

BRI PRESENTS...

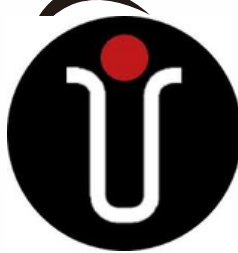
**AMR - THE SILENT
PANDEMIC**

**AUGUST
2025**



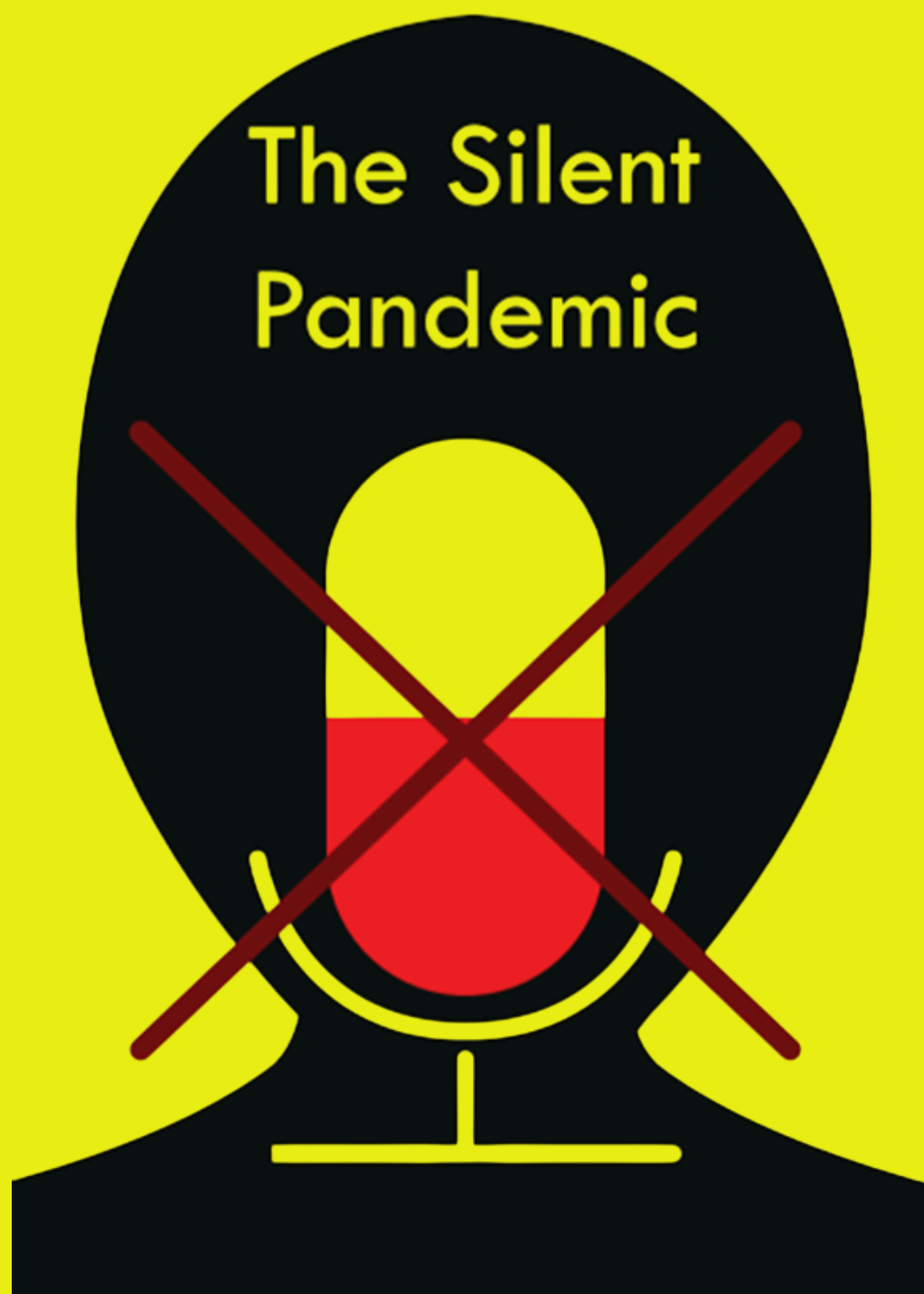
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at Liverpool Life
Sciences UTC and The
Studio School
Liverpool



A Special Edition of the BRI Journal raising awareness of Antimicrobial Resistance (AMR)

Editor's Foreword



This is a special edition of the Baltic Research Journal focussing on our work around anti microbial resistance. The primary aim of this edition is to continue raising awareness about the ignored “Silent Pandemic”. The “comic-book” style of this edition is to appeal to a younger audience who we are hoping to engage in the issue of AMR.

Over the past year we have worked on how we can best increase awareness of AMR particularly amongst young people. This is a culmination of all our research and the events we have attended. We know that the most efficient way to educate is through youth engagement and teaching the future generations how to combat AMR.

Through an industry insight day we allowed the students at the UTC and Studio schools to find solutions to AMR utilising their own skills and subject interests.

We hope you enjoy this special edition of the Journal and we look forward to hearing any feedback or any opportunities to collaborate on future projects.



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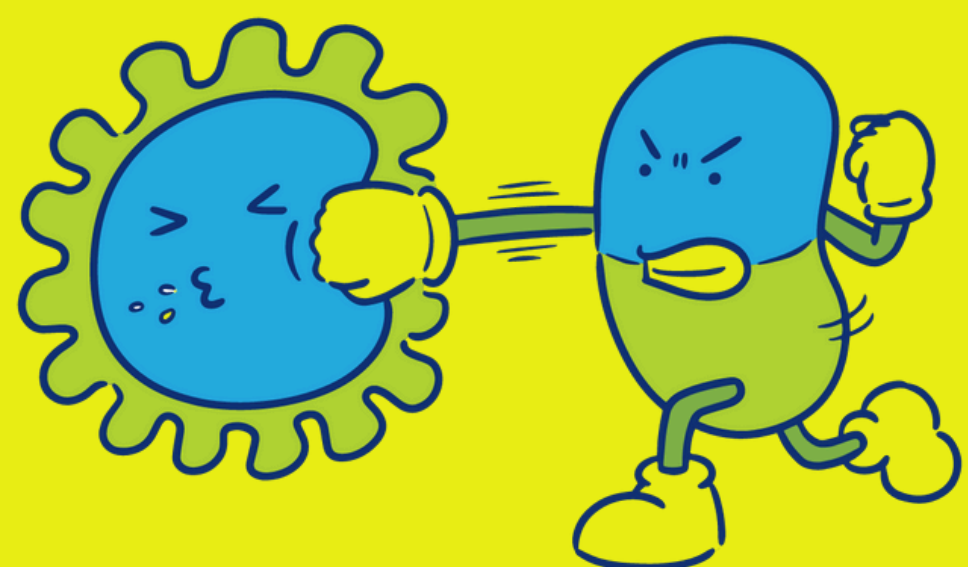
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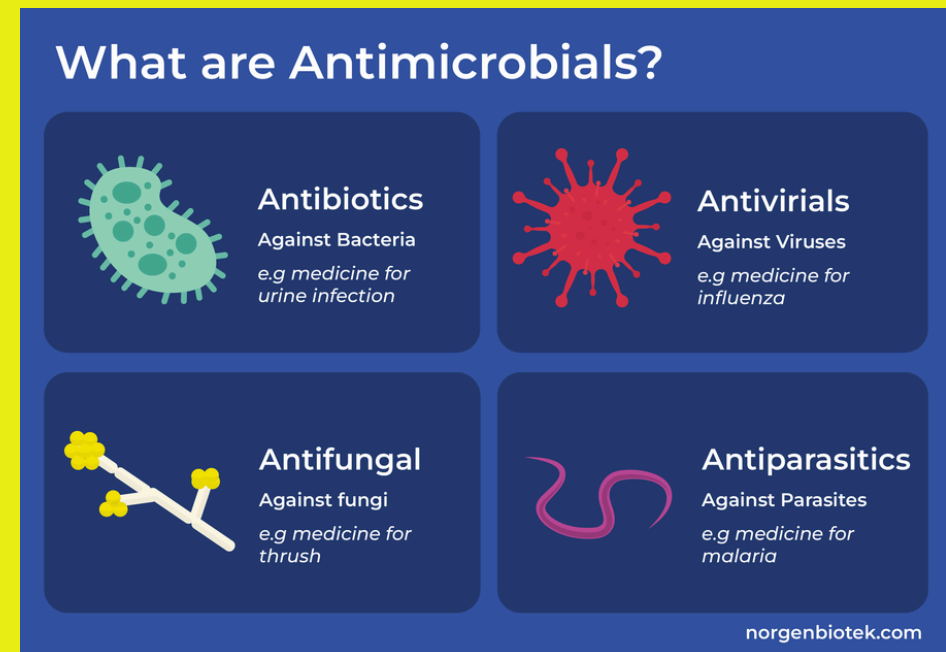
What is Antimicrobial Resistance (AMR)?

The World Health Organisation defines AMR as microorganisms such as bacteria, viruses, fungi, and parasites evolving to resist the effects of medications that once killed them or inhibited their growth. These drug resistant infections impact the health of animals and plants, while reducing rural productivity; therefore, threatening food security. AMR occurs when pathogens undergo adaptive evolutionary changes that enable them to withstand antimicrobials. People or animals who encounter resistant pathogens may then suffer infections that can't be treated. The pathogens survive, patients get sicker and may die, the cost of medical care rises, and disease continues to spread.



Figure 1. Projected deaths and cost of AMR by 2050. Public Health England (2015). Health matters: antimicrobial resistance. [online] GOV.UK. Available at: <https://www.gov.uk/government/publications/health-matters-antimicrobial-resistance/health-matters-antimicrobial-resistance>.

