

"PASSIVE RESISTANCE"

by Sabrina Giannini

MILENA GABANELLI, IN STUDIO

Good evening. In tonight's episode we have some good news. When you're in debt beyond your means, there's a way out, provided by a law that few know of. Then we'll see the pension contributions paid by journalists and print workers, who manages them and how. But to start, an issue that concerns the world's entire population. In Europe, Italy is one of the countries most affected. By what? Well, just 70 years ago penicillin came about and then all the antibiotics to fight bacteria. In 1948, when Fleming collected his Nobel, he said be careful, don't abuse it or as a weapon it won't work anymore. Little did he know of what would happen, of how they would be overused by physicians, by prescribing them even when they aren't needed. Then there are those we consume through food, without our knowing it, which end up in intensive farms—in the United States even just to fatten the animals, but most of all to treat infections. Take a look here.

SABRINA GIANNINI

You can see a rat trap there. And a rat, there it is. On the animal... two, three. Not bad for a place protected by biosecurity measures. Look here, this is all rat excrement. The dust that's coming out of this... all the animals have severe abrasions. First stall... wounded...wounded...two wounded. I wonder what the European Commission officers were thinking, who considered this place to be compatible with the welfare of the animals, because that's what they called it. Clamoxil, iron.

MILENA GABANELLI, IN STUDIO

We're in the civilised lands of Romagna. In any case, bacteria end up stronger and through slurry end up in the soil, in water and in our plates. This news is fresh from Friday, just two days ago, and it's the latest in a long series. The risk looming over humanity as a whole is that of going back to when a minor infection could be lethal. The difference is that we are informed and we can change direction. The great, lengthy work of Sabrina Giannini. Watch this.

SABRINA GIANNINI, OFF-CAMERA

Sit down to dinner. There's an invisible guest at the table that could render the night an unforgettable one.

SABRINA GIANNINI, OFF-CAMERA

It was with serious delay that German microbiologists discovered that what killed 46 people and seriously harmed the kidneys of another 800 was a toxic Escherichia Coli that had become resistant to treatment. Because inside the intestine of who knows what animal, it had acquired a genetic mutation, giving it the capacity to shield itself against the attack of antibiotics.

STEFANIA STEFANI – PROFESSOR OF MICROBIOLOGY, UNIVERSITY OF CATANIA

I'll give you an example of an intestinal ecosystem, in which lots of similar microbe species live. If one is resistant, it can transfer its resistance to another, which is the pathogen, let's say. Now this means that it is not just mutation but also the horizontal transfer from another species that makes the micro-organism resistant. When a species becomes resistant, if antibiotic comes along it wipes out the entire population susceptible to it and only they survive. And they progressively grow in number.

SABRINA GIANNINI, OFF-CAMERA

Evolutionary theory is applicable also to bacteria. Those that win the battle with antibiotics survive. In this way, the one and a half kilos of bacterial flora in our gut is forced to live side by side with these super-bacteria, which are now everywhere—in the environment and in other animals. More than half of the antibiotics consumed globally are used in intensive farming. So what has happened over the last fifty years in the guts of animals? To find out, the European Commission conducted checks in abattoirs in all 28 member states.

ANTONIO BATTISTI – CENTRE FOR VETERINARY ANTIBIOTIC RESISTANCE

Samples are taken from the intestine, from the cecum to be precise. This year it's chickens.

SABRINA GIANNINI

This year it's chickens?

ANTONIO BATTISTI – CENTRE FOR VETERINARY ANTIBIOTIC RESISTANCE

Decision 652 specifies chicken and turkey in 2014, pork and beef in 2015, chicken and turkey in 2016... alternating every year until 2020.

SABRINA GIANNINI, OFF-CAMERA

Looking at the results of the first set of checks, all that can be said is it's worrying.

ANTONIO BATTISTI – CENTRE FOR VETERINARY ANTIBIOTIC RESISTANCE

We found a high presence of multi-resistant micro-organisms in the intestines and also a high percentage of resistance to antibiotics of critical importance.

SABRINA GIANNINI, OFF-CAMERA

Antibiotics that are fundamental for infections. Those were the findings of checks on more than one thousand chicken and turkey guts in Italian abattoirs. The majority of the bacteria are resistant to antibiotics. The most widespread belong to the Campylobacter species, found in the faeces of seven out of ten chickens. In turkeys, that proportion rises to 90 per cent. Salmonella lives side by side E. Coli, which could transfer its resistant genes to it, given that 81 per cent of the bacteria has acquired a shield against antibiotic attacks. Which is precisely what happened in the German epidemic. At this point it is fundamental to know whether those Coli bacteria contaminate the meat that is slaughtered and thus our kitchens. Soon we will know.

ANTONIO BATTISTI – CENTRE FOR VETERINARY ANTIBIOTIC RESISTANCE

Checks were conducted on retail pork and beef, so when it's on sale in supermarkets. In 2016 we're conducting those checks on poultry.

SABRINA GIANNINI, OFF-CAMERA

The data on contamination levels in meat sold in supermarkets across all of Europe will be released as soon as tomorrow. For now we have only one set of figures, those from British supermarkets.

BRITISH DOCUMENTARY

Invisible to the eye but hidden in three-quarters of the chicken in supermarkets in Great Britain, Campylobacter is the leading cause of food poisoning the United Kingdom. A new report shows that one in eight products have high levels of contamination. Campylobacter in food causes disease in more than 280,000 people a

year, kills at least 100 and costs the economy almost a billion pounds sterling. The regulator maintains that supermarkets must do more to reduce contamination in farms and abattoirs.

SABRINA GIANNINI

Ready for use. Strictly British chicken.

CÓILÍN NUNAN – ALLIANCE TO SAVE OUR ANTIBIOTICS

According to the latest estimates from the University of Liverpool, some 500,000 people per year are infected by *Campylobacter*. *E. Coli* is a huge problem for human health because new antibiotics for these microbes have not been found. It has been 30 years since new ones were discovered, and as a result serious infections are growing year after year.

