Creating a hygienic workplace.

Prism White Paper June 2023.

AirRated™

PRISM

The mark of confidence in workspaces


Churchill Group

About Churchill Group

Churchill Group is one of the largest independently-owned soft service providers in the UK; comprising specialist businesses of cleaning, catering, security, front-of-house, environmental and compliance. Churchill's clients enjoy the flexibility of a specialised single service through to a complete bespoke multi-service solution. Established over 40 years ago, Churchill is redefining service for over 1,000 clients in all sectors throughout the UK including British Land, The Instant Group, Scottish Power, The Institute of Directors, GTR, Eurostar, Network Rail High Speed, LSER, JLL, Port of Dover, Canary Wharf Management, Norton Rose, Dorset Fire and Rescue, c2c, and The GLA. In August 2023, Churchill became an Employee Ownership Trust. A controlling interest in the company has been transferred to an employee owned trust which is then held for the benefit of employees.

About PRISM

PRISM is Churchills' workplace hygiene and safety programme. It supports those responsible for facilities, premises and estates, and employee wellbeing to create safe and hygienic workspaces, instilling confidence in employees and visitors by removing the fear factor surrounding returning to work and reducing the risk of a localised virus outbreak.

Powered by science and technology PRISM helps to proactively and transparently manage the bacteria levels and mitigating actions, providing assurance, confidence and a healthy space.

This is the first hygiene programme of its kind, unique in its ability to measure the effectiveness of cleaning services. It delivers a transparency which creates a trusted environment and peace of mind for building occupiers, employees and visitors.

About AirRated

AirRated was born out of the desire to empower people with knowledge about their indoor environment. Exposure to poor air quality can have a hugely adverse impact on health, wellbeing, and productivity. It helsp clients to promote healthy spaces by raising awareness of the importance of indoor air quality and providing strategies for improvement.

AirRated offers three certifications that provide an industry-leading analysis of a building, or of its proposed design:

- The AirScore (for buildings post-completion)
- The AirScore D&O (for new developments and those undergoing refurbishment
- The Monthly AirScore (a continuous performance check of IAQ in operation)

Its standards are aligned with various global standards, including BREEAM, LEED, Fitwel, and WELL. Furthermore, both the AirScore and AirScore D&O have been recognised as accredited building certifications by GRESB.

Mark Phelps

We are sad to report that while this paper was being prepared we received the sad news of the passing of our esteemed colleague, Mark Phelps, microbiology and infection prevention consultant.

Mark's contribution to this project and our work was invaluable and his dedication to the sector as a whole was unwavering and significant.

As we move forward, we remain committed to upholding the standards of excellence that Mark inspired.

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Hypothesis

The study conducted on implementing a science-led approach to workplace hygiene has provided valuable insights into the importance of testing for bacteria, as well as implementing effective hygiene programmes. By conducting (TVC) swabbing and analysing the results, it was possible to identify areas of high microbial contamination and implement targeted cleaning and disinfection protocols.

The findings of the study have demonstrated that a science-led approach to workplace hygiene can effectively reduce bacterial and viral contamination. The correlation between relative humidity, temperature, and microbial growth highlights the need to control these environmental parameters to limit the risk of transmission. Likewise, the study has shown that enhanced cleaning and disinfection not only reduce bacterial contamination but also have a positive impact on viral surface contamination, including enveloped viruses like the coronavirus.

The introduction of PRISM as a tool for monitoring and analysing microbiological hazards has proved valuable in identifying “hot spots” and guiding the implementation of state-of-the-art technology and enhanced hygiene practices. By setting microbiological benchmarks and employing cost-efficient and sustainable decontamination technologies, it is possible to continuously improve and review hygiene practices in the workplace.

Overall, the study emphasises the need for the facilities management industry to lead the way in delivering effective hygiene programs. It acknowledges the challenges in understanding different types of bacteria and viruses and highlights the importance of demystifying the science and technology for FM professionals. By adopting a science-led approach and providing evidence of a hygienically safe workplace, organisations can instil confidence in employees and ensure their safety and wellbeing.

