



Global Antibiotic Resistance Partnership



Global
**Antibiotic
Resistance**
Partnership

CDDEP

THE CENTER FOR
Disease Dynamics,
Economics & Policy
WASHINGTON DC • NEW DELHI

RESOURCES
FOR THE FUTURE



Objective

Develop actionable national strategies to address the challenge of antibiotic resistance in five low- and middle-income countries

- China
- India
- Kenya
- South Africa
- Vietnam



Specific Aims

- Develop the evidence base for policy action on antibiotic resistance
- Identify policy opportunities where research dissemination, advocacy, and information can have the greatest impact in slowing the development and spread of resistance.

Steps

- Create country profiles of baseline resistance, antibiotic use and burden of resistance
- Assess the health and economic consequences of antibiotic resistance
- Develop mathematical models of specific approaches to delay emergence of antibiotic resistance
- Constitute GARP National Working



Other objectives

- Create an IT platform for a global antibiotic resistance atlas
- International conference to compare policy approaches across the five target countries and to discuss the relevance of these approaches to other countries outside the initial partnership

Second Phase

- Dissemination of national strategies
- Policy communications
- Further research

Objectives for this meeting

- How serious a problem is antibiotic resistance in Vietnam?
- What are the primary drivers of resistance?
- What policies could both help reduce the
 - Suboptimal use of antibiotics
 - Need for antibiotics
 - Emergence and spread of resistance

RAMANAN LAXMINARAYAN and ANUP MALANI
with David Howard and David L. Smith



EXTENDING THE CURE

Policy responses to the growing threat of antibiotic resistance



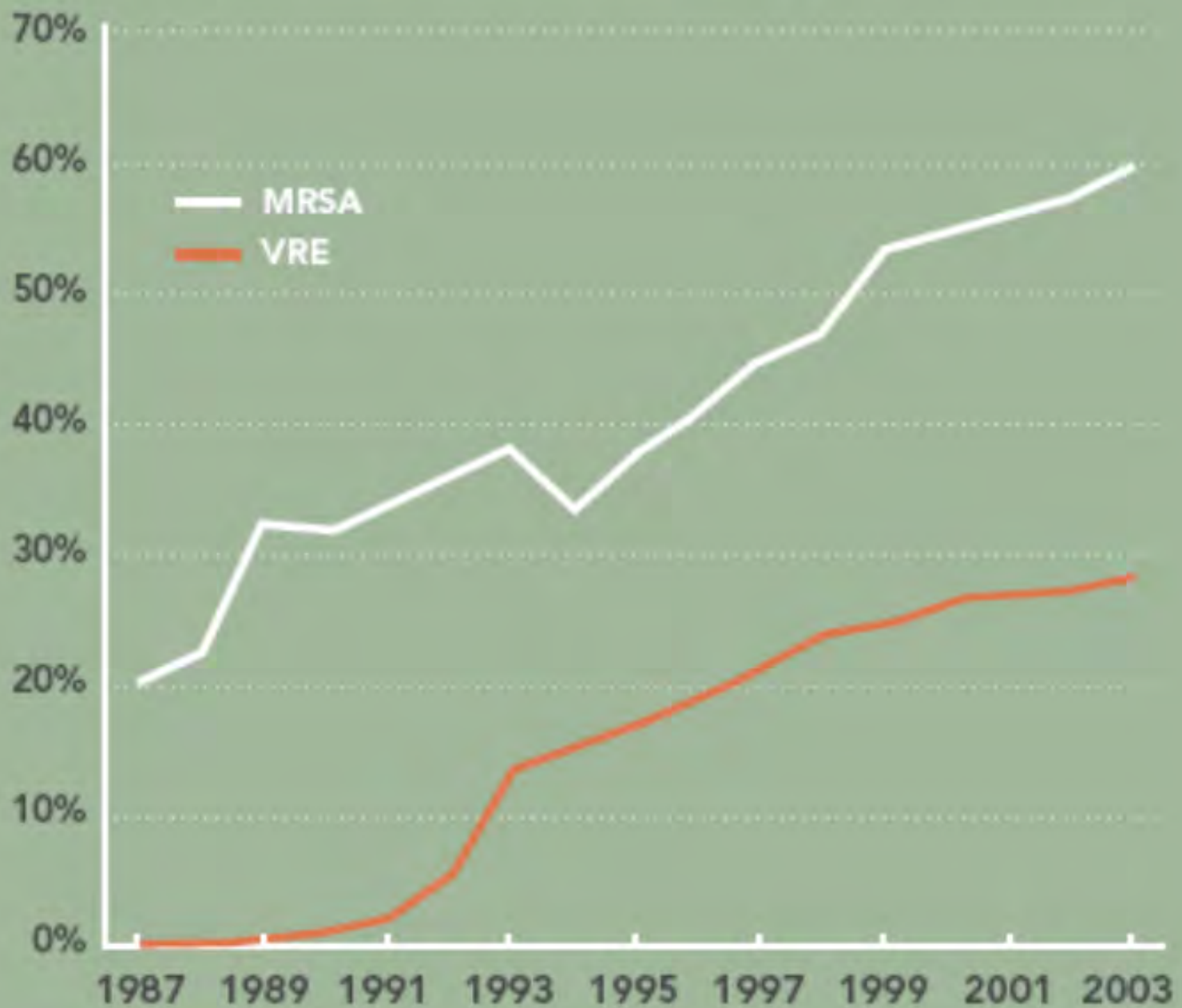
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www.extendingthecure.org