SABRINA GIANNINI, OFF-CAMERA

Against this invasion of resistant bacteria it is not enough to write on the label, “to be cooked before consumption”. This announcement by the German Ministry of Health goes further, underscoring how in Germany every year hundreds of thousands of people get sick from food, and how what you do before cooking it can be fatal. By touching it and then contaminating cutlery, crockery, plates, tea towels and vegetables that we eat raw—washing them isn’t enough. And your dinner of bacteria is served. After handling meat, hands should be washed carefully and separately from crockery. From the *E. Coli* outbreak in 2011 Germans have learned their lesson. The public service announcement certainly does not invite one to eat. The European Commission—including Germany, a major producer of meat—does not require producers to use a label that could save thousands of lives. And it does nothing to eliminate the cause, namely the overuse of antibiotics. The wheels of politics are too slow to keep up with the rate at which bacteria mutate and clone themselves to survive.

CÓILÍN NUNAN – ALLIANCE TO SAVE OUR ANTIBIOTICS

For our study we purchased British meat from supermarkets and the University of Cambridge analysed it and found *Staphylococcus aureus* on some of the packets of pork. This shows that the bacterium was linked to the farms, especially pork farms, that it can infect people who handle the animals and that it is present in British pigs. But the government won’t test them.

SABRINA GIANNINI, OFF-CAMERA

Nor will ours. That’s why I have taken 30 packets of pork purchased in three Italian supermarkets to be tested at the microbiology lab of the University of Catania, where they specifically study *Staphylococcus aureus*, one of the most dangerous bacteria for humans.

MILENA GABANELLI, IN STUDIO

What hides inside those packets? What we do know is that when eating a steak full of antibiotics, we absorb some too, and that resistant bacteria can end up on the steak, but if we cook it we kill them. But, if you don’t wash your hands and you get infected, an antibiotic might not work. This is true, too, for raw milk and eggs. It doesn’t happen automatically, but it can happen. Then there are bacteria that live on the mucous membranes of animals—they too have become resistant, indeed one farmer in Denmark even lost his life. Which led us to ask, what if they live in or are present on Italian pork? That’s why we took the samples to a laboratory specialised specifically in this type of research. It takes four weeks for the results. In the

meantime, let's go to Denmark to see how they discovered it and what they are doing to defend themselves.

TV NEWS, DENMARK

A record number of people were infected in August, 127 according to experts. The epidemic is out of control.

INFECTED YOUNG MAN

I went to the doctor because I had some spots on my face and the doctor was alarmed when I told him I worked in a pig farm.

HENRIK WESTH – MICROBIOLOGY, HVIDOVRE HOSPITAL

In Denmark, Staphylococcus associated with pigs—CC398—has entered the hospital several times and there have been at least four epidemics.

INFECTED YOUNG MAN

I've lost a lot of hair. The doctor told me to take an antibiotic for eight months, but if I stop taking it, I'll get sick again.

SABRINA GIANNINI, OFF-CAMERA

The infection is hard to treat because antibiotics are not always effective against this strain of Staphylococcus. It's found in the nasal membranes and on the skin. In intensive pig and cattle farms, it has found the perfect conditions to clone itself.

HENRIK WESTH – MICROBIOLOGY, HVIDOVRE HOSPITAL

What has happened is that the pigs were treated with an antibiotic, and it has to be said that breeders have given animals a lot of antibiotics, really a lot, and the bacteria have become resistant, adapting to the bodies of the pigs. After that they were able to move back to humans and now they provoke infections, especially where there are many livestock farms.

SABRINA GIANNINI, OFF-CAMERA

But the clone spread from the farms and at that point the Danish were alarmed.

HENRIK WESTH – MICROBIOLOGY, HVIDOVRE HOSPITAL

Five people died from an infection of Staphylococcus associated with pigs, but none of them worked with animals.

SABRINA GIANNINI, OFF-CAMERA

How they were infected, nobody knows. But it cannot be excluded that the contagion came from meat.

HENRIK WESTH – MICROBIOLOGY, HVIDOVRE HOSPITAL

Two studies have found the bacterium in 20 per cent of Danish meat. The percentage is growing. It's found especially in bacon.

SABRINA GIANNINI, OFF-CAMERA

Seeing that a lot of Danish meat is exported, a British journalist tested 100 packets of pork sold in supermarkets around the United Kingdom. The bacterium was present in 10 per cent of the samples.

FIONA HARVEY – THE GUARDIAN

Eight were Danish; one was Irish. This is a very significant figure. It's quite shocking.

NILS MULVAD – JOURNALIST

We have gone from 20 per cent to 70 per cent of livestock farms that are infected. If the government had acted immediately it would have contained the epidemic.

SABRINA GIANNINI, OFF-CAMERA

For years, the journalist Nils Mulvad asked the government for a list of the livestock farms in which pigs tested positive to the bacterium. When he found and published the names of some of the farms with infected pigs, he was charged with breach of privacy.

NILS MULVAD – JOURNALIST

We first asked for the list in 2012 and we received it one month ago. It took us four years. Now we are trying to understand how the bacterium spreads where there are no livestock farms.

DANISH BREEDER

I followed all the instructions, wearing an extra pair of socks, washing my hands with disinfectant when I go in and when I come out.

POUL BÆKBO – VETERINARIAN, SEGES PIG RESEARCH CENTRE, COPENHAGEN

Our association informed breeders as early as 2007 that they risked infection and that they had to be careful and inform their doctors that they worked with pigs; that they could become infected with this strain of Staphylococcus and should be careful out of respect for themselves, their families and their friends.

DANISH BREEDER

We had the pigs tested again in 2015 and they were found positive to Staphylococcus. They took a swab from my throat and nose to see if I had it, too, and they found it in me.

SABRINA GIANNINI

But can pigs or their meat which are positive to Staphylococcus be exported or are there restrictions?

POUL BÆKBO – VETERINARIAN, SEGES PIG RESEARCH CENTRE, COPENHAGEN

No, no restrictions in Europe.