Finally, the Landlord community can show real value to employers looking to enter their space, whilst demanding market leading rents. Employees wanting transparent data around air quality and now hygienic workplaces has never been more important.

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The truth about workplace hygiene

The coronavirus pandemic caused irreversible changes across every industry. Perhaps one of the most obvious is the change in mindset regarding cleaning and hygiene. What was once a 'behind the scenes' role, only really noticed when it wasn't done well, has been brought to the forefront of everyone's minds. Previously building managers may have had little interest in the minutiae of surface disinfection or cleaning schedules, these processes can now mean the difference between business-as-usual and closing a building due to infection. For many organisations, now a key part of health and safety considerations, workplace cleaning and hygiene is a boardroom issue.

Since workplaces reopened and businesses have started to welcome employees back, the link between the workplace and employee wellbeing is being recognised as a priority. Many organisations have experienced the pitfalls of mandating a return and understand the importance of providing a workplace that is an attractive destination for employees. In a post-pandemic workplace, employee concerns are increasingly focused on their health. It's essential that business leaders are empathetic to those concerns, which could range from desk hygiene to being in a fully occupied office, and that they are taking positive action to address them. Meeting employee needs and expectations is critical not only to encouraging employees back to the office but retaining and attracting talent.

It is agreed that cleaning programmes need to be much more science-led than they were pre-pandemic. We have conducted our own in-depth study into what that actually means. In this paper we have presented a Proof Of Concept (POC) that demonstrates the air quality and hygiene risks that are present in a typical workplace and tested the solutions that mitigate those risks. Employees don't just want to see that cleaning is happening, they want to know that the space they are working in is hygienically safe. That is now about more than whether something looks clean – it's about testing for bacteria and implementing a hygiene programme that can provide evidence. It is a basic requirement for any workplace, and it is the facilities management industry that should be leading the way in delivering it. While traditionally the remit of HR, employee wellbeing has become a priority across businesses, and with cleaning and hygiene forming the foundation of a safe workplace, it is essential that FMs implement effective hygiene programmes to ensure the safety and wellbeing of the people who use their buildings.

But as an industry, do we have the skills and knowledge to deliver? Cleaning providers are adept at talking about the benefits of different types of cleaning schedules and products, but understanding the different types of bacteria and viruses, and the risks they present, can be overwhelming. Making sense of bacterial loads and TVC levels can push many in FM out of their comfort zone. In this paper we look to demystify the science and technology, to give FM professionals the insights they need to not only make the workplace hygienic, but to demonstrate an organisation's commitment to health and safety to employees, removing the fear factor of returning to the office in the process.

Chapter 1 –
A science led approach to a safe workplace

Churchill is committed to always doing the right thing, always seeking better and always putting people first. As part of our wider matrix of virus mitigation tools and services, we introduced PRISM to enable workplace, property and facilities managers to understand the bacterial and viral content of certain environments, and to support the implementation of tailored infection prevention solutions. The key to its continuous development is our teams working in close collaboration with clients, sharing real data and for corrective actions to take place. Science is at the core of PRISM.

It is broadly understood that if surfaces and the air within a workplace contain harmful microorganisms (pathogens), or if the indoor air quality is poor, it can have a direct negative impact on the health and wellbeing of building users. The number of microorganisms on surfaces and in the air increases over time as individuals' hands are the main source of transmission. Building users easily pick up pathogens from one place and transfer them to other surfaces around the building, eventually leading to them being transmitted to people who may never have been near the original source of the pathogens. Pathogens are deposited by infected people touching surfaces with their hands or from contaminated droplets expelled through coughing, sneezing or even just talking, and from person-to-person contact.

It is particularly important for FM professionals to understand the bacteria and viruses that are present in their buildings. If they are able to identify potential risks, they can take proactive measures to mitigate them. For example, if there are high levels of pathogen growth in a specific area of the workplace, the FM could implement measures such as increased cleaning and disinfection protocols in that area. Similarly, if poor air quality is an issue, they can investigate the causes and take steps to improve ventilation and filtration and control.