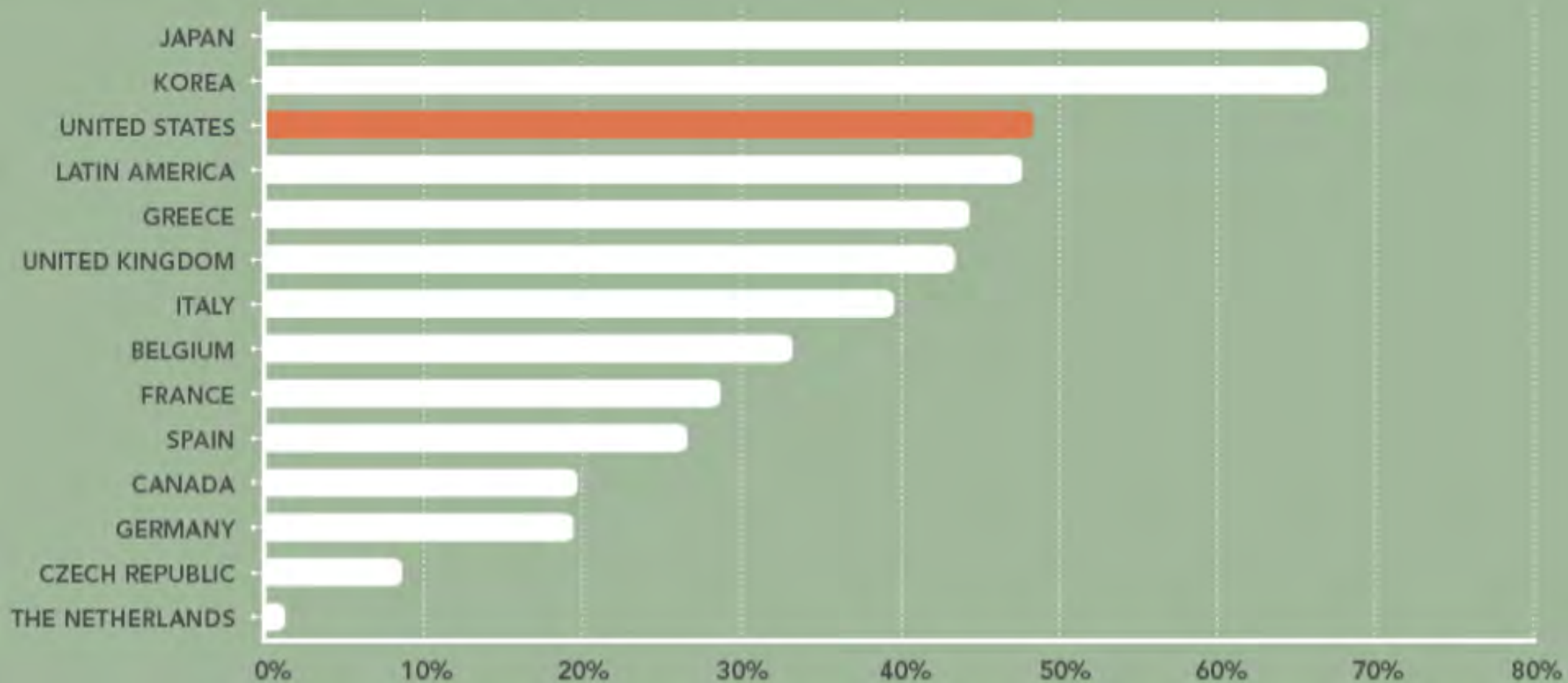
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The proportion of methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant enterococcal infections is increasing (1987–2003)



The proportion of methicillin-resistant Staphylococcus aureus (MRSA) infections in the United States is high compared with other high-income countries (2004)



Growing resistance combined with an increasing number of *Staphylococcus aureus* infections has resulted in an increasing number of hospitalized patients who have MRSA infections

