009

Belmont report

Ethical principles:

1. Autonomy / Respect for persons
2. Beneficence
3. Justice
4. Non-maleficence…

APUA

The Alliance for the Prudent Use of Antibiotics

Dedicated to antimicrobial stewardship (AMS)

What ethical considerations are there in AMS?

Is a life in the future worth less than a life in the present?

How do we fairly allocate resources?

Ethical considerations in treating disease

Many current health strategies: saving a life now is more important than saving a life in the future

> WHO Global Burden of Disease project discounted the value of future lives

Are we really making decisions that benefit the most people irrespective of when they live?

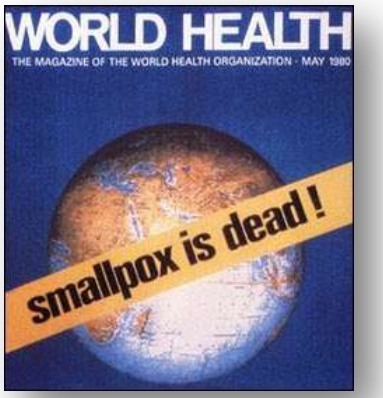
Healthcare resources should be used to maximises the health benefit for the largest number of people…

We cannot predict

state of future populations

unforeseen events (war or emerging diseases)

may make investments in the future worthless

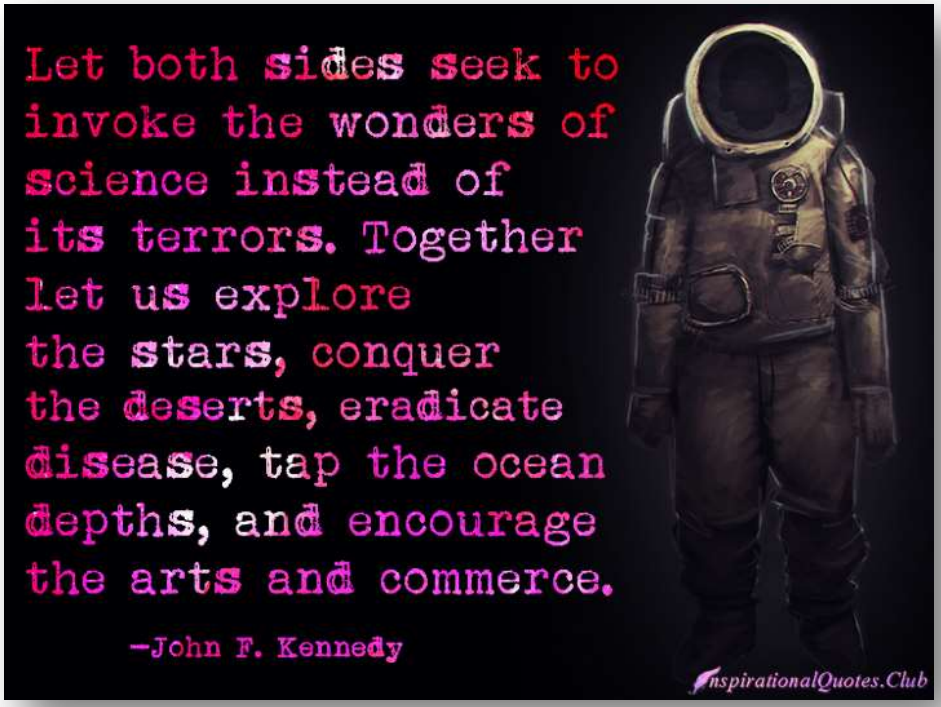


Invest most of our resources now to eradicate

diseases, and therefore save countless future lives.