The term "good bacteria" (not considered harmful) is a phrase commonly used in the context of introducing live bacteria into the digestive system, for example drinking yoghurt containing bacteria that maintain a healthy "gut". This technology has also been used to add "good bacteria" to environmental systems such as water treatment, drains etc, and relatively recently to surfaces and in some cases, is known to have a positive impact on managing levels of harmful bacteria. However friendly bacteria have no effect on viruses, which are the cause of many common infections, especially in the workplace. Disinfection to eradicate pathogens is important to help minimise potential infection to include viral pathogens.

As important as understanding the number of pathogens, is knowing the species. Some pathogens are more infectious than others and can be capable of causing infection despite being present in fewer numbers. There are also variations in the level of risk posed by pathogens depending on who comes into contact with them, for example, those who are immunosuppressed. Because of this complexity it is difficult to set a "safe level" so it is important for FM professionals to understand how much of what pathogens are in their buildings, so that they can manage the potential risk.

TVC (Total Viable Count) swabbing tests the level of bacteria present on a surface. A sterile swab is used to collect a sample of bacteria from the surface, which is then analysed in a lab and reported. It delivers an auditable bacteria count, and the more swabs taken, then more accurate the hygiene pattern that is built is.

It then allows a more thorough understanding of the measures needed to reduce the risk of infection.

Successfully reducing levels of bacterial contamination (measured via TVCs) will also have an impact on viral contamination as all the enhanced cleaning and disinfection technologies employed will also impact viral surface contamination. Swab tests are an effective hygiene marker for microbiological contamination and identifying hazards. Because viruses cannot be easily sampled on surfaces, the focus is to reduce microbial contamination. Enhanced cleaning and disinfection has a positive effect on contamination caused by viruses, especially those that are termed “enveloped” such as the coronavirus.

An effective TVC swabbing programme can identify where high levels of contamination have occurred. Where touch points show a high level of microbiological contamination, it is a clear indication that cleaning processes need to be implemented but also helps to identify where changesto cleaning processes need to take place .

This chart shows our top priority high risk touch points based on a number of swabs with a TVC above the recommended limit: highlighted in blue - samples with TVC between 500 and 1000 TVC; highlighted in red - samples with TVC above 1000; highlighted in green – TVC below 200.

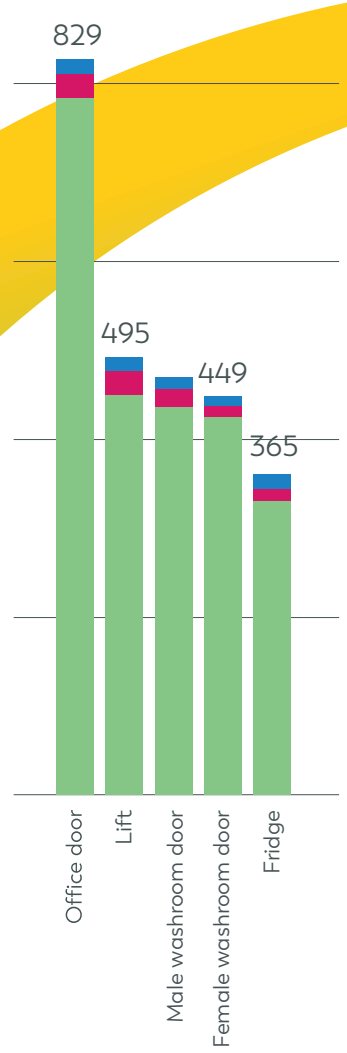

Fig 1: Top high priority high risk touch points:

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Indoor Air Quality

The two environmental parameters that are most likely to have the biggest impact on microbiological contamination are temperature and relative humidity. These parameters are typically associated with one another and if not adequately controlled can allow for the occurrence of 'ideal' conditions for microbial growth. It is therefore important that these parameters are controlled effectively to ensure occupant comfort but also to limit the risk of transmission. These parameters can be readily and easily monitored in buildings and could be used as key indicators of adverse conditions, which may necessitate intervention.

By detecting and counting bacteria on surfaces and in the air together with the use of indoor air quality sensor technology, we can measure the solid and gaseous pollutants to ensure the air present within the space is being maintained at a safe level and any impacts on health, wellbeing and comfort are limited and controlled.