DANISH BREEDER

These here weigh 100kg and are ready to go to slaughter.

SABRINA GIANNINI

So they can get this big is so little time? In three months?

DANISH BREEDER

Yes.

SABRINA GIANNINI

In your view do we have this Staphylococcus strain in our pig farms, too?

POUL BÆKBO – VETERINARIAN, SEGES PIG RESEARCH CENTRE, COPENHAGEN

Of course. Checks were conducted in farms in all the countries of the European Union in 2008.

SABRINA GIANNINI, OFF-CAMERA

Those checks found that Italy, together with Germany and Spain, had the highest rate of the pig-associated Staphylococcus clone in livestock farms. That was in 2008. In the meantime it has spread in Denmark, and probably here, too, but our health authorities aren't interested.

PALMINO PEDRONI – MICROBIOLOGY, MANERBIO HOSPITAL (BS)

He was working on a cattle farm—not pigs but cattle.

SABRINA GIANNINI

That's rather interesting.

PALMINO PEDRONI – MICROBIOLOGY, MANERBIO HOSPITAL (BS)

It's clearly documented that this Staphylococcus strain is in livestock farms. If we hadn't been on the ball—the intensive care specialist, the infectious diseases specialist...

SABRINA GIANNINI

What would it have been taken for?

PALMINO PEDRONI – MICROBIOLOGY, MANERBIO HOSPITAL (BS)

It would have been taken for normal Staphylococcus. It still happens today in many hospitals—it's Staphylococcus and that's it... Staphylococcus is treated like this.

SABRINA GIANNINI, OFF-CAMERA

Dr Pedroni requested a DNA test from the National Institute of Health. The researcher took interest in the case and published it in a scientific journal, then widened the study by asking for analyses of other patients infected with Staphylococcus. That investigation of twenty patients found that one had been infected by a farm bacterium.

PALMINO PEDRONI – MICROBIOLOGY, MANERBIO HOSPITAL (BS)

The other hospitals involved did not or could not produce data and so we were the only ones to have originated the study published by Dr Monaco and Dr Pantosti from the National Institute of Health.

SABRINA GIANNINI

This prevalence of CC398 in Italy stopped here, substantially?

PALMINO PEDRONI – MICROBIOLOGY, MANERBIO HOSPITAL (BS)

I don't have... we didn't conduct other investigations, also because I was told, "don't send us any more. If you send us one every now and then out of curiosity, because the case is interesting, that's okay, but if you send me ten a month..."

SABRINA GIANNINI

Ten a month, you don't have ten a month, do you?

PALMINO PEDRONI – MICROBIOLOGY, MANERBIO HOSPITAL (BS)

Of Staphylococcus, of MRSA, I have them every month.

SABRINA GIANNINI

Ah, you have them...

PALMINO PEDRONI – MICROBIOLOGY, MANERBIO HOSPITAL (BS)

So it would be useful to see what type it is...

SABRINA GIANNINI, OFF-CAMERA

Presumably we have the right to know why the National Institute of Health isn't interested, but the president refused to be interviewed. It would also be useful to test the breeders, a nasal swab would suffice—useful especially for them.

SABRINA GIANNINI

Help me out here. You didn't know about this strain of Staphylococcus that pigs can transmit, especially to people who live in close contact with pigs—you breeders and veterinarians, for instance? This is the first time you've heard of it? In Denmark, for instance, the pig breeders' association is...

BREEDER

Even if they had told us, if they tell us, what difference would it make? Are we meant to quit breeding?

DANISH BREEDER

It's nice when you go to hospital and they know what medicines you need.

HENRIK WESTH – MICROBIOLOGY, HVIDOVRE HOSPITAL

In Denmark, all the major breeders have been informed of the risk of pig-associated Staphylococcus. At the moment not all livestock farms are screened so we don't know if they have been colonized, but there is a high risk that they have been. As such, when they come into hospital they're put in isolation.

SABRINA GIANNINI

For instance, by getting this close to this little piglet here, could I be infected?

STEFANIA STEFANI – PROFESSOR OF MICROBIOLOGY, UNIVERSITY OF CATANIA

You touched its nose so probably yes, but maybe not. If the piglets are colonized, the breeder is colonized, but they have no clinical sign of infection.

SABRINA GIANNINI, OFF-CAMERA

Here in Italy, the cloned pig-associated bacterium spreads undisturbed on meat. After four weeks we finally have the results of the DNA tests on the thirty packets of pork. One had the MRSA CC398 bacterium, and it had been farmed in Italy. It's the first case and it may not be the only one, and it only emerged because we went and asked for the analyses. The Dutch discovered it 12 years ago.

DUTCH MAN

We changed the way we thought about it after seeing what happened to our Eveline. It was all the fault of the antibiotics I used. Twelve years ago, Eveline had to have heart surgery, but after the analyses they told us they couldn't operate because she was colonized by Staphylococcus. They feared for her health, but also that she might infect the other patients. Only after a DNA test of the bacterium, the microbiologist

discovered that it came from my sheds. After that they tested all five of us in the family and four of us had been colonized.

HEIMAN WERTHEIM – MICROBIOLOGY, RADBOUD UNIVERSITY

If a patient needs to be operated and he has Staphylococcus, including the kind transmitted by pigs, he has to be decolonized. For the little girl who had to have heart surgery, the risk of infection after the operation would have been higher.

SABRINA GIANNINI

Dutch authorities didn't cover up the affair, did they?

DUTCH BREEDER

When my story ended up on television, they said to us breeders, "You have to use fewer antibiotics."

SABRINA GIANNINI, OFF-CAMERA

In its livestock farms, the Netherlands used more antibiotics than any other European country, but in 2010 it took the drastic decision of reducing the antibiotics by 70 per cent.

HETTY VAN BEERS – DIRECTOR, VETERINARY MEDICINES AUTHORITY

The quantities are shown here: we have dropped from 600,000 to 200,000 tonnes. It was decided to reduce them by 20 per cent in 2011, by 50 per cent in 2013 and in 2015 by 70 per cent, which is what we did.