Even if attempts at eradication fails…

…can lead to large populations being relieved of their burden of disease if only temporarily…



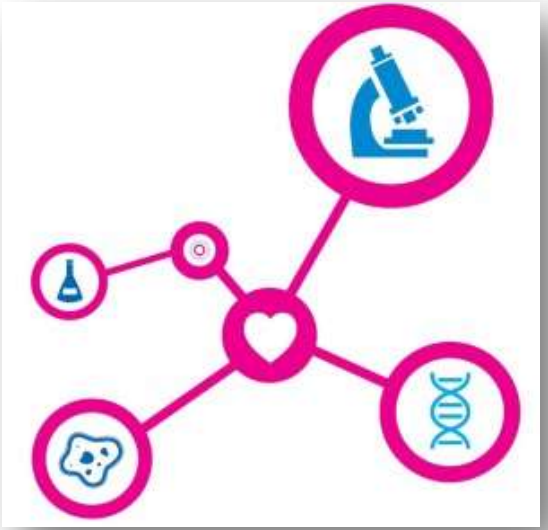
Multi-pronged strategy

Vaccine development

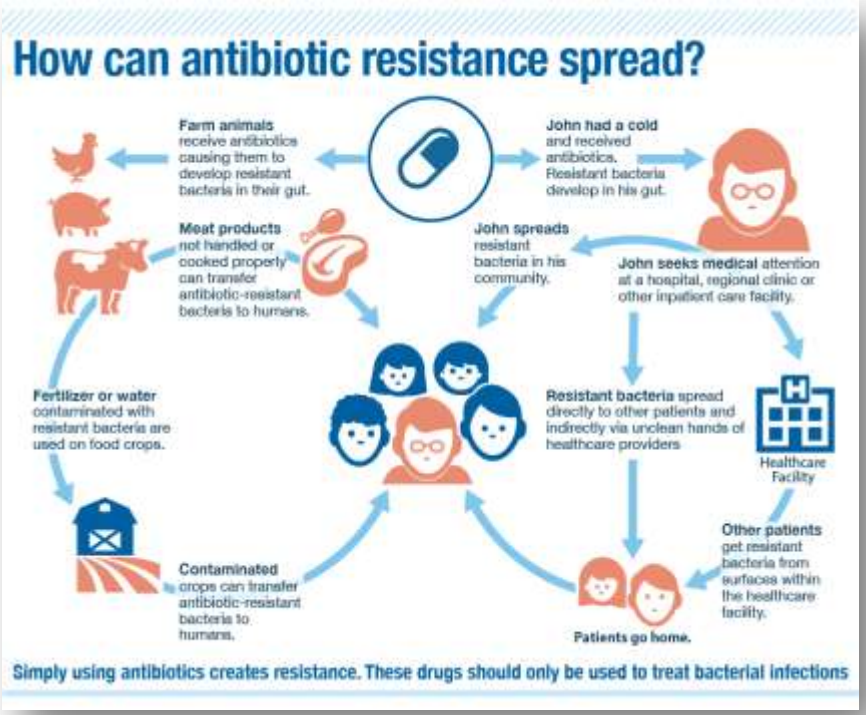
Improved diagnostics

Antibiotic resistance surveillance

Antimicrobial stewardship



Half of the world's production of antibiotics are still used in animal and fish farming, which has created reservoirs for resistant bacteria and exacerbates the problem further




TRUST
EQUALITY
FREEDOM
HOPE
PEACE
JUSTICE
RULE OF LAW
DIGNITY
PROSPERITY

How do we fairly allocate resources?

