

ProVen: Antibiotics

Antibiotics –
The Most Prevalent and Potent Disruptors
of the Microbiome

ANTIBIOTICS: THE GREATEST MEDICAL ADVANCE OF THE 20TH CENTURY

1928: Penicillin discovery (Sir Alexander Fleming, 'Mould Juice')

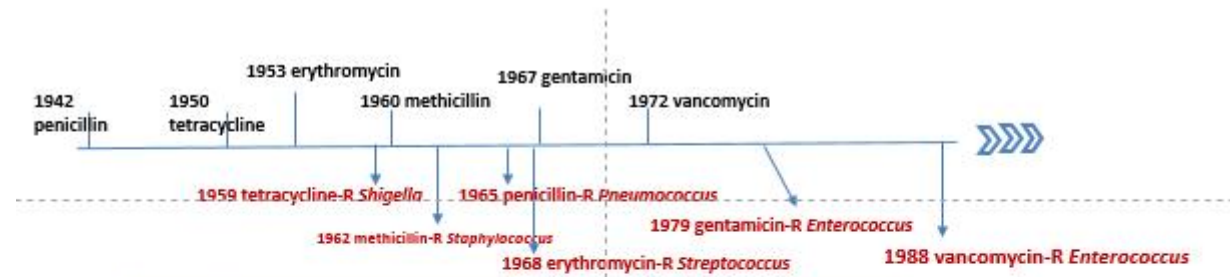
1942: Penicillin as a 'Miracle Drug' introduction

1940s-1960s: Golden Age - Discovery of a number of antibiotics

- Pneumonia
- Tuberculosis
- Diarrhoea
- Common infections
- Small cuts and wounds infections
- Battlefield infections
- Surgical infections
- Childbirth complications
- HIV
- etc

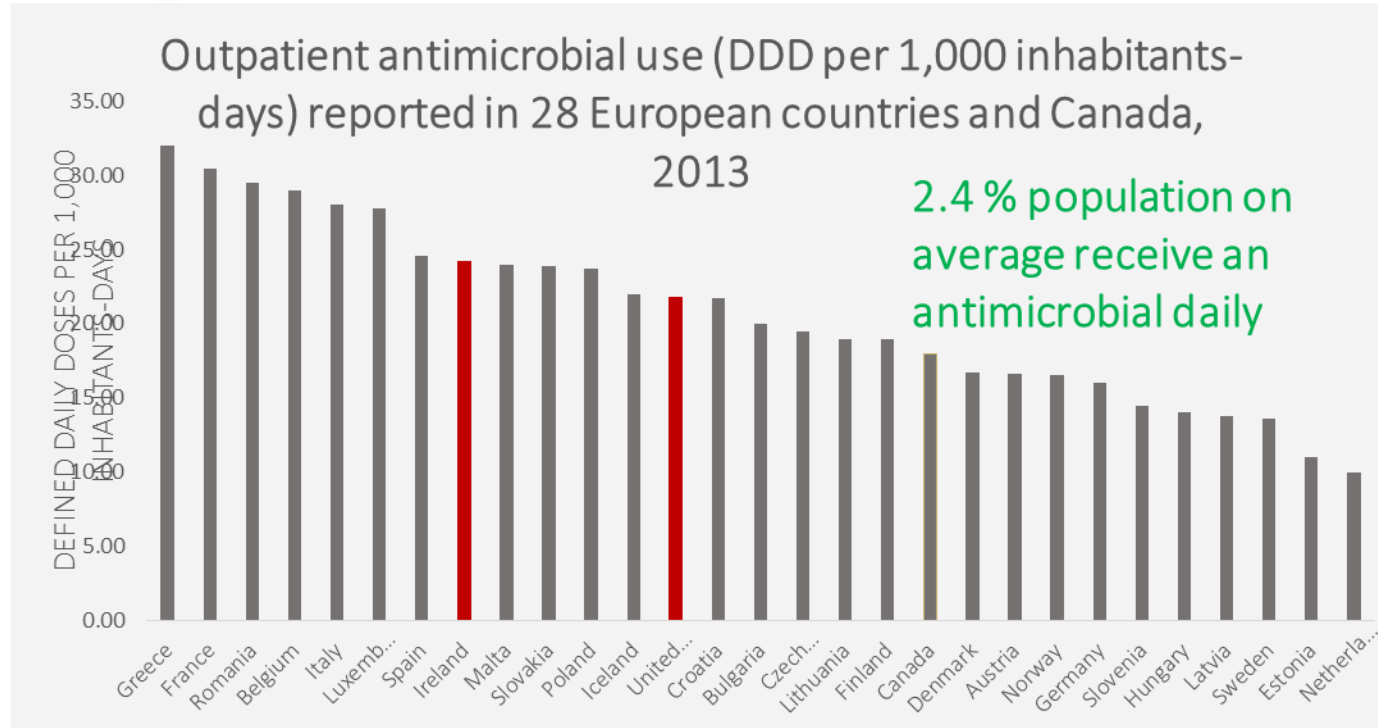
ANTIBIOTIC RESISTANCE : The Biggest Threat to Human Healthcare in the 21st Century