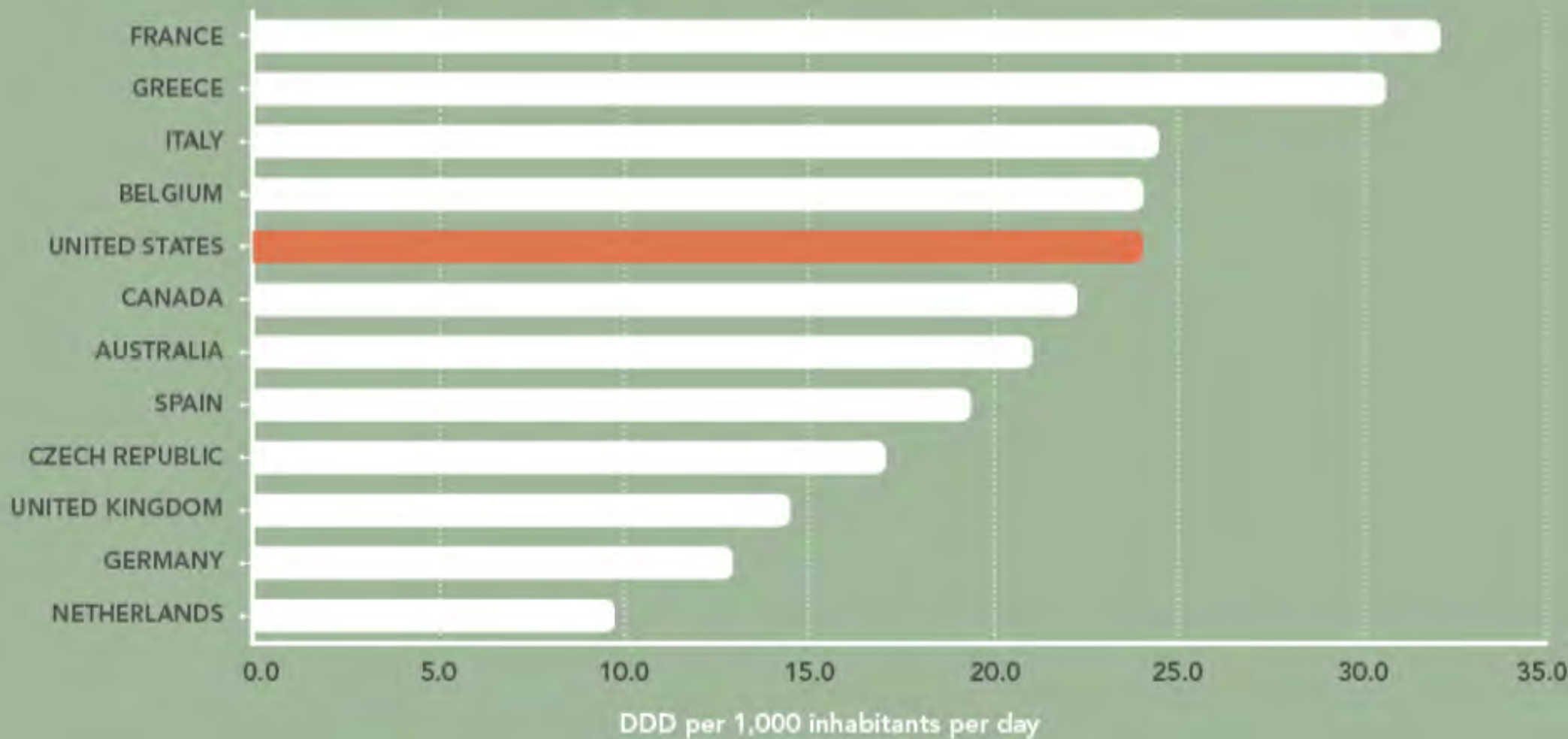


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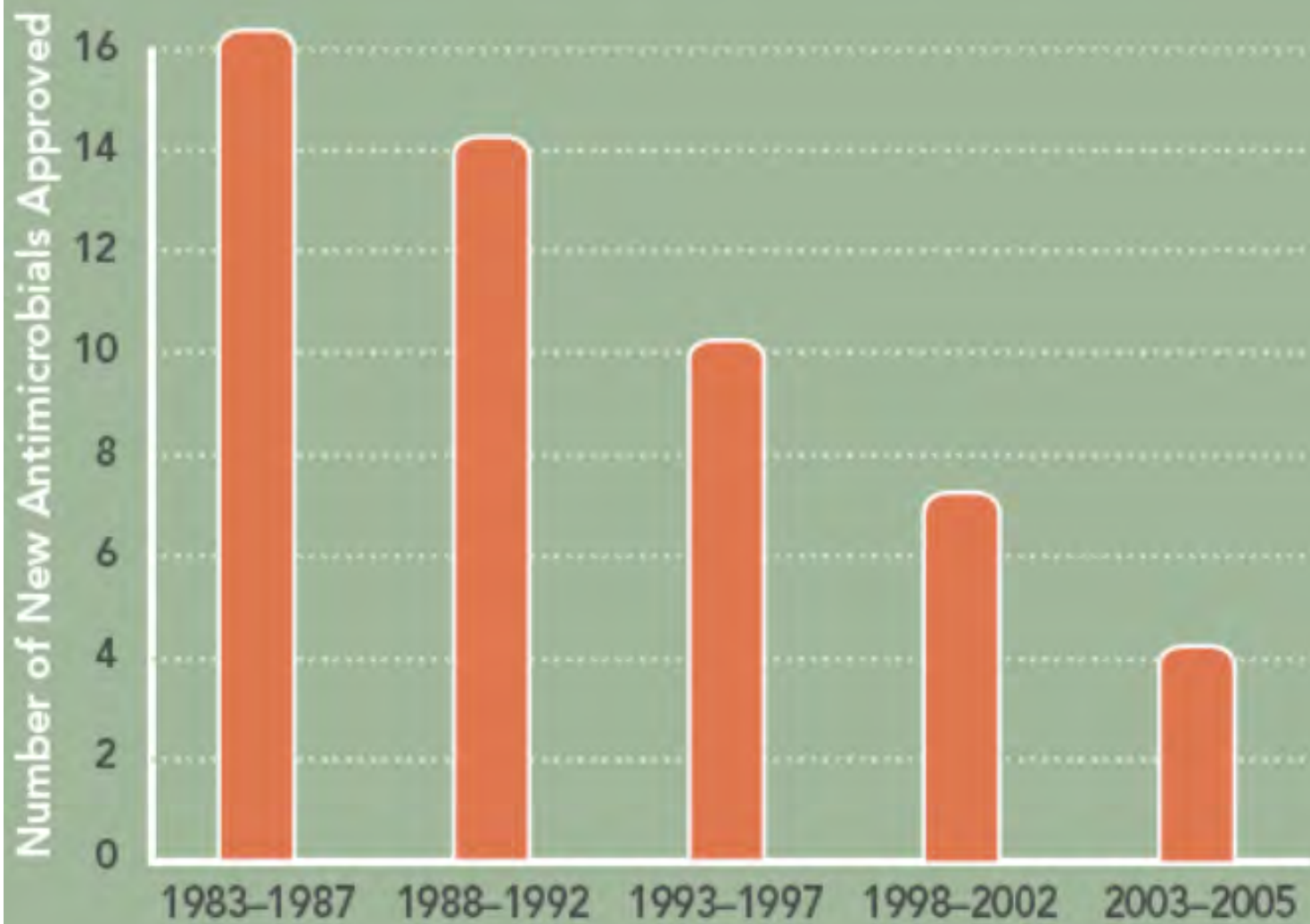
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The United States is among the most intensive users of antibiotics in the world