Figure 1 clearly shows how AMR could be the next global health crisis, but AMR is already one of the top global public health threats increasing the morbidity and mortality rates. The increased difficulty to treat some of these infections is causing more people to suffer from prolonged illnesses, disabilities, and death. It is estimated that bacterial AMR was responsible for 1.27 million global deaths in 2019 and that overall AMR contributed to 4.95 million deaths. This number is expected to increase to over 10 million deaths per year globally in 2050.



AMR is also responsible for the increase in cost for healthcare. This is due to treatment for resistant infections requiring more money for the following: longer hospital stays, and more intensive care. Therefore increasing the overall healthcare cost. These longer hospital stays could affect people's ability to work or care for others which will affect productivity. The overall cumulative effect has placed a substantial economic burden on national economies costing the global economy \$66 billion per year.

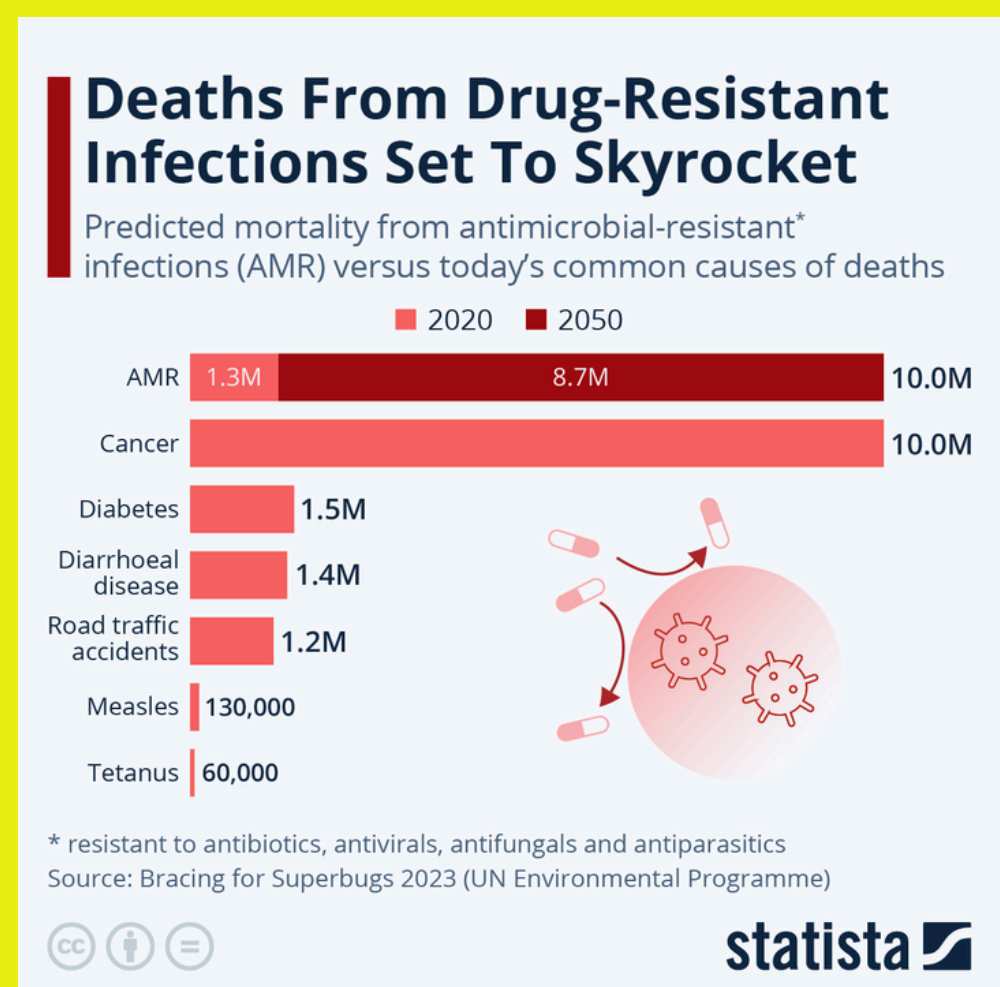


Figure 2. AMR deaths versus other diseases Anna Fleck (2015). Infographic: Deaths From Drug-Resistant Infections Set To Skyrocket. [online] Statista Infographics. Available at: <https://www.statista.com/chart/3095/drug-resistant-infections/>.

With AMR already causing so many deaths and costing us so much, it is clear that we need to do more to prevent further catastrophic global consequences.

BY AVA KNOWLES

The Causes of AMR

Antimicrobial resistance (or AMR) is a direct result of gene mutations within a bacterial population. Resistant bacteria have genes that make antibiotics less effective against them. These bacteria carrying resistant genes are more likely to survive and reproduce, causing the resistant gene to become more common within the entire population. There are many human factors that contribute to the spread and frequency of the resistant strains of pathogenic bacteria.

The most commonly known cause of AMR increasing, and arguably the easiest to correct, is individuals not completing a full course of antibiotics. Antibiotics work by either killing bacteria or preventing them from reproducing. However, if a course is not complete, the less resistant bacteria will be killed whilst the more resistant bacteria will survive and continue to reproduce without competition. Taking a full course of antibiotics makes it more likely that all bacteria are eradicated.

Another cause in regard to antibiotics is the overuse and overprescription of them. It is becoming increasingly more common for antibiotics to be prescribed for unnecessary reasons. This is mostly due to lack of knowledge surrounding the topic, for example some people are unaware that antibiotics do not work on viruses, and will push for prescription, even when they are unsuitable, such as having the flu. Moreover, the misuse of antibiotics can contribute to AMR. This could be taking someone else's medicine, stopping treatment early, or taking an incorrect dosage (e.g. taking 2 tablets instead of 1 with the premonition this will "speed up" the healing process).



Overuse of antibiotics in livestock is becoming increasingly concerning due to its contribution to resistant bacteria that are contractible by humans. Although antibiotics can be beneficial for treating diseases in livestock, many farmers also use them as a preventative measure which is largely unregulated by some governments. Antibiotics can be used in animals to promote faster growth and prevent fatalities, however this overuse exposes lots of human contractible bacteria to antibiotics, therefore increasing their resistance. These bacteria are then transferred to humans either via food or direct contact.

Hygiene is a key factor in the rate of AMR growth. If everyone practises good hygiene, especially hand hygiene, this will reduce the need for antibiotics. When hygiene is poor, bacteria thrive and can easily spread across contaminated surfaces. In hospitals, hygiene is especially important, as microbes are rife and it is the most likely place to contract disease. Preventative measures can be made by everyone so that overprescription of antibiotics does not occur which will remove the selection pressure that causes an increase in AMR.

BY THOMAS DAVIES

What Can You Do To Help?

Having the understanding of how to reduce the increase of AMR on a personal level is key to reducing the spread of resistance and avoiding the associated costs. Some of these suggestions may seem logical, but if everyone was doing them we wouldn't be facing such an issue. One of the main drivers of AMR is the overuse and misuse of antibiotics. Many people take antibiotics for viral infections like the common cold or flu, even though antibiotics are ineffective against viruses. To combat this, only take antibiotics when they're prescribed, follow the full course of the treatment (even if you feel better before it's finished), and don't use leftover prescriptions.

Preventing infections in the first place reduces the need for antibiotics giving less opportunity for resistance to develop. By improving personal hygiene and sanitation infections are less likely to occur. Washing your hands regularly before eating food and ensuring good hygiene during food preparation is all helpful in stopping the transmission of infection. Staying up to date with vaccinations which protect against infections that might otherwise require antibiotic treatment is also important.

Antibiotics are widely used in livestock and agriculture, often to promote growth or prevent disease in healthy animals. This contributes significantly to the global AMR problem. By supporting responsible use of antibiotics in agriculture you are lessening the increase of AMR.

Some ways you can help are: choose products from farms or suppliers that use antibiotics responsibly, support regulations that limit the use of antibiotics in animal farming to only when medically necessary. Finally, consume less meat, or choose organic or antibiotic-free options where possible.

Finally, staying informed and educating others is critical to reducing AMR. An increased public awareness means more people will take measures against AMR as they understand the threat it poses to humanity. By learning about AMR from credible sources such as WHO or the NHS you can share their data and information with others, influencing them to make the right choices. Whilst sharing information with family and friends is a good step to take, advocating for widespread change through policy and investment in new antibiotics, vaccines and diagnostic tools is most important to seeing a large-scale improvement.

Antimicrobial resistance is a global problem, but every person has a role to play in combating it. Through responsible antibiotic use, good hygiene practices, informed food choices, and community awareness, we can help preserve the effectiveness of life-saving medicines. By taking action today, we can protect ourselves, our families, and future generations from the devastating impact of untreatable infections.

BY AVA KNOWLES



1. Stay healthy

Ok, so we cannot always keep from getting sick. But you can look after your health. That means washing your hands, practising good hygiene, such as closing your mouth when sneezing and using protection during sexual intercourse. Importantly, get vaccinated against all **vaccine-preventable diseases**, such as tuberculosis, diphtheria, tetanus, pertussis, Haemophilus influenzae type B, cholera, typhoid, and Streptococcus pneumoniae.