DICK HEEDERIK – EPIDEMIOLOGIST, VETERINARY MEDICINES AUTHORITY

What happened was that the bacterium was quite comfortable among pigs and calves, these are the main groups of animals. Due to a series of genetic mutations, however, it's less comfortable in people, and that's why there isn't much transmission between humans, but this, of course, could change in the future.

We have a complete picture these days. Our last checks found that Staphylococcus colonizes 60–70 per cent of livestock farms.

HETTY VAN BEERS – DIRECTOR, VETERINARY MEDICINES AUTHORITY

For breeders of pigs or other animals, in the past it was much less expensive to use antibiotics rather than improve farm conditions to keep the livestock healthy. In the Netherlands, antibiotics are not very expensive.

SABRINA GIANNINI

Even though this is an intensive farm, right?

HETTY VAN BEERS – DIRECTOR, VETERINARY MEDICINES AUTHORITY

What you see is an intensive farm, but an organic one. This means, as you can see, that the livestock can go out, something which in other intensive farms in the Netherlands does not happen. Differently to other countries in the European Union, our breeders keep the sows in groups and they can't shut them up in individual stalls.

SABRINA GIANNINI

Eric, after all you have done, why haven't you adopted more natural breeding techniques?

ERIC VAN DEN HEUVEL – PIG BREEDER

The problem, or not the problem but rather the challenge is this: if consumers are willing to pay for a piece of organic meat, we would all be happy to adopt organic breeding methods, there's no doubt about it.

SABRINA GIANNINI

Bio-secured area... We have to watch out for rats. Maybe that was the security system to be protected. You can see a rat trap there. A rat... there it is, there it is... On the animal... two, three. Not bad for a place protected by biosecurity measures. Look here, this is all rat excrement. The dust that's coming out of this... all the animals have severe abrasions. First stall... wounded...wounded...two wounded. I wonder what the European Commission officers were thinking, who considered this place to be compatible with the welfare of the animals, because that's what they called it. Clamoxil, iron.

MILENA GABANELLI, IN STUDIO

So, we saw at the start a biosecurity farm, which doesn't mean an organic farm, but the set of measures and precautions adopted to minimise the risks posed to the environment, human health and animal health. Now, we're certainly not shocked by a few rats—we all know we can find them in our own henhouses in the countryside, but who exactly owns this wonderful farm in the Romagna region? We'll see that after the commercial break.

COMMERCIAL BREAK

MILENA GABANELLI, IN STUDIO

We're back. So, there's at least one thing we have in common with chickens, turkeys, pigs and cows: we take the same antibiotics. And by eating meat from intensive farming, we can get our fill. There is a choice, however, because fortunately other things are out there. Italy exports its culinary culture around the world; it is renowned for the variety of its agricultural products and there is excellence to be found in all segments. So an alternative exists, it's just less advertised, because investing in image is expensive and only the big names can afford it, and they create lots of jobs. Even the big names can be examples of excellence. But then you see something like this and the least you can hope for is that it's an isolated case.

SABRINA GIANNINI, OFF-CAMERA

This pig farm belongs to Amadori. The company replied with an abrupt "no" to our request to visit some of their facilities, chosen by us. The association "Essere Animali" had reported breaches of hygiene and welfare regulations; we wanted to check for ourselves. You can see them here. Amadori has its headquarters in Romagna. From above, it looks like council housing, but inside there are thousands of chickens that reach the end of their lives barely able to stand up. Without medicines mixed with water, none of this would be possible. During the break for night-time loading for the abattoir, the staff are hardly respectful. We don't know if this is permitted by so-called animal welfare regulations... or whether you can urinate inside the farm area! These images are miles and miles away from the Made in Italy advertising that largely comes from intensive farming—30 million animals bred, on the one hand, 1300 tonnes of antibiotics, on the other. One of the highest consumption rates in Europe. A business worth a total €32 billion per year for the production of meat and processed goods, plus the turnover made by pharmaceutical companies. Two kingdoms that together make an empire, in whose hands our Health Minister leaves the sceptre. There are no electronic scripts here to trace the use of veterinary medicines.

ILARIA PROIETTI

Why did you decline an interview with Report?

BEATRICE LORENZIN – HEALTH MINISTER

Look... I honestly don't know. We can do it another time.

SABRINA GIANNINI, OFF-CAMERA

In a report commissioned by the British government, the economist and politician Jim O'Neill and infective diseases specialist Jeremy Farrar predict the possibility of a pandemic that by 2050 would lead to infections becoming the leading cause of death in the world, ahead of cancer.

SABRINA GIANNINI

Lord O'Neill, aren't you being rather apocalyptic?

JIM O'NEILL – CHAIRMAN, AMR REVIEW

What we published in the report may seem alarming and apocalyptic, yet we believe it is quite true. We were asked to find solutions for a serious threat to global health and I believe it is a good thing that you find it alarming, because a world without antibiotics would be really very frightening.

SABRINA GIANNINI, OFF-CAMERA

Emerging countries should be frightened most, because the majority of those ten million deaths per year would be there, with 400,000 in Europe. But the economist theorises an economic crisis that would affect everybody, with an impact on world GDP of \$100,000 billion.

JIM O'NEILL – CHAIRMAN, AMR REVIEW

There's a reason why the figures are so high. China, India and many other emerging countries won't have the slightest chance of reaching their expected robust economic potential if they do not help play an essential role in resolving the crisis.

JEREMY FARRAR – DIRECTOR, WELLCOME TRUST

According to the data in my possession, in all of Europe some 25–30,000 people die every year due to infections that are resistant to drugs.

SABRINA GIANNINI, OFF-CAMERA

Among the urgent measures suggested by the report there is the reduction of antibiotics used in farming, because that's where 70 per cent of all the antibiotics manufactured in the world are used.