Fewer new antibiotics are being brought to market as more firms leave the anti-infectives business



New antibacterial agents approved by FDA, 1983-2005



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THE BRITISH JOURNAL
OF
EXPERIMENTAL
PATHOLOGY
VOLUME TEN
1929

Reproduced from pages 226–236.

ON THE ANTIBACTERIAL ACTION OF CULTURES OF A
PENICILLIUM, WITH SPECIAL REFERENCE TO THEIR
USE IN THE ISOLATION OF *B. INFLUENZÆ*.

ALEXANDER FLEMING, F.R.C.S.

From the Laboratories of the Inoculation Department, St Mary's Hospital, London.

Received for publication May 10th, 1929.



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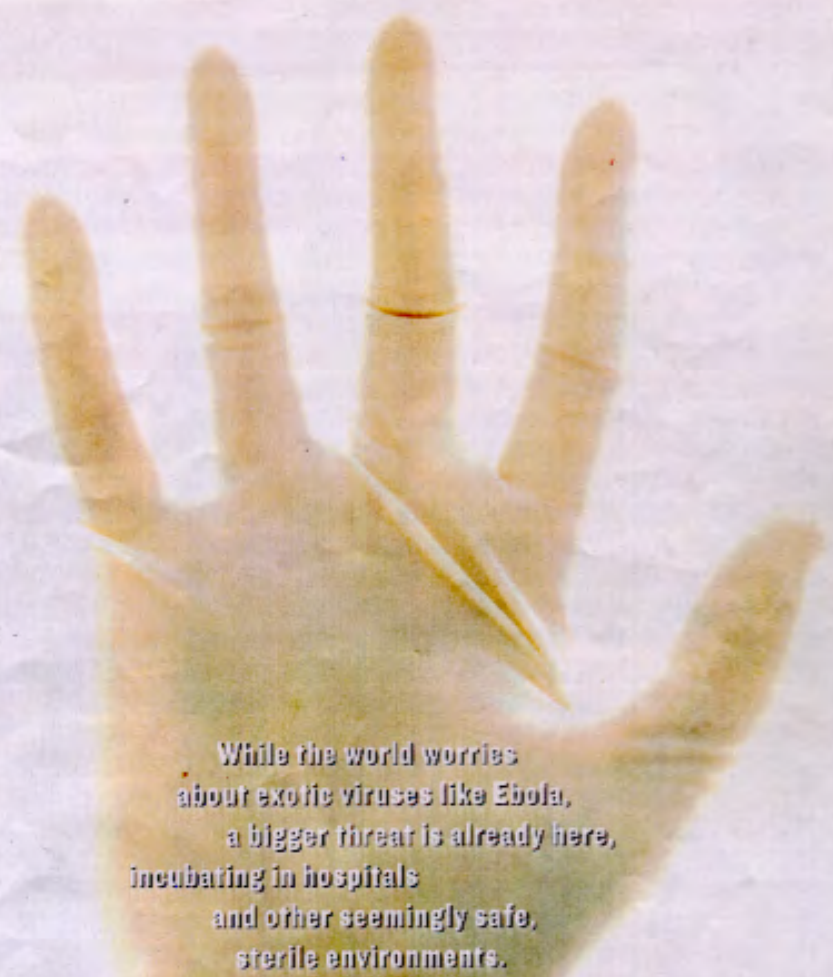
Thanks to PENICILLIN
...He Will Come Home!