2. Be medicine smart!

Got a headache? Got a stomach bug? Before you reach for the antimicrobial pill packet or buy them from the market, stop and think: If I take this without a prescription, will it stop working for me when I need it most? Similarly, if you have coronavirus symptoms, you must not take antibiotics because there is currently no effective treatment and you could put your life and the lives of your loved ones at

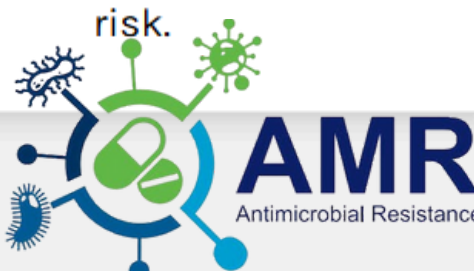


3. Get talking!

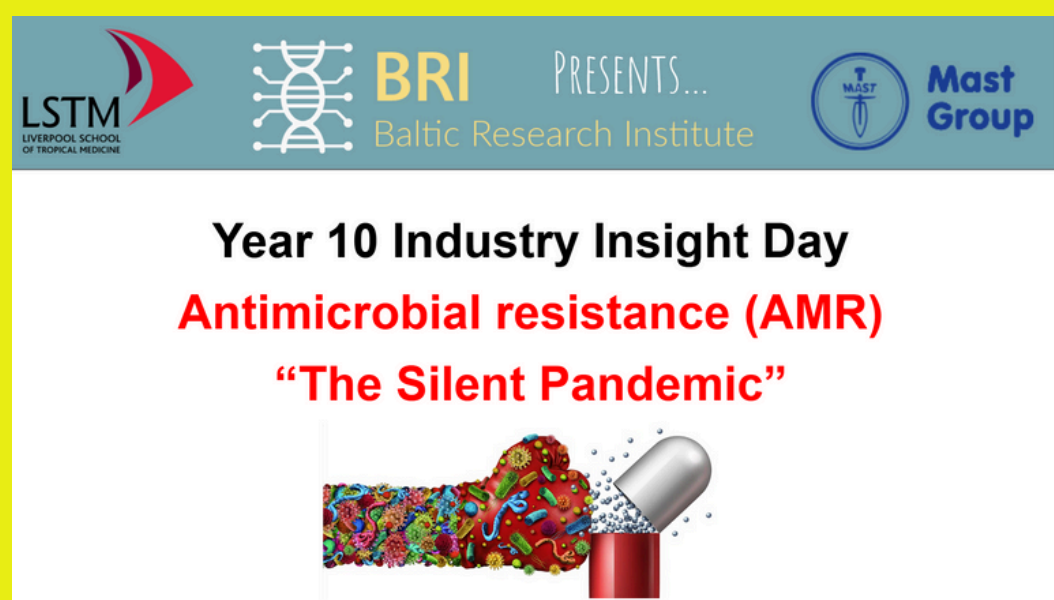
You can help spread the word so that more and more of us resist the resistance and protect against AMR. Tell your friends, tell your family – even tell your doctor!



World Health Organization



AMR – Silent Pandemic Day



On Thursday 10th July 2025 all year 10 students at Liverpool Life Sciences UTC and The Studio School, Liverpool took part in an Industry Insight Day themed on AMR - The Silent Pandemic.

This special day was designed by John Dyer and subject specialist staff at our two schools with support from the Baltic Research Institute (BRI) team of year 12 students and two of the school's key industry partners, Liverpool School of Tropical Medicine (LSTM) and MAST group.

Over 200 students aged 14 -15 spent a full day learning about the problem of AMR and working on their own solutions to raise awareness of AMR.



We started off with two fascinating talks from two of the school's industry partners. Charlotte Hemingway from Liverpool School of Tropical Medicine is part of LSTM's ReCITE Community-led Research for Health Equity team and spoke about the importance of engaging communities in healthcare and ways to do this.



Rebecca Booth who is the Uri and Media development manager from Mast Group Ltd gave an excellent introduction to antimicrobial misuse and MASTs history with antimicrobial products. These insights were really useful for the year 10 students as they designed their own strategies.



The following pages of this section of the journal summarise the six different challenges that different groups of students completed on the day. These were:

- **Storytellers** - create a short story for young people aged 7-11 to engage them in AMR.
- **Illustrators** - create a range of illustrations for a short story or comic book to engage 7-11 year olds in AMR.
- **Game Developers** - design and develop a computer game to raise awareness of AMR to young people.
- **Engineers** - Design a new train carriage to reduce the spread of AMR on public transport.
- **Data Analysts** - Analyse complex data on AMR and present it in a visually engaging way.
- **Primary Outreach** - Develop and deliver a range of practical activities to engage primary school students.

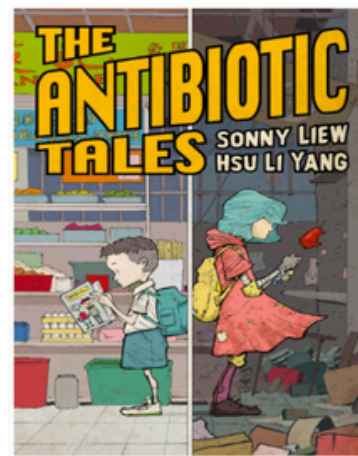
At the end of the day we had a range of amazing ideas and solutions presented by our talented students, including:

- Beautifully illustrated comic book ideas, children's stories and original computer games to engage young people in AMR.
- Incredible redesigned train carriages to reduce the transmission of resistant pathogens.
- Infographics and data analysis of large data sets using Microsoft Power Bi.
- Primary Engagement Activities designed and actually delivered to local Primary School students by our own year 10s.

Storytellers

Example structure

- Character gets sick
- Character takes antibiotics
- Sickness didn't require antibiotics
- Character recovers
- Character gets sick again
- Character takes antibiotics
- Character becomes very ill because of AMR
- Character learns lessons of AMR and next time they become sick try different methods of healing
- How is this plot cyclical? This plot is cyclical because...



BRI

Baltic Research Institute



Mast Group

The story tellers were given the challenge of taking their English skills and creating a short children's story to simply explain the issue of antimicrobial resistance to a younger audience in an interesting way. Throughout this task they have developed an extensive understanding of how AMR will become detrimental to society and how it is already changing the basis of how medicine works. Most crucially the groups have also been learning how they can help stop the increase of AMR and been working this into their stories.

Story telling is a way for students who are not as interested in science to still help spread the message about the dangers of AMR. Arguably, for scientists to successfully share their knowledge, story telling is crucial and could be the key in solving AMR. By making the story of antimicrobial resistance entertaining, the information is more likely to be retained and shared, especially for the younger generations who are the key.

A special thanks to Joe Corner and Andrew McKenzie for helping to design and run this challenge

The winners of the story tellers group created a short script which they performed in front of children who came for the primary outreach part of the day. The winning group said they've made their story about tonsillitis so it is relevant to young children who often suffer with tonsillitis. Also, different types of tonsillitis can be caused by either viruses or less commonly bacteria. This means diagnosing the correct type is important as antibiotics will only work against the bacterial form.

The winning group also suggested that their play could be taken by the younger children and performed by them so they could inform their friends and the rest of their school. The interactive nature of their product kept the story exciting for young children who might find a regular story boring, ultimately helping the children to better understand AMR.

Another group of story tellers said that by making the story short it helps to keep the story focussed on the real issue of AMR and can help with a child's short attention span. The activity really highlighted the importance of language in getting the message across.

BY AVA KNOWLES

Illustrators



The illustrators were given the opportunity to incorporate their artistic skills and create either a comic or a storyboard explaining the issues surrounding antimicrobial resistance aimed at a younger audience. Throughout the day their knowledge surrounding AMR has developed, as well as their understanding of how AMR is caused as well as how to help prevent it. Illustrating is a way for those who aren't as interested in the life sciences route to help spread the message about antimicrobial resistance and the danger it poses to society.

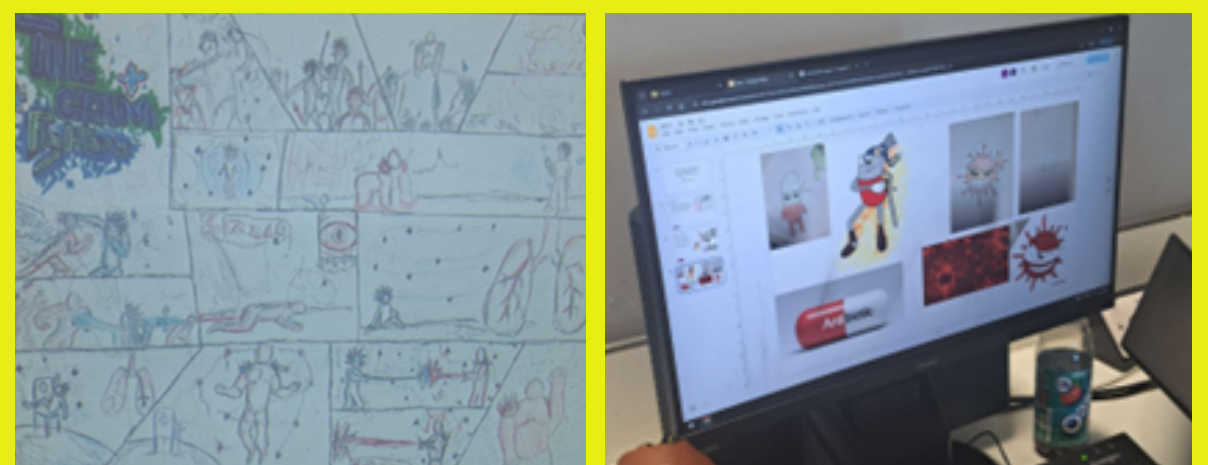


The illustrators were given the options to either write their own story to illustrate or to choose from the 3 given stories. These consisted of: 'The Germ Fighters', 'The Health Power-Up Game', and 'The Healing Race'. Out of the six groups, five of them chose storyline one with a few groups choosing to use this storyline as inspiration for their own. Along with these stories, each person was given a specific role to help guide the illustrations. The roles were: Lead Illustrator, who is in charge of making sure everything goes as planned; Environment Developer; Character Developer; and Storyboard Developer.