- Over prescribed in humans
- Livestock industry



By 2050

- Global cumulative cost of antibiotic resistance will reach 100 trillion US Dollars
- 10 million people dying every year due to antibiotic resistance

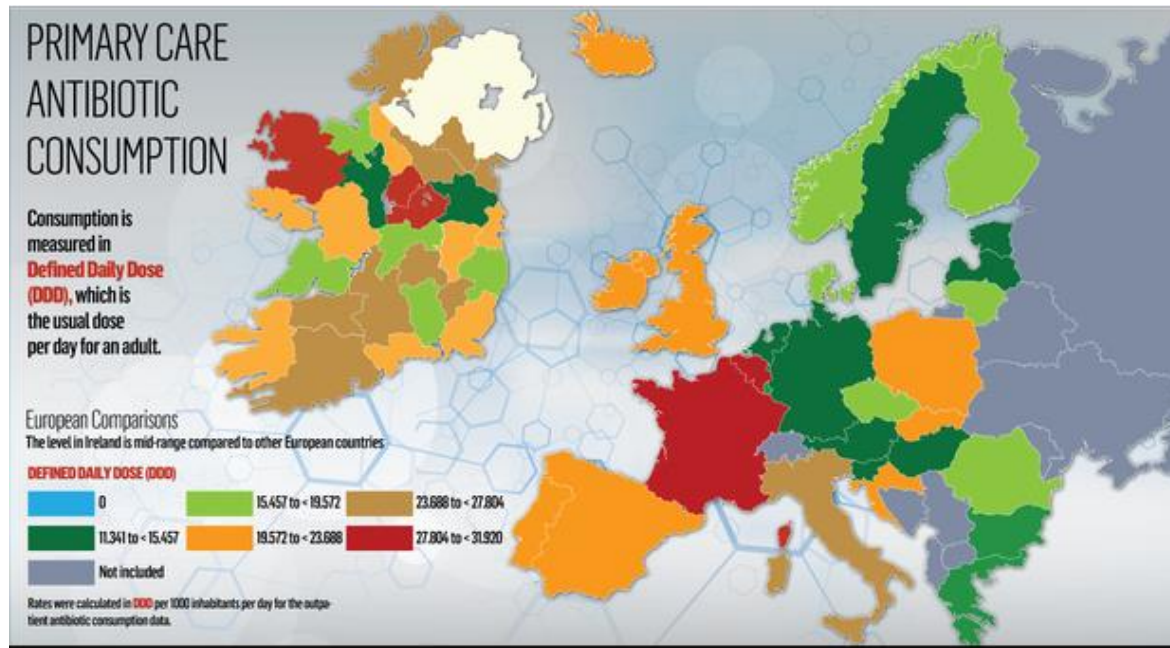


This is equivalent to approximately 5.93 million 7 day courses per year in Ireland

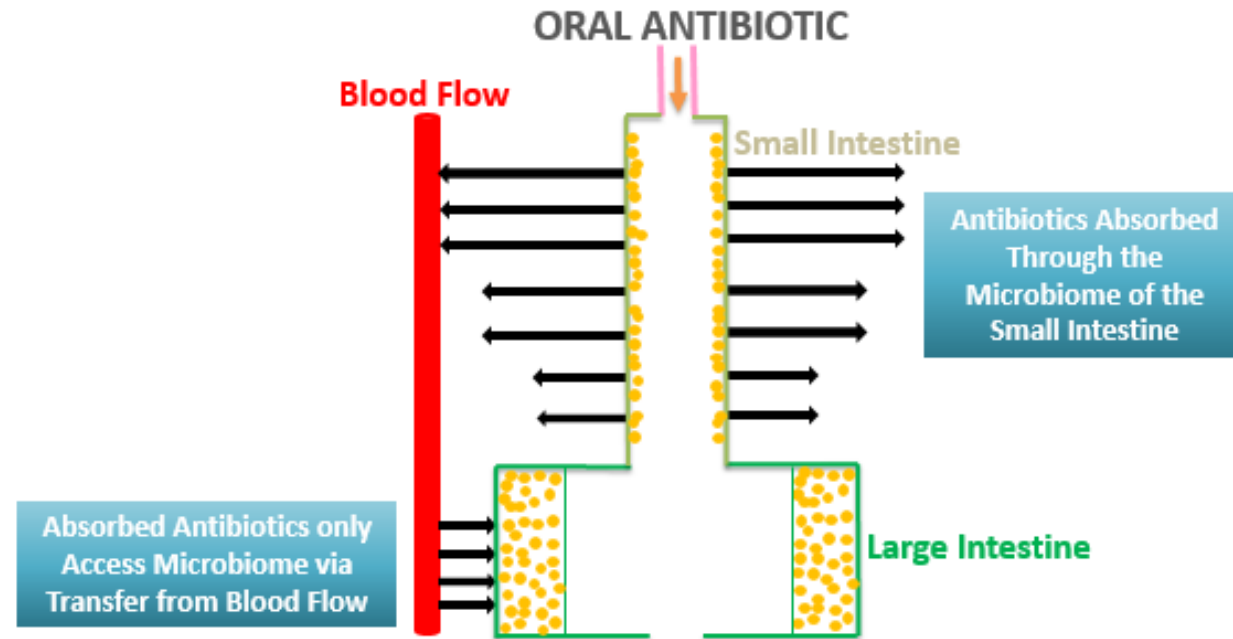
Ireland – Facts and Figures on Antibiotic Use