Mexico's
Illustrating
ero
y Paul
erman

The New York Times Magazine

AUGUST 2, 2008 / SECTION 4



While the world worries
about exotic viruses like Ebola,
a bigger threat is already here,
incubating in hospitals
and other seemingly safe,
sterile environments.

Superbugs

The **Bacteria** Antibiotics Can't Kill

By Sheryl Gay Stolberg



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The Bug Wars

In the battle of bad bacteria vs. antibiotics, the drugs usually lose.

Infectious diseases give us a striking demonstration of evolution in action. It's a **fitful bacteria** – the one that survives an antibiotic onslaught – transfers their resistance to new generations and across species. Their ability to fight back usually strengthens with each mutation, allowing them to thwart even the most intelligently designed drugs. Over the past 43 years, deadly bugs like *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Escherichia coli* have evolved to withstand medicines like penicillin, tetracycline, and rifampin. Do scientists are now planning a flank attack – precisely targeted drug-delivery systems and bacteria-eating nanobots. But if history repeats itself, the bugs will ultimately win. – Patrick D. Jones



BEHIND ENEMY LINES: A LOOK AT RESISTANCE TACTICS

Genetic mutations enable bacteria to adapt to new threats. Here are three ways they evolve to combat antimicrobial agents.

CAMOUFLAGE

A bacterium's protein receptors morph so the antibiotic can't lock into them. (Staph used this method to evade the penicillin family.)

BRICKWORK

The cell membrane changes to keep the antibiotic out. (Bacteria use this tactic to thwart tetracycline and rifampin.)

DISARMMENT

A bacterium produces enzymes that break off the active part of the antibiotic. (This tactic is used by many *Staphylococcus*.)



HOW FAST BACTERIA EVOLVE TO THwart DRUGS

Staphylococcus aureus
S. aureus causes everything from skin infections to toxic shock syndrome. More than half of all staph infections found in intensive care units today can be linked to a drug-resistant strain.

Staph resists penicillin
The drug that started it all gave down in just five years, sending researchers back to the lab.

Staph resists methicillin
Staph quickly co-opted methicillin, turning it into the "superbug."

Staph resists vancomycin
The drug of last resort, the one of choice when others failed, is slowly defeated.

Staph resists linezolid
The first new class of antibiotic in 25 years looks to fly under the radar.

Streptococcus pneumoniae
Besides the much-feared strep throat and the much-feared flesh-eating bacteria, strains of *Streptococcus pneumoniae* cause over 125,000 cases of pneumonia a year that require hospitalization.

Escherichia coli
Dangerous forms of *E. coli* cause all sorts of maladies, from GI distress to meningitis. In June 2008, the FDA approved tigecycline, a new type of antibiotic designed to fight resistant *E. coli*.

Antibiotics
More than 110 million antibiotic prescriptions are written annually in the US. The Centers for Disease Control and Prevention discourages the use of antibiotics to treat viral illnesses like the flu. The drugs are ineffective against viruses.



Source: Alliance for the Prudent Use of Antibiotics; Centers for Disease Control and Prevention; Clinical Infectious Diseases; Mark Postema and Brian Levy, *The New Superbugs*; Jeffrey Fisher, *The Superbug*; Robert Stewart; The Antibiotic Pipeline; National Library of Medicine.



WHITewater: ANGUISH INSIDE THE WHITE HOUSE

Newsweek

ANTIBIOTICS

THE END OF MIRACLE DRUGS?