A special thanks to Clare Cameron and Andrew Storey for helping to design and run this challenge



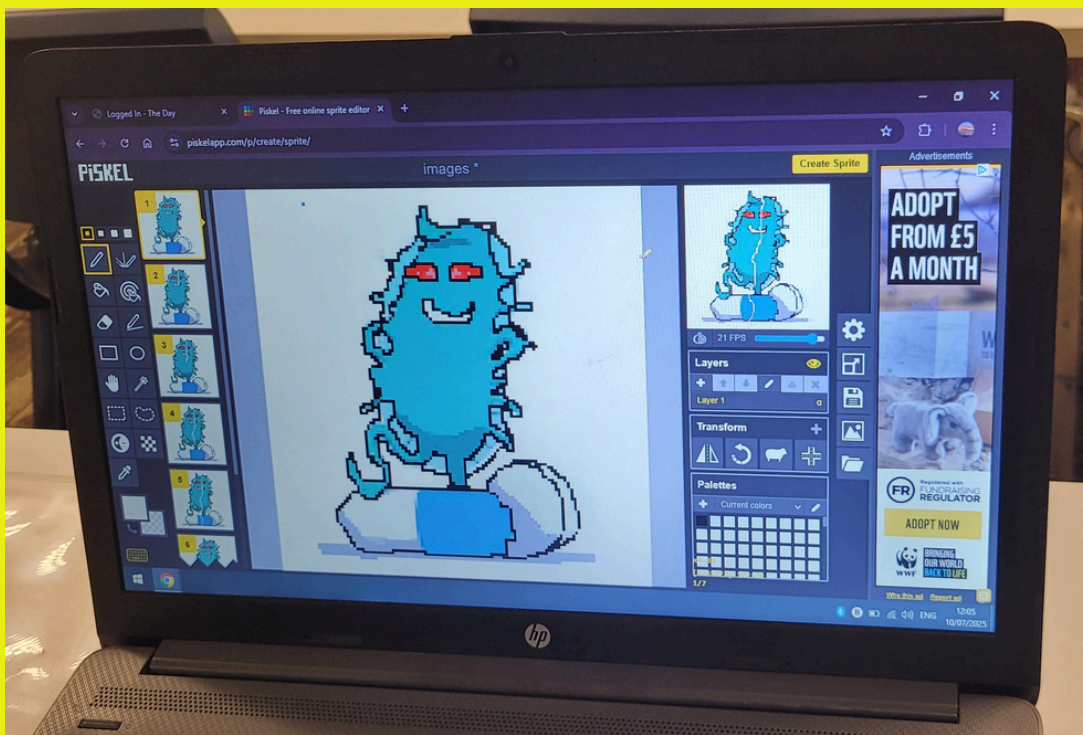
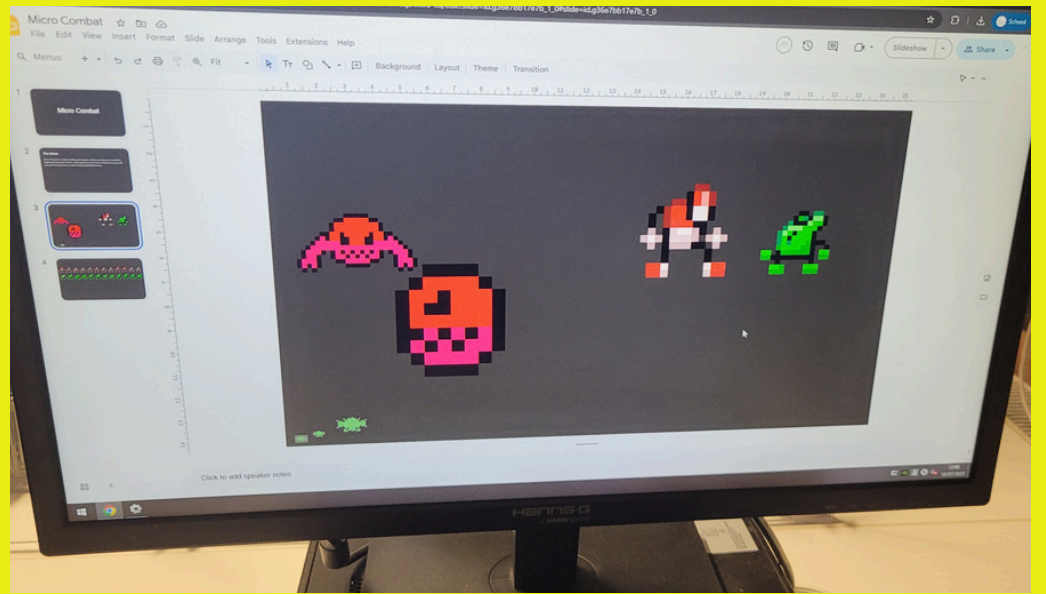
After the group's presentations the overall winners for Claire's class was "Samurai Pill and Super Bacteria". This is about a child who gets cornered by three bacteria until the antibiotic, 'Samurai Pill' comes along and helps defend the child, but then more and more bacteria arrive. Due to the amount of bacteria and their increased resistance the Samurai Pill is defeated. Andy's class winner was "The Germ Fighters". This story depicts a massive battle between the good and the bad germs when the main villain, Pneumonia, evades the body's defences, the hero, Antibiotics, fight the villain resulting in the defeat of pneumonia. However the antibiotics are stopped too soon which allows a mutated version of pneumonia to invade causing a more severe illness. So the overall message is to take the full course of antibiotics so that we don't leave resistant strains.



Both of the teachers said that their own knowledge of AMR had improved as a result of the silent pandemic day. Along with the teachers, the student's knowledge surrounding AMR had greatly increased as most of the group had very little knowledge of AMR at the start. So this just shows how important it is to carry on doing these days with similar topics to spread important messages. We now plan to turn some of these ideas into a published comic.

BY THOMAS DAVIES

Game Developers

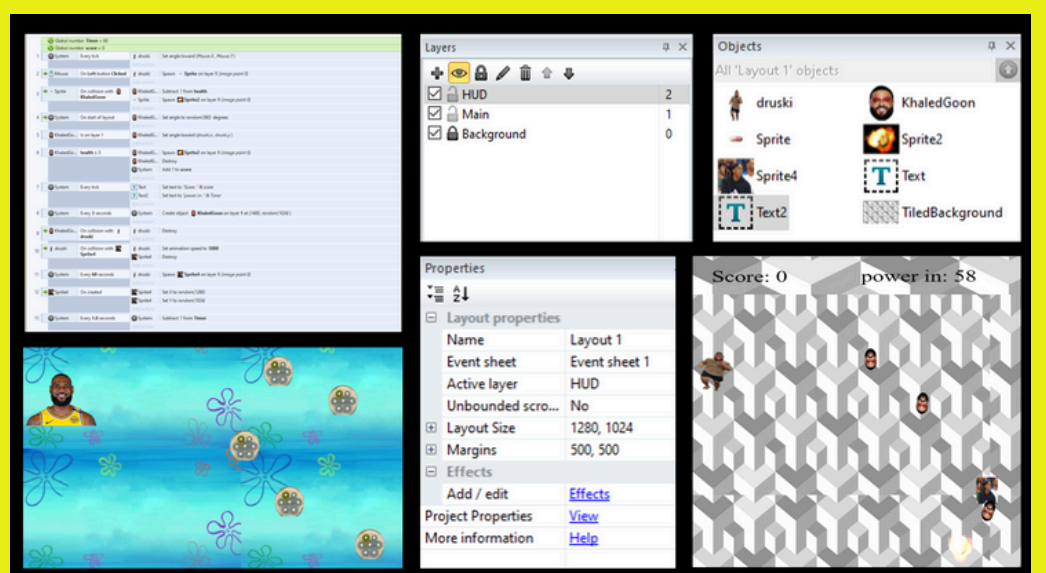


We were looking at creating characters & animations to put into a videogame to help engage 7-11 year olds in the UK. The students have been using a combination of technical tools to help develop our amazing ideas. This will help engage young people in a format they are familiar with higher levels of engagement than any other medium (music, video, text).

We started with a quick session about what are the main things in a game and after lots of different thoughts about graphics, story, challenge, etc. we all agreed it was all about fun!

The students started off getting used to the various software and then thinking about their ideas around AMR. We started using a 2D game engine to develop some ideas and also used an online art tool called Piskel so students could develop characters, storyboards, etc. Overall we had some great ideas for our games with some students even producing playable demos of a game in less than 1 day. The artists in the group really worked hard to produce some amazing designs for their characters all based on the theme of AMR and focussed on the younger age groups.