JEREMY FARRAR – DIRECTOR, WELLCOME TRUST

I think our goal should be a world in which the antibiotics used by humans are separated from those used for animals, but it will take many years before we achieve this. I think in upcoming years we will find it incredible that we used the same antibiotics for pigs and for humans. In twenty years' time, our children will laugh at the mere idea and wonder how we could have ever thought of allowing such a thing.

JIM O'NEILL – CHAIRMAN, AMR REVIEW

Countries generally defined as Mediterranean, such as Italy, but also Greece and, to some extent, France, will have to face challenges much bigger than in countries in northern Europe. Great Britain is perhaps in the middle, probably a little bit closer to northern European countries than to the Mediterranean. In any case, a central part of

the issue appears to be the overuse of antibiotics in some parts of Mediterranean Europe.

BARACK OBAMA – PRESIDENT OF THE UNITED STATES

Hand me the file. So, we have a problem. It's a very serious public health problem. Some of you will have read something about it and heard something about it recently. Drug-resistant bacteria are one of the most serious public health problems that we are faced with today. We're talking about thousands of deaths, millions of sick people — and that's just in the United States. The numbers will grow for sure, unless we act in a clear, concrete and coordinated way.

MILENA GABANELLI, IN STUDIO

Obama has set up a task force and put up a lot of money, because the United States beats all the negative records. At least, he's trying, but he is unlikely to succeed in imposing a reduction in the use of antibiotics in intensive farming as it would mean overhauling the farming system itself. In short, what the future promises doesn't look good, with deaths each year from infections of super-bugs exceeding deaths from tumours, which are 8.2 million. Estimates show the situation in Italy to amount to 5000 deaths per year due to ineffective antibiotics, which are ineffective because we ingest them unknowingly with food but mostly because we take a lot of them to treat illnesses. In Europe we are among the countries that use the most antibiotics. A report by the Italian Medicines Agency shows that in Italy there are many differences between the north and south—in Liguria, for instance, 16.2 doses are taken per day per 1000 inhabitants; 14 doses in the Province of Bolzano; 19 in Lombardy; 20 in Emilia-Romagna; 30.3 in Puglia; 28.4 in Calabria; 32.7 in Campania. One would think that in the south, where the climate is milder, there would be fewer cases of bronchitis. Unless they're infections—that is, antibiotics are used more because there are more infections in hospitals. So, faced with this planet-wide emergency, what's our action plan? What's being done to defeat the epidemics of infections acquired in hospitals, because that's the real problem. Where they are transmitted from one patient to another. One of the most dangerous is *Staphylococcus aureus*. The laboratory we're heading back to is studying it in an effort to fight it.

SABRINA GIANNINI

Who sends them to you?

STEFANIA STEFANI – PROFESSOR OF MICROBIOLOGY, UNIVERSITY OF CATANIA

These come from an Italian study, which includes sixty clinical microbiology labs in Italy.

SABRINA GIANNINI

Why do they send them to you?

STEFANIA STEFANI – PROFESSOR OF MICROBIOLOGY, UNIVERSITY OF CATANIA

They sent them to me because I've been studying *Staphylococcus aureus* for a long time. In the Italian study I was at the centre for the standardization of the study of antibiotic resistance and *Staphylococcus aureus*. That Italian study revealed that *Staphylococcus aureus* was such as to provoke 11 per cent of all hospital infections—and it wasn't the leading micro-organism.

SABRINA GIANNINI

Of course, we know that Klebsiella is much nastier. You have conducted leading research, which has also been published in leading journals. Have you requested funding to implement your research?

STEFANIA STEFANI – PROFESSOR OF MICROBIOLOGY, UNIVERSITY OF CATANIA

Yes, I have requested funding.

SABRINA GIANNINI

And did you receive any?

STEFANIA STEFANI – PROFESSOR OF MICROBIOLOGY, UNIVERSITY OF CATANIA

Often from the private sector.

SABRINA GIANNINI

But did you request public funding? From the ministry...?

STEFANIA STEFANI – PROFESSOR OF MICROBIOLOGY, UNIVERSITY OF CATANIA

It's difficult to find the programmes. The problem here is finding funding programmes that selectively, let's say, focus on issues concerning resistance research.

SABRINA GIANNINI

You mean, there aren't any.

STEFANIA STEFANI – PROFESSOR OF MICROBIOLOGY, UNIVERSITY OF CATANIA

Well, they're harder to find...

SABRINA GIANNINI, OFF-CAMERA

Added to which is the lack of a centre of reference for doctors and microbiologists, left at the mercy of bacterial invasion.

BEATRICE LORENZIN – HEALTH MINISTER

Do you want to ask me a question?

ILARIA PROIETTI

I did want to ask a question. We wanted specifically to ask why Italy still doesn't have a centre of reference for antibiotic resistance.

BEATRICE LORENZIN – HEALTH MINISTER

Well, in reality we are working very hard on antibiotic resistance; it's one of our cardinal points.

SABRINA GIANNINI, OFF-CAMERA

But there is a centre of reference for zootechnics and for food. So?

ILARIA PROIETTI

There is a centre of reference for the veterinary sector, but not one for human studies.

BEATRICE LORENZIN – HEALTH MINISTER

Because the issue has been addressed on two levels. As concerns the animal sector, for the drastic reduction of the use of antibiotics in the food that we consume, from farming through to, let's say, when it gets to our tables to be eaten.

SABRINA GIANNINI, OFF-CAMERA

Which isn't really working, though. In fact, we use more antibiotics than anybody else and without electronic scripts. So, this centre of reference?

BEATRICE LORENZIN – HEALTH MINISTER

It's on the agenda, as part of a wide-ranging policy on antibiotic resistance, which unfortunately is the leading cause of death in hospitals around the world, not just in our country.

SABRINA GIANNINI, OFF-CAMERA

Especially in our country, where, epidemic after epidemic, we live alongside lethal bacteria, both outside but especially inside our hospitals.

VOICE-OVER

It may have been a lethal bacterium that killed eight people.

Fourteen deaths in six months.