WARNING

NO LONGER
EFFECTIVE
AGAINST
KILLER
BUGS



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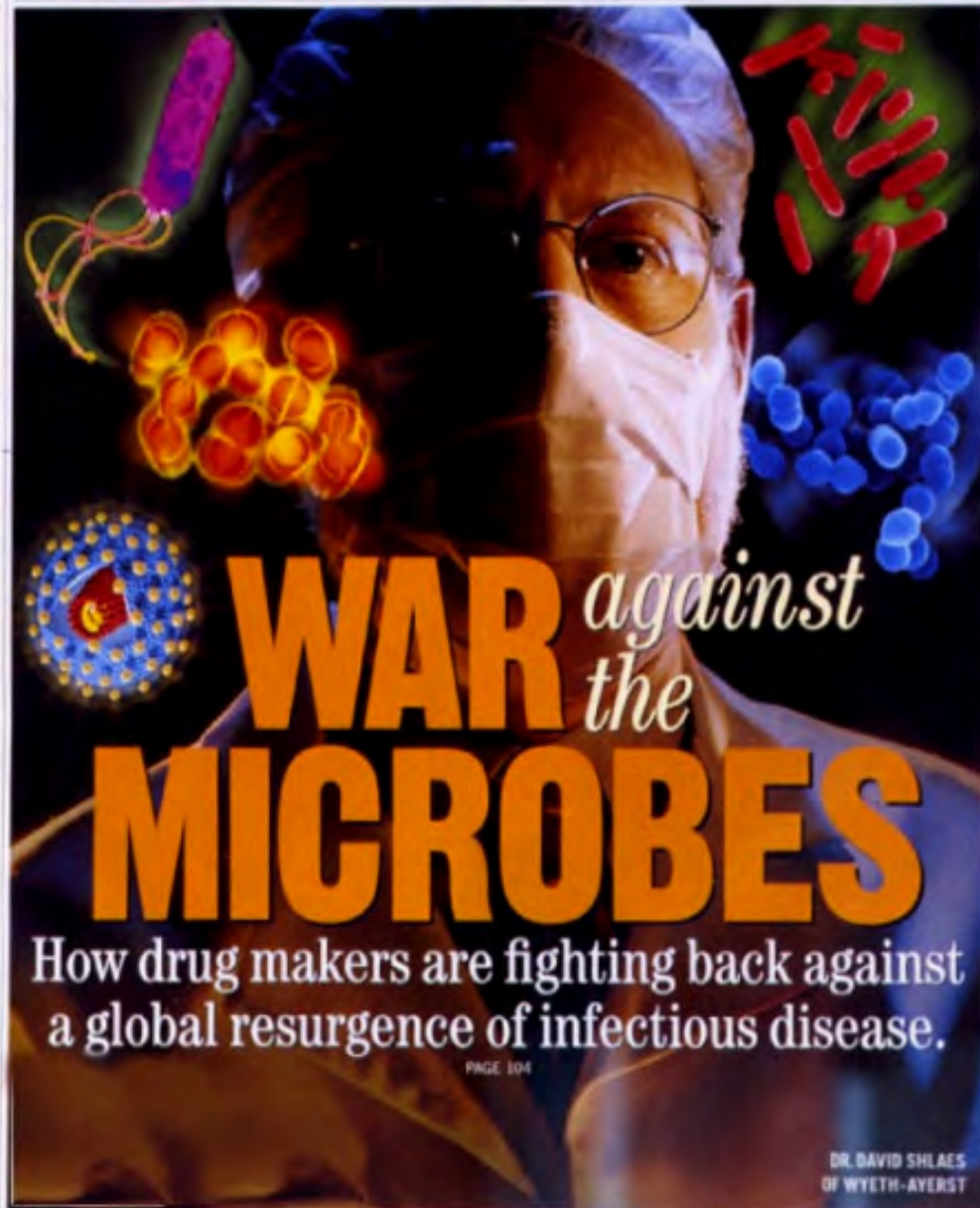


BusinessWeek

APRIL 6, 1998

A PUBLICATION OF THE MCGRAW-HILL COMPANIES

\$3.95



WAR *against* the MICROBES

How drug makers are fighting back against a global resurgence of infectious disease.

PAGE 104

DR. DAVID SHLAES
OF WYETH-AVERST



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COSMOPOLITAN

November 1995

At Last!
Something
Pleasurable
That's
Good
for You.

**The
Health
Benefits
of Sex**

Cosmo's
Update on
Antibiotics.
What's Okay
and What's
Dangerous

The
Heart-
Pounding
Bowdiness
of
**Brad
Pitt,**
Who
Couldn't
Care
Less

**Why
Marry
Instead of
Just
Fooling
Around?**

Makeup Tricks

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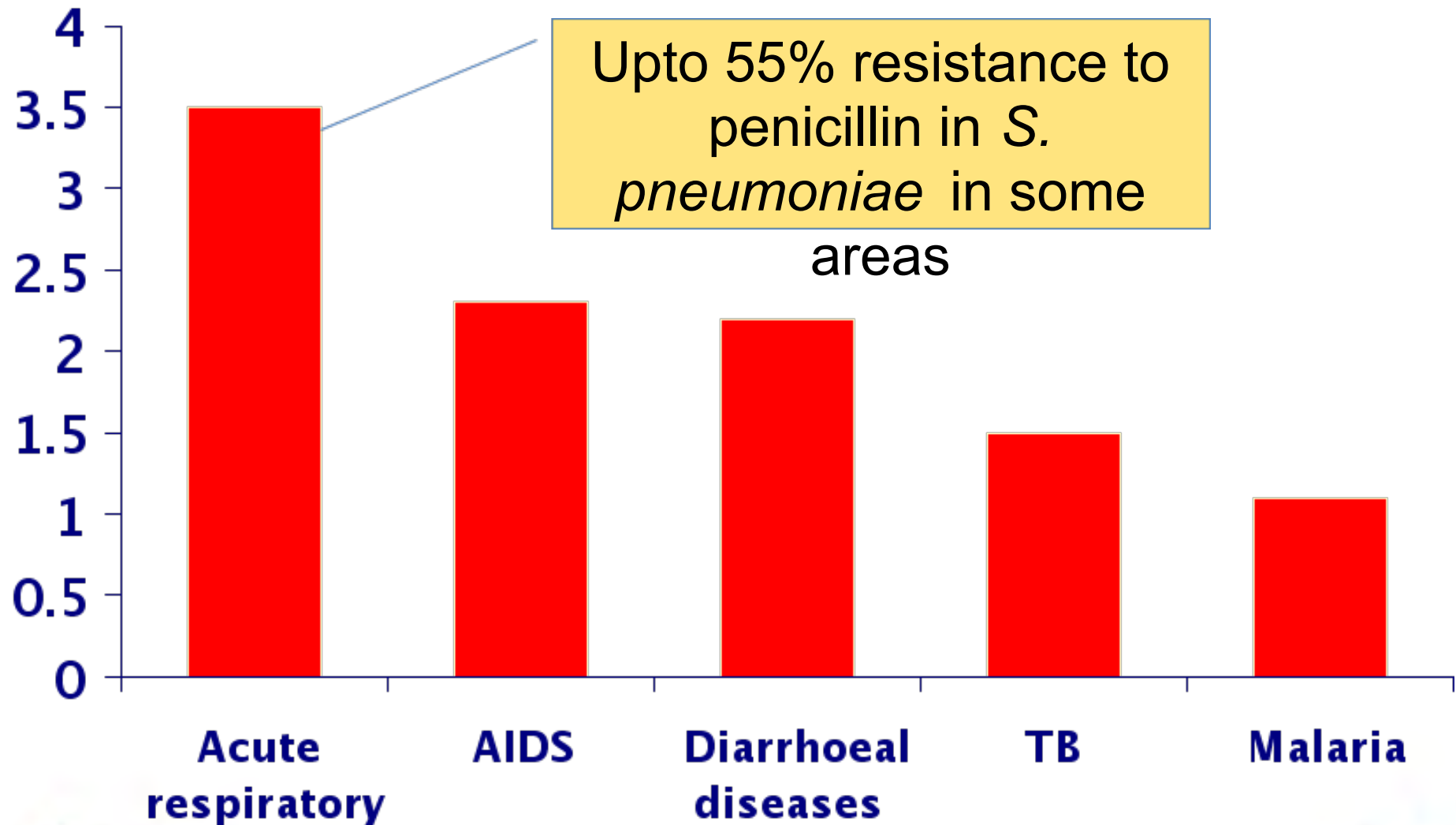
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Leading Infectious Killers