Common microorganisms

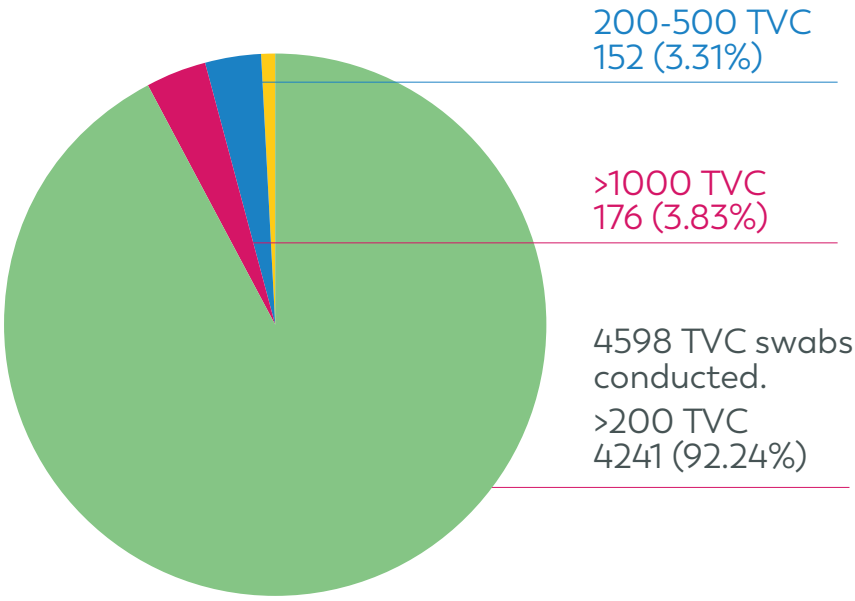
Pathogen	Source	"Hot spot"
Coronavirus (e.g. Covid 19)	Person to person, air and potentially surfaces	Air, frequently touched surfaces and those potentially contaminated by aerial droplets
Rhinovirus/Influenza (Flu or "common cold)	Person to person, air and potentially surfaces	Air, frequently touched surfaces and those potentially contaminated by aerial droplets
Norovirus	Person to person, air and potentially surfaces	Air, frequently touched surfaces and those potentially contaminated by aerial droplets and contaminated food.
Respiratory Syncytial virus (RSV) (Flu)	Person to person, air and potentially surfaces	Air, frequently touched surfaces and those potentially contaminated by aerial droplets
Streptococci (sore throat, wound infection) Bacteria	Person to person, air and potentially surfaces	Air, frequently touched surfaces and those potentially contaminated by aerial droplets
Staphylococcus aureus (Eye, wound infection) - Bacteria	Person to person, air and potentially surfaces	Air, frequently touched surfaces and those potentially contaminated by aerial droplets

Proof of Concept (POC)

To further develop our understanding of hygiene in the workplace, Churchill worked in partnership with AirRated, a company that provides certifications for Indoor Air Quality (IAQ), to conduct a POC trial. It was implemented at a LGIM shared office space in Reading, covering 221,000 square feet. The site has 24 wings broken into four blocks and at full capacity has around 1,000 building users each day.

The trial, which was conducted between April and September 2022, was used to identify those areas that show high levels of microbial contamination and to establish if there was a correlation between those levels and adverse IAQ conditions. During the POC, PRISM collected over 2,000 microbiological swab samples from various test sites that were identified for pathogen growth and transmission (Figure 2).

Fig 2: Total number of TVC swab analysis conducted to date:



IAQ monitoring was also undertaken across the same LGIM building. The IAQ monitoring consisted of five key parameters, which are most likely to affect the health, comfort and wellbeing of occupants:

- Carbon dioxide (CO_2)
- PM2.5 (fine particulate matter with a diameter <2.5•m)
- TVOCs (Total Volatile Organic Compounds), a collection of gaseous, organic chemicals that include substances such as formaldehyde, benzene and toluene
- Temperature
- Relative Humidity

Proof of Concept (POC) continued...