A special thanks to Enda Carey and Nathan Gorton for helping to design and run this challenge

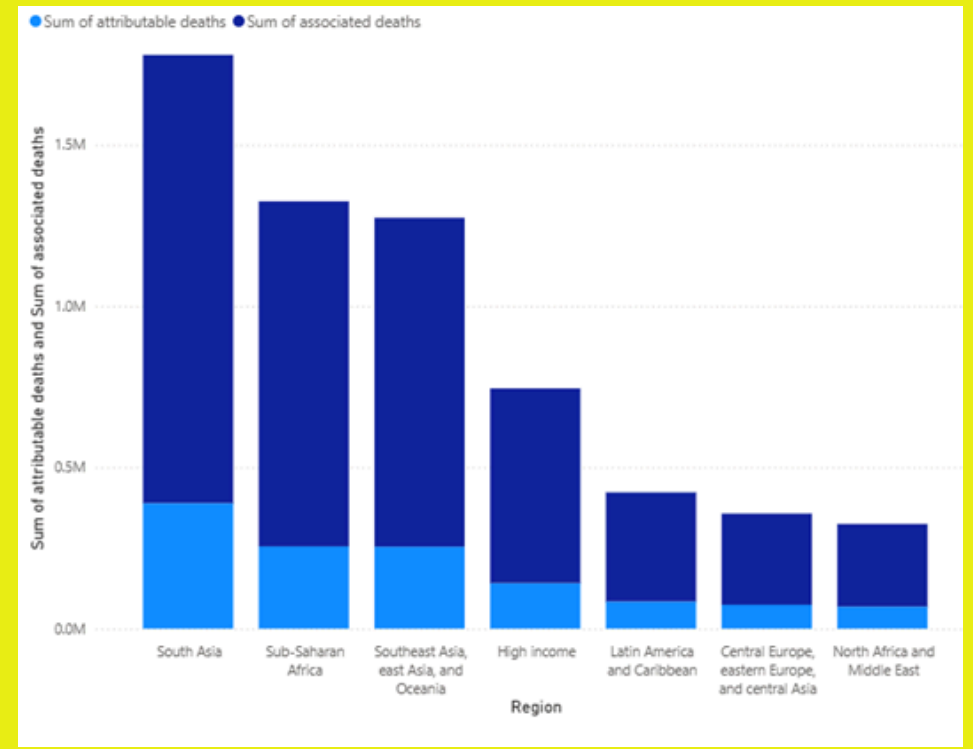
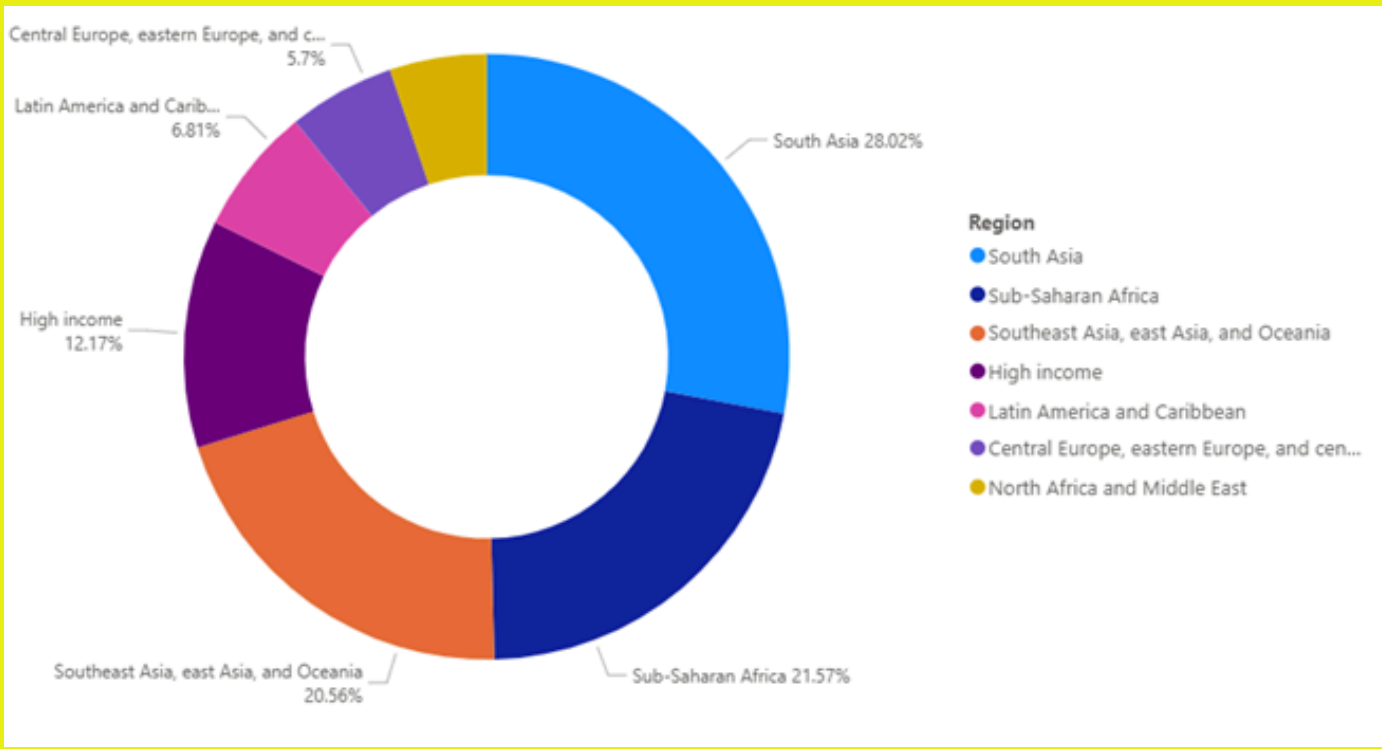


At the end of the day the students presented their ideas to each other and the best of those ideas represented the group in front of the whole year. We picked out winners because one was a fully thought through idea looking at the game, characters, levels, engagement, etc. really focussing on the younger audience. The other game we chose was just bonkers mixing influencers, DJ Khalid & Lebron James and above all this made us laugh the most as a group bringing us right back to fun where we started the day.

Special shouts out were given to Taif and Adam who got a special prize for their hard work and for really embracing the challenge all day, working on their own and producing really high quality work

BY ENDA CAREY

Data Analysts

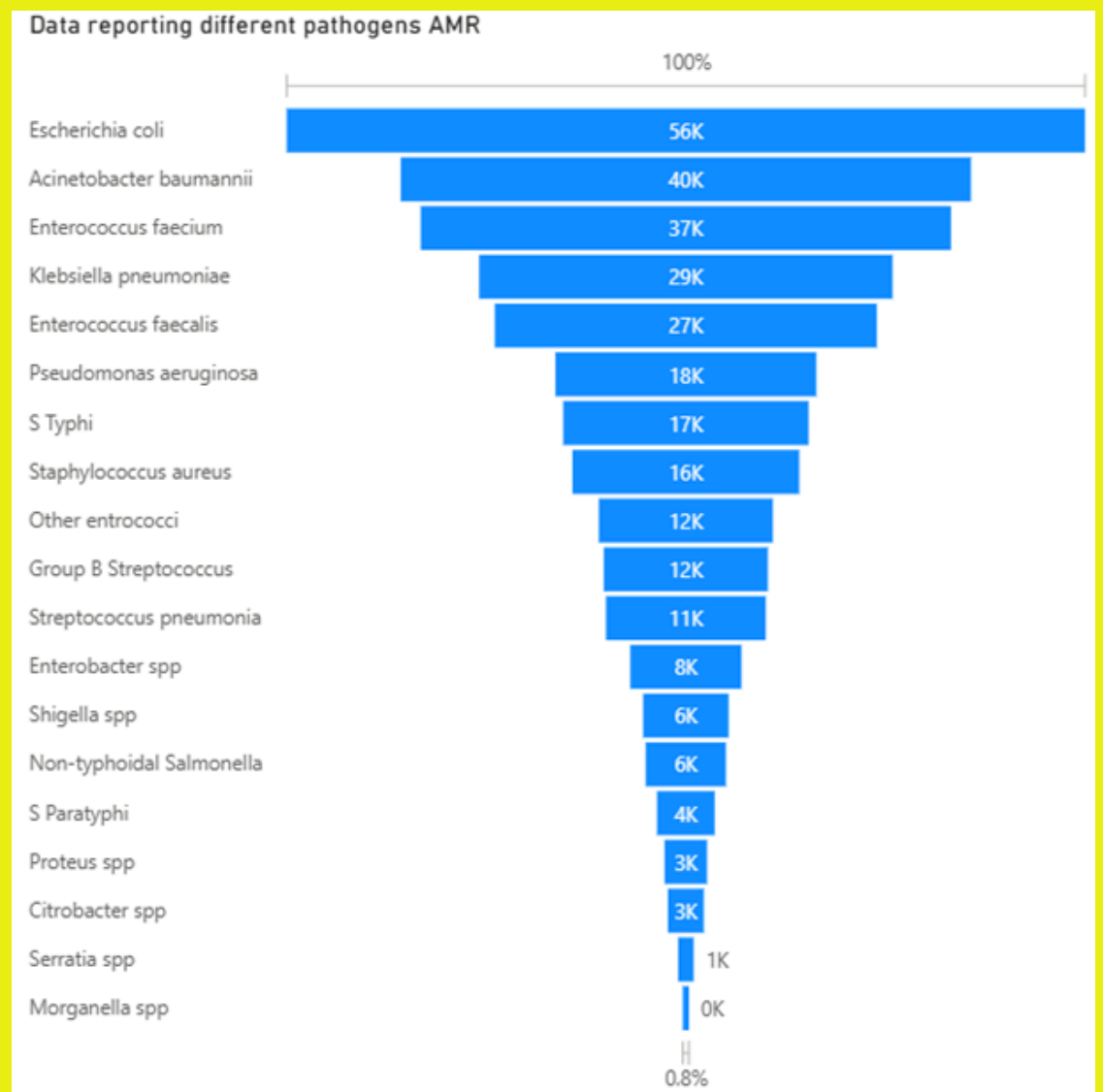


AMR is a huge global problem and there is so much data available showing the scale of the problem. But how do we present this data in a way which engages the public in this issue?

The data analysts were tasked with the challenge of presenting complex data in a simple and engaging way.

The data analysts were provided with multiple real open-source data including resistance levels and deaths from AMR in different regions and areas of socioeconomic status. There was also data on resistance levels in different pathogens.