Concerns are growing in Brindisi over hospital-acquired infections.

Six deaths.

Eight suspicious deaths in San Giovanni Hospital.

Klebsiella pneumoniae: the bacterium has claimed the lives of another two patients at San Martino-IST hospital. Prosecutors are investigating.

The situation is completely under control. Both the ward and the entire facility have been completely rehabilitated.

STEFANIA STEFANI – PROFESSOR OF MICROBIOLOGY, UNIVERSITY OF CATANIA

Italy is in the red, along with Portugal, Greece and other Eastern European countries... we're at the same level as Eastern Europe. It's pandemic here, resistance has reached problem levels. Bacteria colonize humans; humans move, so just think of transferring patients from one region to another, from one hospital to another. There's no barrier against antibiotic-resistant micro-organisms, especially. Hence it certainly requires a global strategy, or a broader one at least, let's say nation-wide.

SABRINA GIANNINI

Is this a health-care emergency, in your view?

STEFANIA STEFANI – PROFESSOR OF MICROBIOLOGY, UNIVERSITY OF CATANIA

Resistance? Yes, absolutely.

SABRINA GIANNINI

I'm not sure you perceive it as an emergency...

LOREDANO GIORNI – SENIOR MANAGER, PHARMACEUTICALS DEPT., PIEDMONT REGION

No, it's an emergency; it is an emergency.

VITTORIO DEMICHELI – EPIDEMIOLOGIST, SENIOR MANAGER, HEALTH DEPT., PIEDMONT REGION

Absolutely. I don't think... the last reports I remember seeing on antibiotic resistance were those done in Tuscany and Emilia. I've never seen, for instance, a nation-wide report.

SABRINA GIANNINI

Is that so? So in practice at the national level the ministry doesn't know...

VITTORIO DEMICHELI – EPIDEMIOLOGIST, SENIOR MANAGER, HEALTH DEPT., PIEDMONT REGION

Which are the strains. It knows those of a few hospitals, or a few...

SABRINA GIANNINI

Which send them in voluntarily.

VITTORIO DEMICHELI – EPIDEMIOLOGIST, SENIOR MANAGER, HEALTH DEPT., PIEDMONT REGION

Exactly.

SABRINA GIANNINI

Because if they chose not to send them in...?

VITTORIO DEMICHELI – EPIDEMIOLOGIST, SENIOR MANAGER, HEALTH DEPT., PIEDMONT REGION

On that, let's say...

SABRINA GIANNINI

You can bet on it...

VITTORIO DEMICHELI – EPIDEMIOLOGIST, SENIOR MANAGER, HEALTH DEPT., PIEDMONT REGION

You can bet on it.

SABRINA GIANNINI

Something that at the national level still hasn't been done, i.e. coordinating all the local realities.

GUALTIERO RICCIARDI – PRESIDENT, NATIONAL INSTITUTE OF HEALTH

Because unfortunately the constitution doesn't allow it. These are organisational-management aspects—I know it sounds strange, and the constitution assigns them to the regions.

SABRINA GIANNINI

You mean, here the government has no such obligations? Because that's the point. I was told it was a matter for you, for the regions.

VITTORIO DEMICHELI – EPIDEMIOLOGIST, SENIOR MANAGER, HEALTH DEPT., PIEDMONT REGION

That's absolute rubbish, in the sense that...

LOREDANO GIORNI – SENIOR MANAGER, PHARMACEUTICALS DEPT., PIEDMONT REGION

You must be joking! Sorry, but do you really think that antibiotic resistance stops here at the Po and goes no further? You've got to be joking! This here is a problem of

general scope. You have to talk about the LEA, whether you follow them or don't follow them, things like that, and then they go and tell me that a problem like that is a regional matter?

SABRINA GIANNINI, OFF-CAMERA

And so, without any barriers, the bacterium that has become the scourge of hospital patients crossed our borders in 2007 and in just a few years has spread across the entire peninsula. Is it an epidemic?

CLAUDIO VISCOLI – SENIOR CLINICIAN, INFECTIOUS DISEASES, SAN MARTINO HOSPITAL, GENOA

A patient involved in a road accident in Greece was admitted to hospital in Pietra Ligure. In Pietra Ligure they had a small epidemic in Intensive Care. We could have responded perhaps immediately, earlier, without waiting for individual doctors to realise—us infectious diseases specialists, for instance, who went around the wards and began to see these resistant germs. That's when we said, "Guys, something's not right here."

SABRINA GIANNINI, OFF-CAMERA

The ministry limited itself to writing a simple circular, but late, when everybody was already aware of the problem.

SABRINA GIANNINI

Here, in 2013, here it is. So it was in 2013 that the ministry first...

CLAUDIO VISCOLI – SENIOR CLINICIAN, INFECTIOUS DISEASES, SAN MARTINO HOSPITAL, GENOA

First started doing something.

SABRINA GIANNINI

...It did something...

CLAUDIO VISCOLI – SENIOR CLINICIAN, INFECTIOUS DISEASES, SAN MARTINO HOSPITAL, GENOA

But we had already started one year earlier.

SABRINA GIANNINI

You had already started. Because the problem already existed a year earlier. The problem existed in 2007.

CLAUDIO VISCOLI – SENIOR CLINICIAN, INFECTIOUS DISEASES, SAN MARTINO HOSPITAL, GENOA

Because the region... the first to make a move was Emilia-Romagna and then us, I believe, at the same time.

SABRINA GIANNINI

When did you start, first of all, to monitor it?

MARIA LUISA MORO – DIRECTOR, HEALTH AGENCY, EMILIA-ROMAGNA

Monitoring in 2003. But in 2003, at the beginning not all the laboratories did it. Whereas since 2007, more or less, there all the laboratories.

SABRINA GIANNINI, OFF-CAMERA

This is the surveillance. It's what the Health Ministry should be doing across all of Italy. The guidelines were prepared by Maria Luisa Moro, head of the health department of Emilia-Romagna. The first of the many objectives of her plan is to minimise contagion, hence infections acquired in hospital. Here's an example.