Millions of deaths, worldwide, all ages



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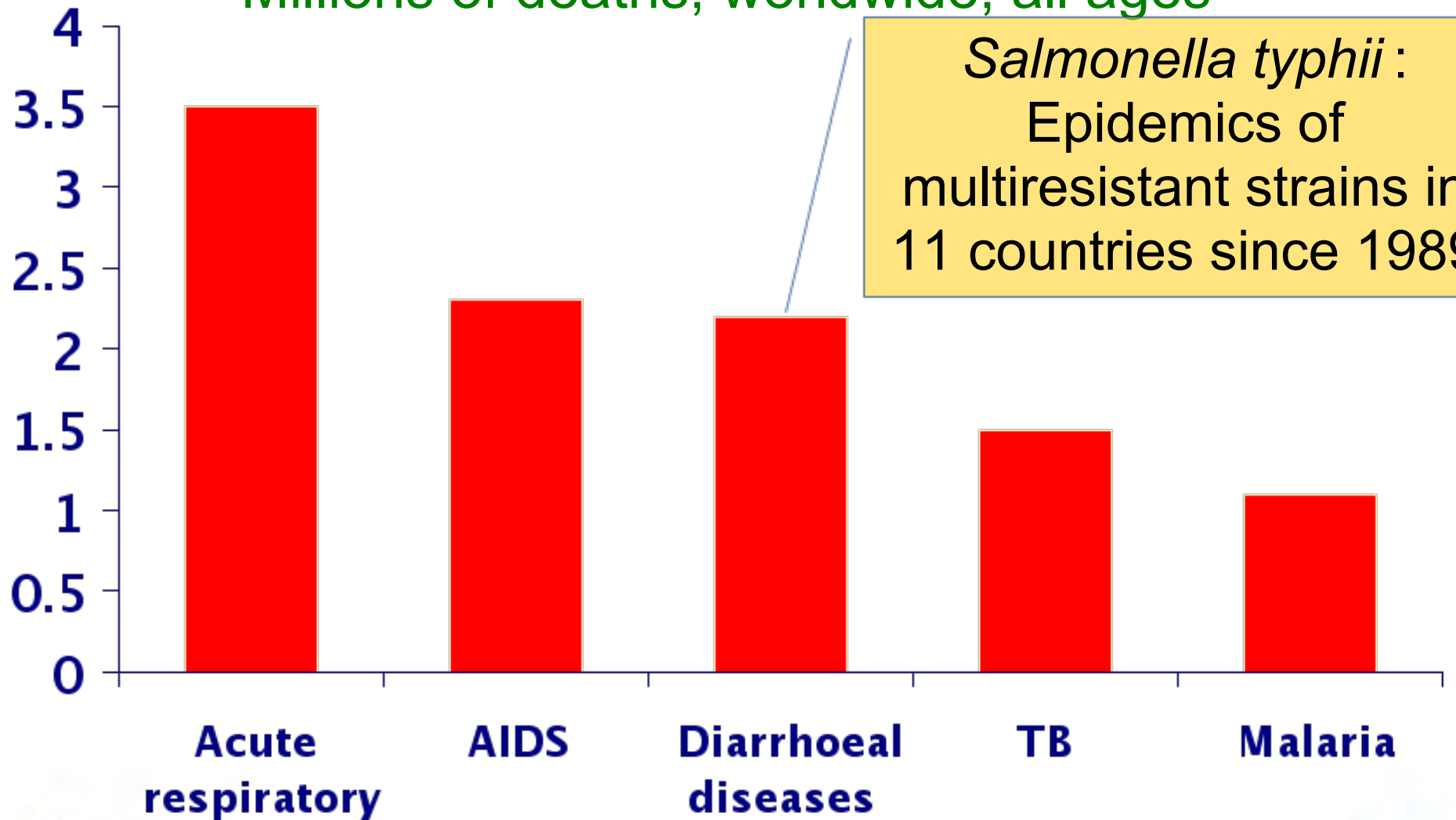
Leading Infectious Killers