The purpose of the trial was to analyse the environment using microbiological sampling of surfaces and analysis of the air using sensor technology, to determine if there are parameters that affect the survival of bacteria. The research identified that both relative humidity and temperature had an impact on the growth of airborne microorganisms (including pathogens) and surface contamination.

There was a positive correlation between relative humidity and TVC as well as between temperature and TVC. This trend was seen across almost all samples in the survey and was particularly prevalent in the lift lobbies where there are increased instances of physical contact and transfer of microorganisms through occupants calling the lifts.

Using PRISM, the data was analysed to identify the "hot spots" where there is a measurable microbiological hazard. These hot spots indicate where corrective controls such as enhanced application technology, disinfection and analysis for risk reduction may be required.

In the absence of any pre-set levels set by any government authority, the PRISM "smart" science led approach (air and surfaces) will be able to identify these at-risk areas so that state of the art technology and enhanced hygiene programs can be installed to minimise the hazard to enable a process of continuous improvement and review.

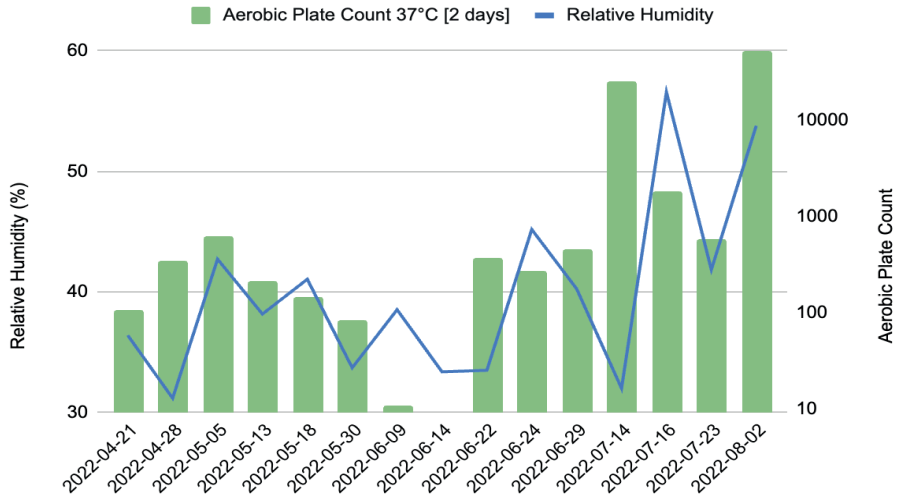


Figure 3 - The average trend between Aerobic Plate Count 37°C and Relative humidity (%) across the test building over the course of the trial. Humidity was one of the biggest risk factors when it came to microbiological growth, as higher levels of humidity appeared to result in an increased amount of bacteria.

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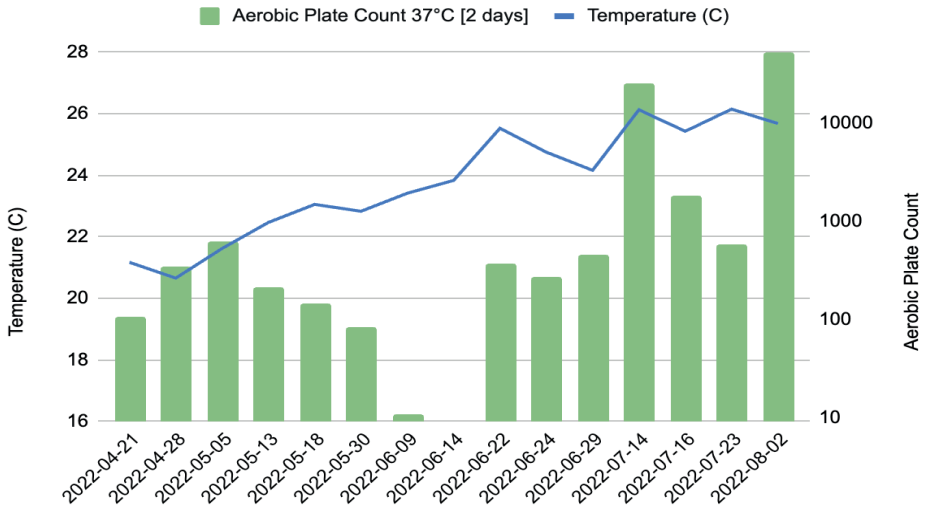
Figure 4 - The average trend between Aerobic Plate Count 37°C and Temperature (°C) across the test building over the course of the trial. Along with relative humidity, temperature appeared to be a risk factor. This is likely due to the relationship between humidity and temperature as, particularly in Britain an increase in temperature will also lead to higher relative humidity. In the trend above we can see that the temperature inside the building consistently increased throughout the trial, likely in line with the seasonal changes as the trial started in Spring and concluded in Summer. This same trend was reciprocated in the average Aerobic Plate count which also appeared to rise over the course of the trial.