Year 10 further maths students were set the challenging task of creating a data dashboard to present this complex data in an more engaging format. They had to develop new skills in using Microsoft Power BI to create their data dashboards. They then had to use their dashboard to draw some valid conclusions about the data.



Our visitors from LSTM and MAST Group commented that the level of skill demonstrated by the year 10 students on the data analyst task was exceptional. It is so important to be able to present complicated data in an engaging and easy to digest format and in just a few hours on the task the students had really got to grips with using Microsoft Power BI to create their data dashboards. They were also able to draw sensible conclusions from the data they analysed.



A special thanks to Chloe Allason for helping to design and run this challenge

BY JOHN DYER

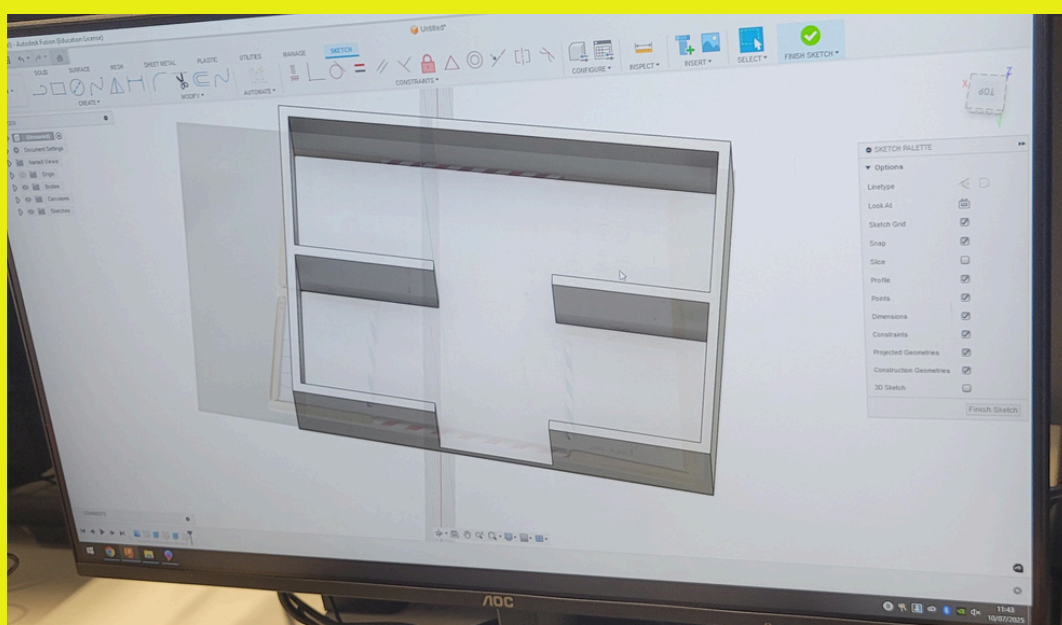
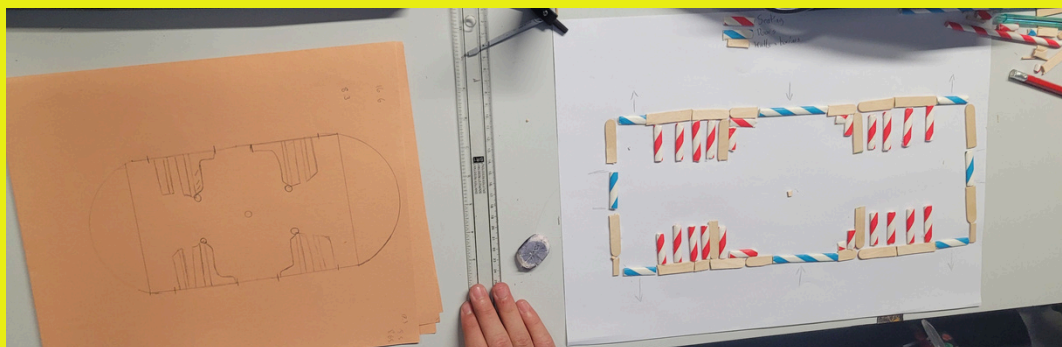
Engineers

Whilst the other groups focussed on engaging the public in AMR, the engineers were set a slightly different challenge around keeping the public safe on public transport. The engineering group had to redesign train carriages to reduce the transmission of infectious disease and in particular the spread of drug-resistant bacteria and other pathogens.

The engineers had to consider the following in their designs:

- Minimising contact between people by considering entrance and exit points and the positioning of seats.
- Minimising the build up of aerosols through ventilation and air flow.
- Fomites and microbe resistant / easy to clean/disinfect surfaces.

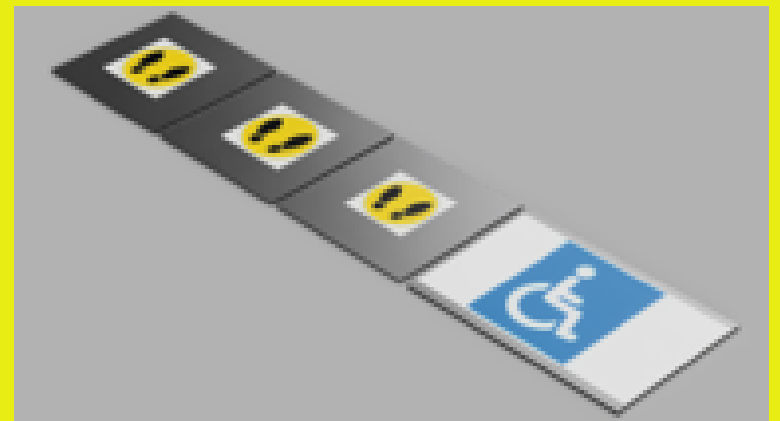
These aspiring young engineers started by coming up with a floor layout to demonstrate their ideas. Most groups sketched out their ideas on paper using items such as lolly sticks and straws to mark boundaries and key features. The groups then used Autodesk Fusion to produce CAD models of their train carriages and infection reduction features. Once the initial CAD models were finished the groups focussed on the materials and cost analysis before producing high quality renders.



The winning group produced an incredibly well thought-out design and included several high-quality renders to demonstrate their carriage and the range of infection control measures, including:

- Open spaces to stand along sides.
- Additional open spaces for wheelchair users.
- Pillars with seats on the perimeter of each of them.
- Hand sanitiser dispensers located next to the doors.
- Metal handles with anti bacterial coating on the handles.
- Pillars have ventilation systems to cycle air in and out of the carriage
- Disinfectant spray above seats to be sprayed when user exits seat
- We made an area for people standing in case the seats are filled.
- Sensor controls to limit direct contact and bacterial transfer.

It's amazing what a group of year 10 students can come up with in just a few hours using industry standard software!



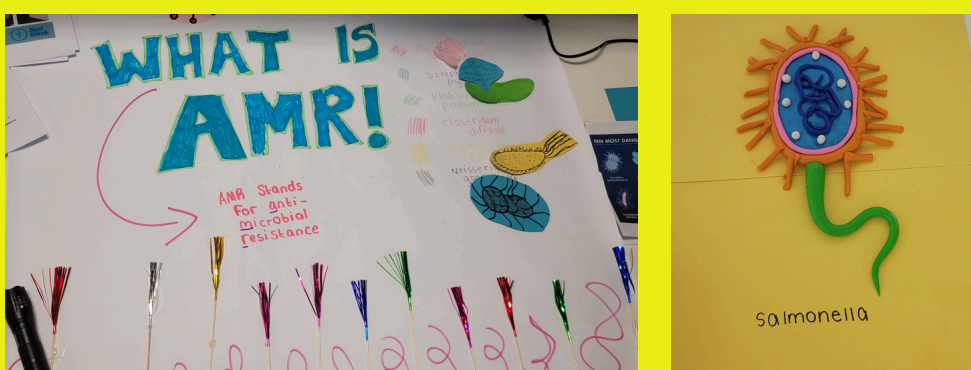
A special thanks to Dan Howard and Andrew Plevin for helping to design and run this challenge

BY JOHN DYER

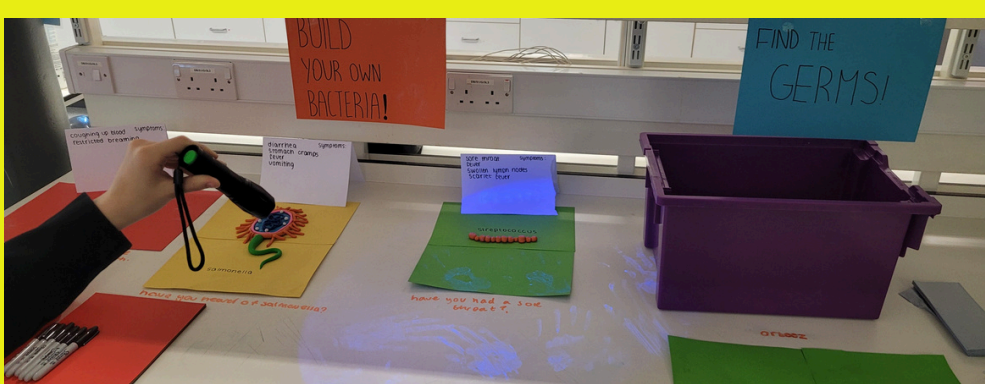
Primary School Outreach



For the industry insight day, our Year 10 science and healthcare students have been given the task to work on designing and delivering primary outreach activities to raise awareness of AMR. Last half term our year 12 BRI team designed and ran some exciting practical activities to raise awareness of AMR to year 10 students during British Science Week. We thought it would be great if the year 10 students could take what they learned from us and plan their own AMR outreach activities for Primary School students.