- The population of Ireland in 2017 is 4.74 million.
- Community antibiotic use is approximately 1.25 courses per person per year in Ireland
- Hospital use is increasing from 2007 to 2012 from 77.2 to 86.0 DDD per 100 bed days – so virtually everybody in hospital gets an antibiotic dose every day.
- ‘Last line’ antibiotic use is on the increase in Irish hospitals.
- Over 90% of all antibiotics are dispensed by pharmacists.
- In Europe 3,700 tonnes of antibiotics used in animal care – almost exactly the same as in human medicine.
- In 2007, 84 tonnes of antibiotics used to treat animals in Ireland.

Antibiotic Use in Ireland is Amongst the Highest in Europe, but Counties Vary Considerably in Prescription Level.



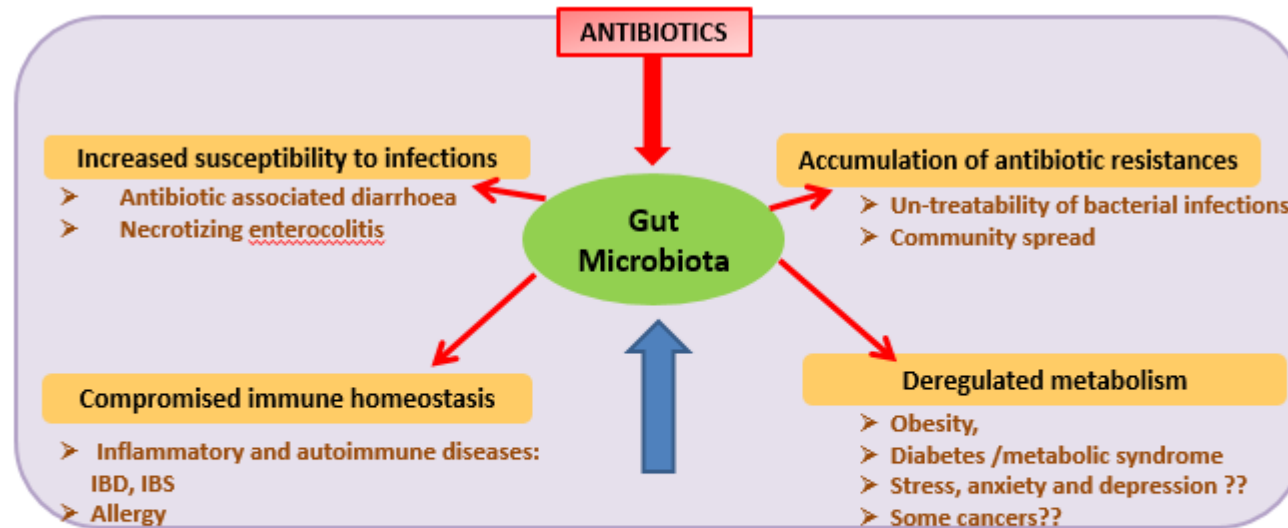
Differential Effects of Antibiotics on the Intestinal Microbiome



Differential Effects of Antibiotics on the Intestinal Microbiome

Antibiotic Administration	Disruption of Microbiome	
	Small Intestine	Large Intestine
Oral Absorbed Antibiotics	High	Low
Oral Non Absorbed Antibiotics	High	High
Intravenous Antibiotics	Moderate	Low

Antibiotic Induced Dysbioses and Potential Disease



Increasingly compelling evidence that **PROBIOTICS** can ameliorate this potential disease risk

(Francino MP 2016, *Front Microbiol* 6: 1543) (Boursi B et al, *Eur J Endocrinol* 2015) (Hallundbaek Mikkelsen K et al, *J Clin Endocrinol Metab* 2015)