Millions of deaths, worldwide, all ages

Resistance to all
currently marketed
retrovirals

Leading Infectious Killers

Millions of deaths, worldwide, all ages



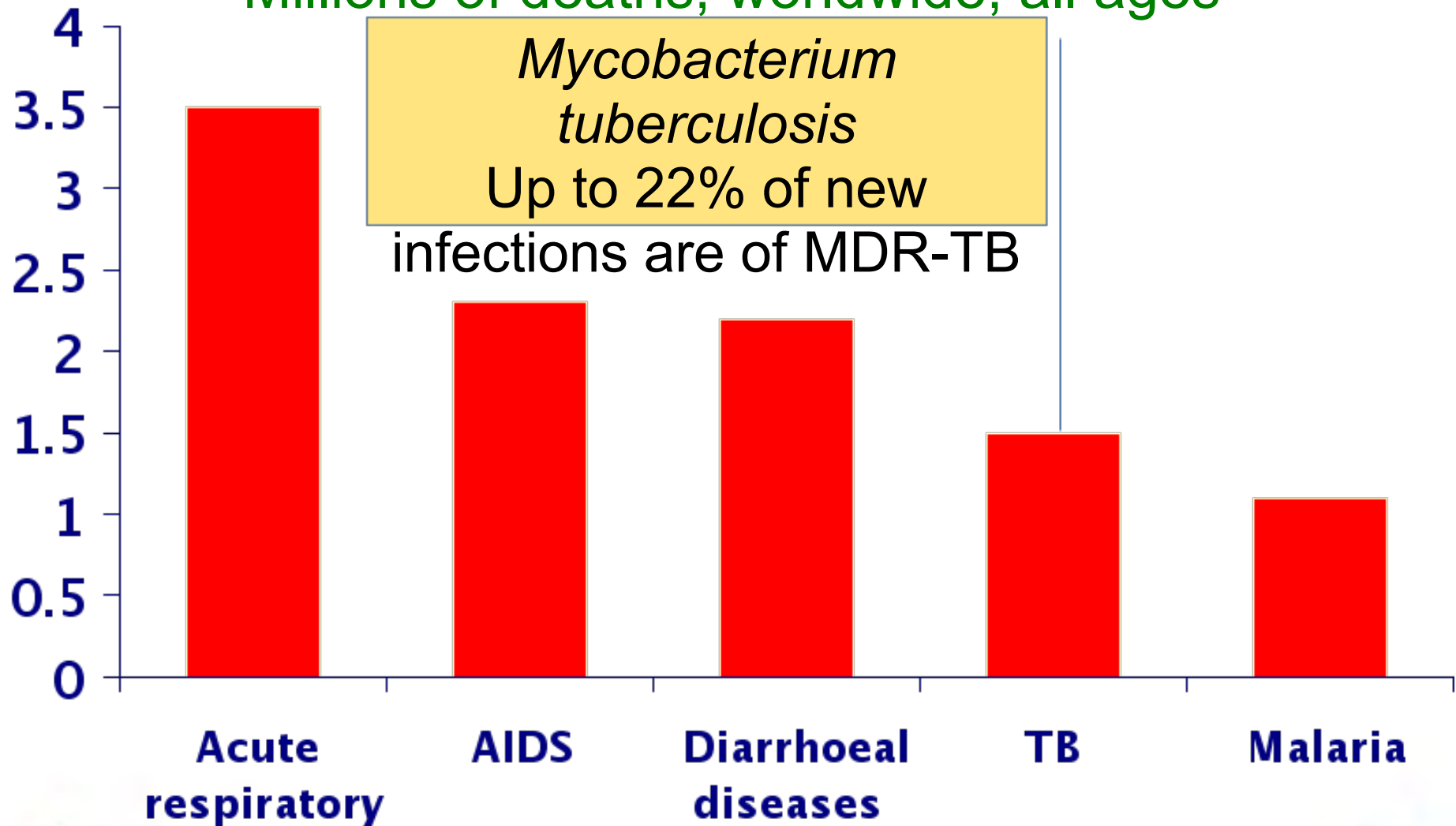
Salmonella typhi:
Epidemics of
multiresistant strains in
11 countries since 1989



Global
infection
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Leading Infectious Killers

Millions of deaths, worldwide, all ages



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