Getting the year 10 students to design their own outreach tasks ensures that not only do they fully understand AMR themselves, they are also able to explain it to others. Making science and learning fun for young people helps get the point across in an interesting way that they can engage in and will remember. AMR is an issue that affects everyone, so the earlier people are aware, the better.



A special thanks to Liz Voges and Amber Kyvelou for helping to design and run this challenge

Our year 10 students got incredibly creative in their approach to the task and came up with some amazing ideas to raise awareness of AMR and the importance of correct antibiotic use and good hygiene in particular. The activities they came up with included:

- AMR Snakes and ladders
- UV SIM - Search for Bacteria
- Build your own Bacteria
- Bacteria and AMR Quiz
- Antibiotic Slime Activity
- Crushing Resistant Orbeez
- Hand Washing Station



The highlight of the session had to be when a group of year 6 students arrived from New Park Primary School to have a go at the activities planned by our year 10 students. The excitement in the room was incredible and we were so proud to watch our year 10 students delivering their amazing outreach activities with such enthusiasm and knowledge. There was widespread agreement that both the year 10 students and the primary school pupils they taught had all learned more about AMR and the importance of correct antibiotic use and hygiene.

BY AVA KNOWLES AND JOHN DYER



Business of Science Conference

BRI Road Show



Business of Science conference 2025 took place on 15th of May at the Spine Building in Liverpool with over 200 leaders from science, businesses and academia. Our team from the BRI was invited along to help run the welcome desk, distributing name badges, information and help to the over 250 attendees at BoS 2025. We also had our very own BRI stand to speak to the delegates about our research, the BRI journal and of course our work on raising awareness of AMR.

The conference focused on how science and innovation drive commercial, environmental and societal progress and how pioneers in the field can continue to help with issues such as climate change and development in healthcare.

The day began with Steve Bennet (Founder of Business of Science Ltd) and Steve Rotheram (Liverpool city Region Mayor) opening the conference, highlighting the city's role in shaping the UK's innovation landscape.

Professor Ottoline Leyser (CEO, UKRI), Professor Tim Jones (Vice chancellor University of Liverpool) and Dr Natalie Kenny (CEO, Biograd) discussed the current and future of UK science and innovation with diversity in STEM cross-sector collaborations and emphasis on funding.

Dr Natalie Kenny's presentation was particularly interesting as she highlighted the gulf between the funding women in science receive in comparison to men, this being even lower for BAME women.

During lunch we were given a chance to vote in the innovation awards, the awards aiming to foster interest in scientific development in younger generations. The youngest competitor was 6 years old and presented his idea to over 200 delegates in attendance.

After lunch, the attention shifted to skills and talent. One of the talks, hosted by Knowledge Quarter Liverpool, focused on the STEM skills gap, talent and industry-academia collaboration, also sharing their experiences that lead them to STEM. Other sessions hosted by BAE Systems were tailored to students and early-career professionals through the Future Leaders Forum.

Innovation Awards

Primary School Category - Phoebee for "The Scouse Garden" -

Secondary School Category - Shaza for "Bio Clamp IX" - Liverpool Life sciences UTC

+18 Category - Doa for "Cerebro" -

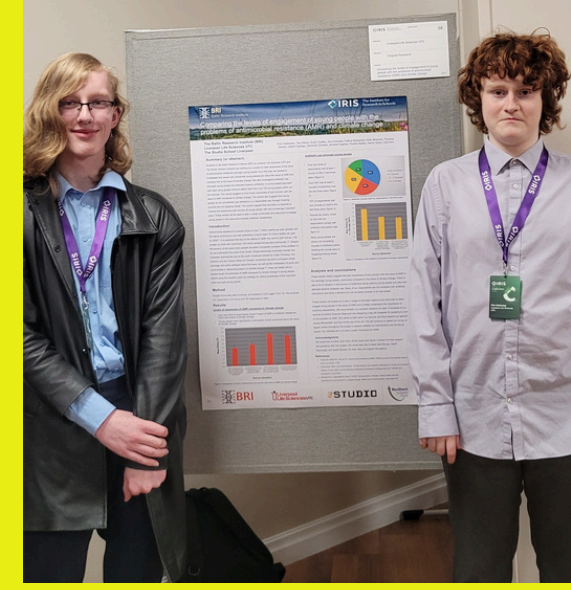
Leadership special Recognition - John Dyer and Sara-Jane Linkman → Recognized for their ongoing support of STEM and the conference.

BY AVA KNOWLES



Summary of the conference on YouTube:
https://youtu.be/7_fQSQN5IOQ?si=85AhSqLHa53hTYVE

Finn and Tes from the BRI presented the work the BRI have been doing on the levels of engagement of young people with AMR. Their original research poster is included in its entirety below. The conference was a fantastic event that took place at the Kings House Conference centre in Manchester on 19th June 2025. Alongside our BRI students presenting the AMR project were 12 students presenting a range of exciting research posters summarising their work. What a great day!



Comparing the levels of engagement of young people with the problems of antimicrobial resistance (AMR) and climate change

The Baltic Research Institute (BRI)
Liverpool Life Sciences UTC
The Studio School Liverpool

Finn Hattersley, Tes Wilcox, ZuSo Costley, Ava Knowles, Fatima Mohamed, Holly Brennan, Thomas Davies, Utieyin Eghagu, Dominion Ekhatior, Andrew Hughes, Charlie Baden, Henry Gorst, Coel Sim

Summary (or abstract)

Students in the Baltic Research Institute (BRI) at Liverpool Life Sciences UTC and The Studio School Liverpool are working on a project to raise awareness of the issue of antimicrobial resistance amongst young people. As a first step we wanted to investigate how aware and concerned young people are about the issue of AMR and compare this to the issue of climate change. We also investigated antibiotic use amongst young people and attitudes towards antibiotics. A survey based approach was used using google forms to collect data from over 150 young people within our two schools. The results suggest a much lower awareness of and concern with the issue of AMR compared to climate change. The results also suggest that young people do not consistently use antibiotics in a responsible way through finishing courses and not skipping doses. The results suggest that education is required to improve the awareness and concern of young people with this increasingly important issue. These results will be used to plan a range of activities and resources to engage young people in this issue and increase antibiotic stewardship.

Introduction

Antimicrobial resistance is already linked to over 1 million deaths per year globally and this figure continues to rise with predictions it could reach 10 million deaths per year by 2050⁽¹⁾. It is predicted that due to the effects of AMR, the world's GDP will be 1.4% smaller by 2030 with more than 100 million people having died prematurely⁽²⁾. Despite the severity of this issue many people are either completely unaware of the problem or do not understand the scale of the threat. Global awareness of climate change has increased dramatically due to the youth movement started by Greta Thunberg. Her activism and the "School Strike for Climate" movement has led to increased media coverage and public dialogue about the issue, as well as the mobilization of youth and communities in demanding action on climate change⁽³⁾. Here we initially aim to assess levels of awareness of AMR compared to climate change in young people before using the results to plan our strategy for raising awareness of this important issue amongst young people.

Method

Google forms was used to survey all students in CUC (ages 13 to 19). We received 121 responses in 24 hours and 167 responses in total.

Results

Levels of awareness of AMR compared to climate change

- Over one third of respondents haven't heard of AMR or antibiotic resistance, 100% had heard of climate change
- Young people were significantly more aware of and concerned about the issue of climate change.

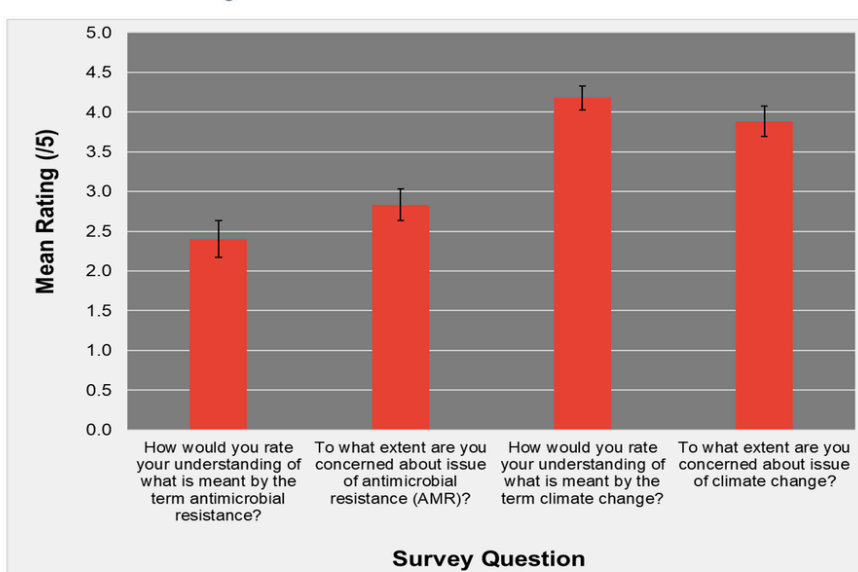


Figure 1. Comparison of levels of awareness and concern with issue of AMR and climate change

Antibiotic use amongst young people

- Over two thirds of respondents had at least 1 course of ABs in last three years (figure 2).
- Over 40% had at least 2 courses of antibiotics over the last three years (figure 2).
- 15% of respondents had four courses or more in the last three years (figure 2).
- Results are clearly mixed on how well our respondents comply with antibiotic instructions (see figure 3).
- Many young people are clearly not completing courses of antibiotics either finishing the course early or forgetting/missing doses (figure 3).