LORENA BONI

The doctors, the orthopaedic surgeons told me straight away that I had caught something in the operating theatre in Tunis.

SABRINA GIANNINI, OFF-CAMERA

Ms Boni came back from Tunisia, a miraculous survivor of the Islamist terrorist attack on the Bardo Museum, with four bullets less to her name, but one bacterium more.

SABRINA GIANNINI

Was it the Foreign Office that phoned your family?

LORENA BONI

Yes.

SABRINA GIANNINI

And they told your children that...

LORENA BONI

I was dead.

SABRINA GIANNINI

Instead, you survived not only a terrorist attack but also...

LORENA BONI

Also something else.

SABRINA GIANNINI

Something else that was invisible...

LORENA BONI

Exactly.

SABRINA GIANNINI

And it wasn't a bullet...

LORENA BONI

But it also caused a lot of problems, too. Klebsiella, which they treated with loads and loads of antibiotics which practically devastated me because I couldn't eat anymore. And until the bacteria were eradicated, I ran the risk of them not being able to perform the final operation, in short. The Thursday after the operation, after I had arrived in Baggiovara, my family, to enter the ward, had to wear white coats and gloves, and even the nurses—there were three or four in particular—even when they just took my blood pressure, they would then hang up their things and wash their hands.

MARIO SARTI – SENIOR CLINICIAN, MICROBIOLOGY, BAGGIOVARA HOSPITAL, MODENA

In a year we perform on average 30,000 cultures as part of the surveillance programme. Now you can see the light there flashing. Positive cultures have been found this very moment.

SABRINA GIANNINI, OFF-CAMERA

Taking swabs from people means isolating them before they infect other patients, then the infectious risk team gets together to prevent those colonized and the infected from infecting others. They decide whether isolation is needed, but also what action to take to make the best use of antibiotics.

MARIO SARTI – SENIOR CLINICIAN, MICROBIOLOGY, BAGGIOVARA HOSPITAL, MODENA

So, as you can see this time we have two cases of *Klebsiella pneumoniae*.

SABRINA GIANNINI, OFF-CAMERA

Even in desperate cases like this. The rings you see correspond to the various antibiotics available on the market. The white part is the bacterium culture that lies there indifferent, even around the ring. No antibiotic can kill it. This is a strain of *Klebsiella* and this is the antibiotic resistance that is increasingly being seen in Italian labs.

SABRINA GIANNINI

Where have you seen the most radical change that has happened?

MARIA LUISA MORO – DIRECTOR, HEALTH AGENCY, EMILIA-ROMAGNA

In children—20 per cent less antibiotics; in infections in surgery. surveillance and improvement programmes have led to a 29 per cent drop in infections. There has been a slowdown and a turnaround in *Klebsiella*. So we can achieve results.

SABRINA GIANNINI

What more is needed?

MARIA LUISA MORO – DIRECTOR, HEALTH AGENCY, EMILIA-ROMAGNA

A lot of work.

PHYSICIAN

These are colonies of micro-organisms that grow in our hands.

SABRINA GIANNINI

How many times should you wash your hands during a shift?

GRAZIA ANTONELLA TURA – HEAD OF INFECTIOUS RISK, INFIRMI HOSPITAL, RIMINI

In Intensive Care it can be as much as sixty or seventy times at least in a shift.

SABRINA GIANNINI

How many times do you wash your hands a day?

PHYSICIAN

Thirty to forty.

SABRINA GIANNINI, OFF-CAMERA

Yet every day in Italy, and not only at San Martino in Genoa, you can enter hospital for treatment but die of an infection.

MARIA PETRETTO – SISTER OF GIANFRANCO

I went to the morgue and came across the relative of a patient who was there at the same time, a long-term patient, there with my brother, and he told me his father had died the day after. That's when it clicked. In the end even he, the boy's father, had died of septicaemia.

SABRINA GIANNINI

When was your father admitted to hospital and when was he discharged?

MAURO SPINETTA – SON OF GIORGIO

He was admitted the first week of September, when we returned from the countryside and took him to emergency. Then they moved him here after two days and later he went into Intensive Care for a fortnight. He died on November 1st.

SABRINA GIANNINI

What was he admitted for?

MAURO SPINETTA – SON OF GIORGIO

He was admitted for a kidney stone.

SABRINA GIANNINI

Just a kidney stone...

MAURO SPINETTA – SON OF GIORGIO

Yes, a kidney stone.

SABRINA GIANNINI

And where did he catch the infection? Do you remember the bacterium?

MAURO SPINETTA – SON OF GIORGIO

Klebsiella.

SABRINA GIANNINI

It was Klebsiella?

MAURO SPINETTA – SON OF GIORGIO

Yes.

MARIA PETRETTO – SISTER OF GIANFRANCO

My brother was 47 years old. He was admitted for pneumonia and was discharged in a coffin with septicaemia.

SABRINA GIANNINI

Bearing in mind the report of the expert you commissioned and the coroner's report, was the cause of death established?

MARIA PETRETTO – SISTER OF GIANFRANCO

Yes, septicaemia, but because the tip of the central venous catheter was infected.

SABRINA GIANNINI, OFF-CAMERA

We don't know what the coroner will decide—whether or not infection could have been prevented by the simplest of gestures. What we do know is that to be given an award by the World Health Organisation, the Rimini hospital has saved many lives.

MARIA LUISA MORO – DIRECTOR, HEALTH AGENCY, EMILIA-ROMAGNA

The two areas in which we have perhaps been most effective are in paediatrics for sure, because we did a lot of work there.

FRANCO MAZZINI – PAEDIATRICIAN, SAN MAURO PASCOLI (FC)

Now for my magic wand... a big "ah"... poke your tongue out. Well done, you did really well. See? A red line. Negative means that you don't have the negative bacterium, Streptococcus, so there's no need for an antibiotic.

SABRINA GIANNINI

Which means it is...?