solidarity

liberty

privacy

reciprocity

fairness

the common good

AMR and Questions of Justice

The global burden of infectious disease is distributed highly unevenly

low-income countries are disproportionately affected by AMR

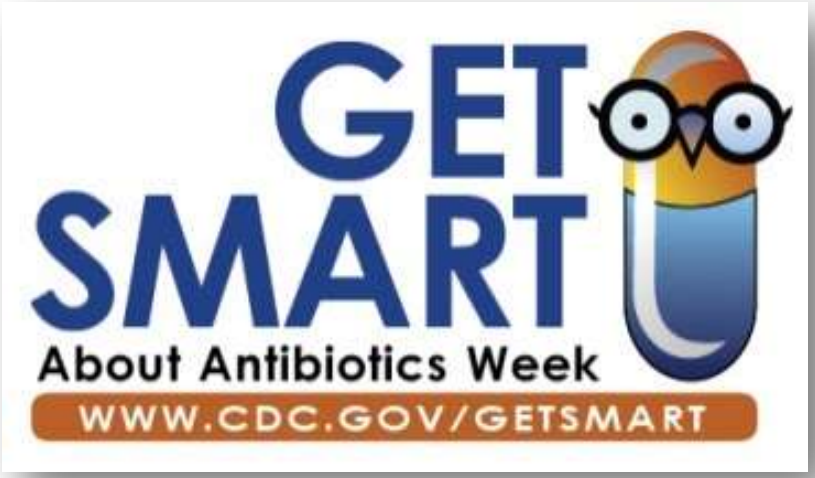
high income countries bear a larger share of the response

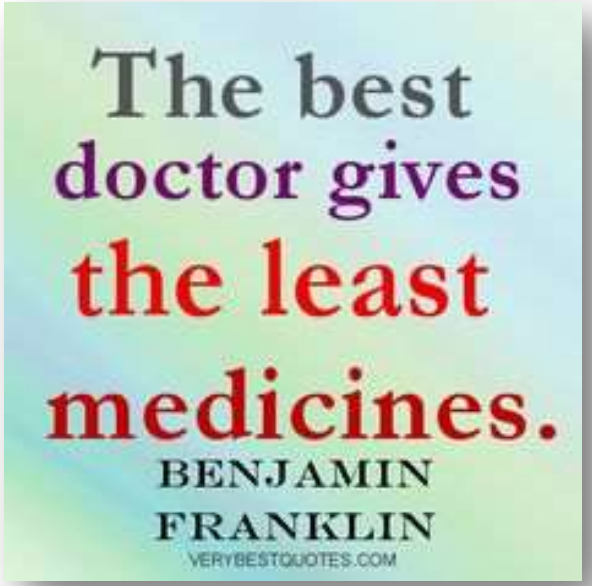
Developing new drugs and technologies

Enhancing surveillance and reporting systems

Conducting research in areas not aligned with current national priorities

At the same time, a response to AMR will also require that we provide better access to high-quality drugs, diagnostic tools and expert care.





Goldman, 2012; Rex, 2014; Drive, 2014

Some solutions…

…implementation of antibiotic stewardship in health care facilities and the community; development of rapid, point-of-care diagnostics; recruitment of academic and industry partners to increase the pipeline of antibiotics, vaccines, and alternative approaches; and international collaboration for prevention, surveillance, and control of antibiotic resistance.

Nathan and Cars, N Engl J Med 2014


cw

Central ethical message here…

Distributive justice

Access: vulnerable populations are essential

Key interventions

Partnerships (Bills & Melinda Gates…)

Preventative measures (Vaccines…)

Rewards

Prioritization of medical use

Littmann J. The Ethical Significance of Antimicrobial Resistance. Public Health Ethics 2015;1–16.

Central ethical message here…

Respect for persons

Protecting the autonomy of all people

Treating them with courtesy and respect

Allowing for informed consent

New concept

Informed consent for antibiotic prescription

Central ethical message here…

Beneficence

Maximizing benefits while minimizing risks

New concept

Only use antibiotics after careful consideration

the risks and the benefits

…in a fully immunized immune-competent child, antibiotics for an URTI/mild OM is NOT needed…

Central ethical message here…

Justice

Ensure reasonable, non-exploitative and well-considered management choices in every patient

The Dalai Lama, when asked what surprised him most about humanity, answered "Man. Because he sacrifices his health in order to make money. Then he sacrifices money to recuperate his health. And then he is so anxious about the future that he does not enjoy the present; the result being that he does not live in the present or the future; he lives as if he is never going to die, and then dies having never really lived."