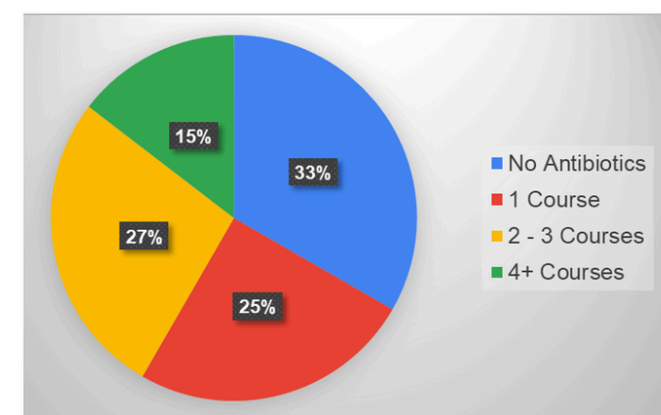


Figure 2. Antibiotic courses taken by respondents in last three years

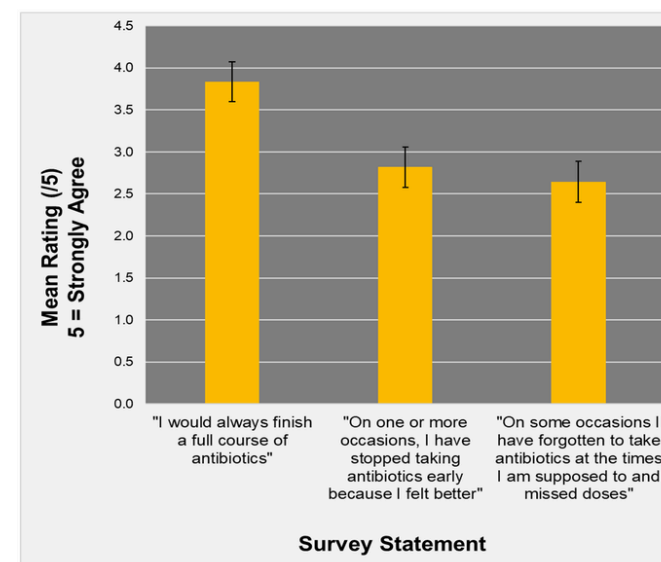


Figure 3. Compliance with antibiotic instructions amongst respondents

Analysis and conclusions

These results clearly suggest that both awareness of and concern with the issue of AMR is low amongst young people, particularly compared to the issue of climate change. There is also a lot of variation in the amount of antibiotics being used by young people and also their attitudes towards antibiotic use. Many of our respondents are not compliant with antibiotic instructions and show a tendency to not complete courses or to miss doses.

These results will enable us to plan a range of activities, lessons and resources to better engage young people in the issue of AMR and to better understand the importance of antibiotic stewardship. We have already run outreach sessions for year 10 students at our schools for British Science Week and are designing a day-off timetable for students to work on the problem of AMR. We intend to start within our schools and then expand our approach across Merseyside and then to the rest of the UK. We will continue to repeat our survey at regular points throughout the project to assess whether our interventions are having an impact. Our ultimate aim is to start a youth movement for AMR.

Acknowledgments

We would like to thank John Dyer, Enda Carey and Sarah Linkman for their support and guidance with this project. We would also like to thank Neil Murray, Geoff Wainwright and Geoff Davison for their help and support throughout.

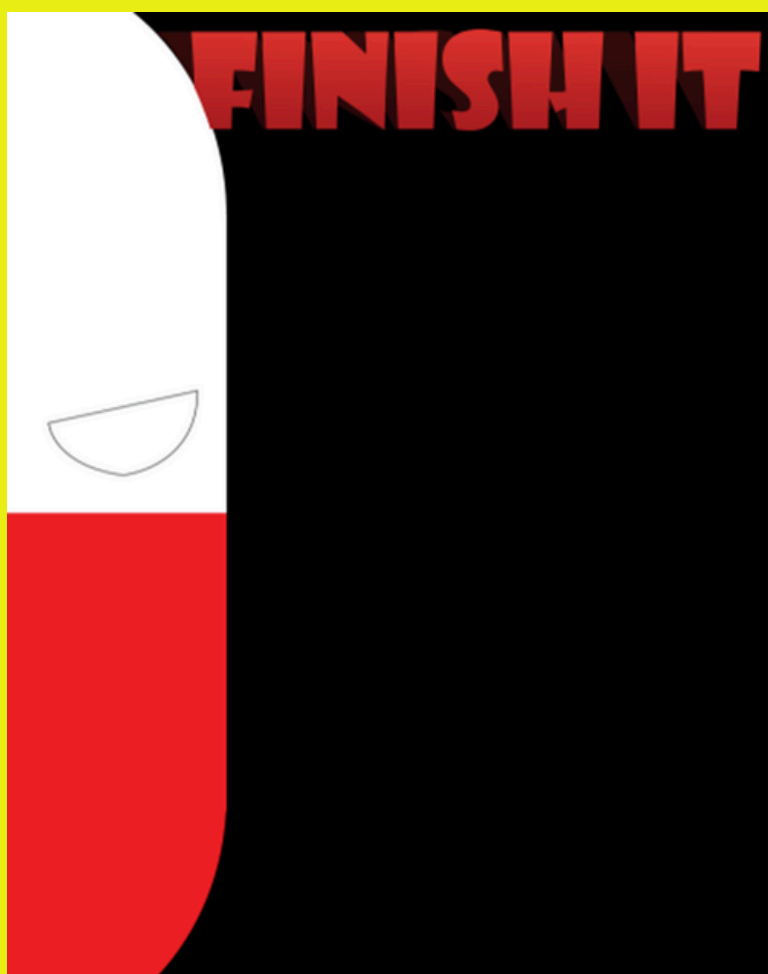
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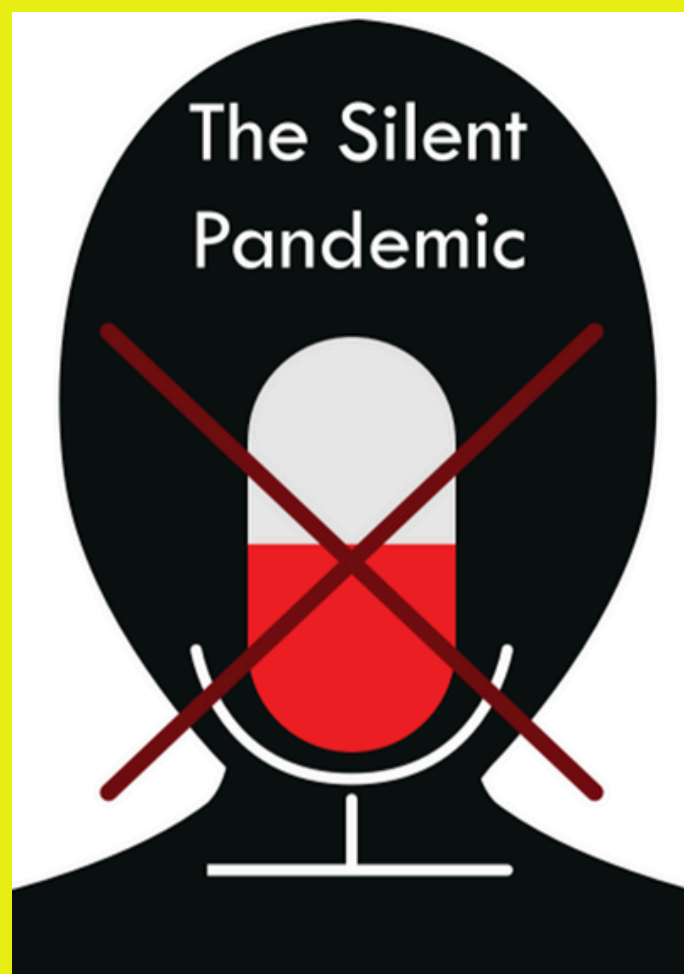
Posters and Campaigns

In an attempt to put into practise our research on how people respond to communication in healthcare, some of the more artistic members of the BRI, Andrew and Finn created posters to engage and educate people about AMR. The first poster is based on the classic game slogan of Mortal Kombat "finish him". This poster aims to appeal to a wide range of generations by using a popular game to first gain the attention of the public and then encourage them to enquire more about the topic. The simple design of the poster allows the message to be received quickly and efficiently.

The second poster titled "The Silent Pandemic" highlights the danger in ignoring the threat of AMR and demonstrates how, so far, the world has responded too weakly. The poster's artist has chosen to create another simple design to grab people's attention.. The final poster has the striking image of a red hand, symbolising the danger that AMR poses. Each finger has concise information on how you can reduce the spread of AMR. The short and simple statements allow the public to read and take in some small pieces of advice without overwhelming them.



WRITTEN BY AVA KNOWLES



POSTERS BY ANDREW HUGHES



Editor's Closing Words

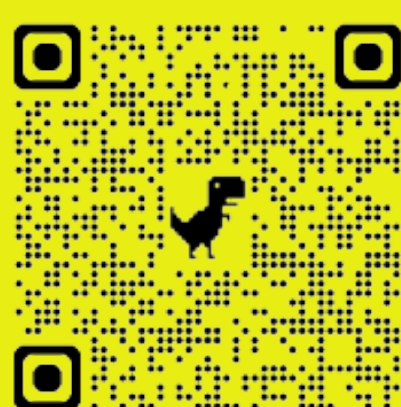
This year has been a successful one for the BRI, we have become focussed on the issue of AMR throughout the year which has culminated in the release of this special edition. We've had the opportunity to not just attend exciting events and conferences but also present at them, showcasing the work we're doing as a young group of students to expand scientific knowledge across our age range and beyond.

We only want to grow further and gain more opportunities in the future so if you would like to get in touch or contribute to the next edition find contact details below. Our next edition will be out in October where we will be focussing more widely on technology and engineering as well as scientific research.

Thank you for taking the time to read our research, **Ava and the BRI Team**



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