FRANCO MAZZINI – PAEDIATRICIAN, SAN MAURO PASCOLI (FC)

It's viral, a viral illness. The fever will last a few days and then go away on its own. They know that when we recommend waiting, they know we are trying to make the best decision for their children.

SABRINA GIANNINI

Don't they get anxious?

FRANCO MAZZINI – PAEDIATRICIAN, SAN MAURO PASCOLI (FC)

Our job is also to handle anxiety, to settle and reassure it.

MARIA LUISA MORO – DIRECTOR, HEALTH AGENCY, EMILIA-ROMAGNA

To convince paediatricians, too, that this approach had countless advantages. We decided that the rapid test was the most convenient, for the community as a whole and for the economy.

SABRINA GIANNINI, OFF-CAMERA

The Dutch hold the European record for using the least antibiotics for humans—a cultural issue but also a practical one. Prescriptions are not given to patients, but doctors send them directly to the pharmacy, that way there's no risk of them being used when they aren't needed. Treatment is calibrated and there's no risk of abuse because it's the doctor who decides how many tablets go into the box. In the Netherlands, the pharmacist opens the box and inserts the exact number of tablets. It's a lot more work for pharmacists—maybe that's why it isn't done in Italy...

JAAP VAN DISSEL –DIRECTOR, CENTRE FOR INFECTIOUS DISEASES, THE NETHERLANDS

We have guidelines for operators in the sector. Inspections are also conducted in hospitals to check how they operate. The inspection reports are public.

SABRINA GIANNINI

How is it possible that Italy is so red and you are so green?

JAAP VAN DISSEL –DIRECTOR, CENTRE FOR INFECTIOUS DISEASES, THE NETHERLANDS

From the map you can see that the countries in red, those around the Mediterranean Sea, have a lot more resistant bacteria than northern countries such as the

Netherlands and the Scandinavian countries. One of the most determinant factors is that in these countries more antibiotics are consumed per capita across the population.

SABRINA GIANNINI

Do pharmaceutical reps come to you in your practice?

HENNEKE BLANKSMA – PHYSICIAN, THE NETHERLANDS

I don't receive them in my practice. At university they teach us that we shouldn't receive representatives that propose experimental drugs on behalf of the companies they work for. As a physician I have to follow guidelines and I certainly have no need for new products and information that serves their commercial interests. I can assure you that I don't know a single physician who receives pharmaceutical representatives. I don't know if that's the reason for the drastic drop in antibiotics in the Netherlands since 2007. Maybe it's the culture. No esteem is shown for colleagues who receive pharmaceutical representatives.

SABRINA GIANNINI

By the way, I'd like to ask, if it's not an invasion of your privacy, whether you have children...

HENNEKE BLANKSMA – PHYSICIAN, THE NETHERLANDS

I have three children. I gave one an antibiotic only once, because he had pneumonia. They're eight, seven and three years old—they're little. We don't use the swab that identifies only Streptococcus, but a device that is able to identify several bacteria and determine whether the infection is viral or bacterial. The result is given in three minutes. I don't do it often with children, only in extreme cases, because we have to jab them.

LOREDANO GIORNI – SENIOR MANAGER, PHARMACEUTICALS DEPT., PIEDMONT REGION

If we take twenty physicians, the most virtuous, and compare those who prescribe less with those who prescribe most, there's a difference of 200 per cent. There must be... somebody must wonder if it's true that Puglia spends... that there are 30 DDD per thousand inhabitants while in Liguria there are 11.15, or something like that... somebody must wonder whether the system actually works. Pharmaceutical representatives that visit physicians are paid on the basis of results and the results are sales. If the pharmaceuticals industry invested in research just a part of what they invest in marketing...

VITTORIO DEMICHELI – EPIDEMIOLOGIST, SENIOR MANAGER, HEALTH DEPT., PIEDMONT REGION

There must be a reason for it.

LOREDANO GIORNI – SENIOR MANAGER, PHARMACEUTICALS DEPT., PIEDMONT REGION

...it's all research. I'm surprised that you're surprised that this then happens. I think I expected worse.

SABRINA GIANNINI, OFF-CAMERA

The president of the National Institute of Health seems to find it more important to promote a convention giving a multinational a stage to advertise its new antibiotics.

SABRINA GIANNINI

I wanted to ask, but isn't MSD a pharmaceuticals company?

GUALTIERO RICCIARDI – PRESIDENT, NATIONAL INSTITUTE OF HEALTH

Yes.

SABRINA GIANNINI

But to have an event like this sponsored...

GUALTIERO RICCIARDI – PRESIDENT, NATIONAL INSTITUTE OF HEALTH

It's not sponsored!

SABRINA GIANNINI

But it's written there, "with the unconditional contribution".

GUALTIERO RICCIARDI – PRESIDENT, NATIONAL INSTITUTE OF HEALTH

Exactly.

SABRINA GIANNINI

Doesn't "contribution" mean that they give money?

GUALTIERO RICCIARDI – PRESIDENT, NATIONAL INSTITUTE OF HEALTH

No, it means that at most they give funding for the catering...

SABRINA GIANNINI

To pay the staff...

GUALTIERO RICCIARDI – PRESIDENT, NATIONAL INSTITUTE OF HEALTH

But it doesn't influence the content in the slightest. The content is decided by us.

MILENA GABANELLI, IN STUDIO

Substantially speaking, the approach being taken is that of finding new antibiotics. But since it's not very profitable as a drug, the pharmaceutical companies stopped their research years ago, which is why governments are now thinking of subsidising them. New drugs are, of course, needed, they're highly useful, but the president of the National Institute of Health surely knows that if the new drugs are not used properly, in a few years' time they'll become ineffective. We use too many and improperly. Our health authorities should therefore act, first of all, to change the things that don't work, for example, reducing their overuse in paediatrics, in the population and in farming, where checks are few and far between. As for us, a few things that we can do are to watch what we eat, wash our hands after touching meat, not take antibiotics of our own initiative and insist that doctors perform in-depth health checks.