Through continued environmental sampling, PRISM will set the microbiological "benchmark" and will employ cost efficient and sustainable decontamination practices. Surfaces that are of lesser risk can be cleaned and disinfected by conventional methods while those that present a greater potential hazard and risk to health, can be addressed through the implementation of "smart" technology and application practices.

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Case study: St Pancras

St Pancras International (managed by Network Rail High Speed) welcomes more than one million passengers every day. Whatever their destination, a positive passenger experience is critical. It is an iconic station due to its mix of new and old with architecture - half the station comprises of grade I listed 19th century ironwork combined with modern glasswork.

One of the most unique elements of this contract is the diverse mix of space, which creates different atmospheres and experiences within the station. From the Avenue of high-end stores to the various dining options in the Circle, St Pancras is much more than a station – it is a world-renowned destination in a unique environment. Passengers, shopping customers, diners and tourists expect the very highest level of care, cleanliness and hygiene.

Churchill implemented smart cleaning processes that started with an IOT system. The technology began with the toilets by installing utilisation sensors to understand flow, and some additional ones in toilet roll holders to alert cleaning teams when it needed replacing.

The sensors allow cleaning operatives to be on the scene as and when required and helps us create smarter cleaning rotas. They also give an idea of footfall, which is a much more accurate indicator of station use than tickets sold. The initiative helped cleaning teams move to a more predictive offering, increasing cleaning presence in peak times and reducing in lower footfall times.

Churchill also implemented PRISM, its workplace hygiene programme. PRISM brings the realms of people, science and technology together via a four-step programme – audit, review, change and monitor. This tech-led approach to workplace hygiene gives both site users and employees the confidence to use a space backed up by scientific insight.

PRISM ensures that St Pancras remains a top-rated station among passengers.

The station has a 95 per cent pass rate for cleaning audits carried out, with the main drivers for passenger satisfaction including station upkeep and cleanliness. It has also seen a reduction in accidents due to an increase in health and safety awareness, a reduction in customer complaints and an enhanced team culture. This has resulted in a better team focus and greater impact on the overall customer experience.

St Pancras International was ranked first in the Consumer Choice Centre "European Railway Station Index 2020". It also received a passenger satisfaction score of 96 per cent – the highest of any UK station. Churchill is proud to have helped the station achieve these accolades.

"The processes implemented by Churchill have dramatically improved the efficiency of the cleanliness at St Pancras and this is reflected in passenger satisfaction scores. A key reason we first partnered with Churchill was for the innovation it brings to its work. The smart cleaning has made a big impact and we look forward to further technological advancements in the future."

Jay Khan, Head of Stations Strategy and Delivery at Network Rail High Speed

Chapter 2 –
Interview with a microbiologist

Mark Phelps, microbiology and infection prevention consultant, has 30 years plus experience in the field of cleaning, disinfection and infection prevention. After working at the Hospital Infection Research Laboratory, the birthplace of the NHS hand washing technique and the use of alcohol for hand disinfection amongst other research, he has been closely involved with the development and launch of two major technologies in the field of cleaning and disinfection that are extensively used to reduce environmental contamination and infection.

For the past 6 years, Mark has been both researching and working in the field of antimicrobial surface coatings with a particular interest in silicon based antimicrobial polymers that have long lasting surface protection properties that have now become more recognised due to the pandemic.

What kind of bacteria are we most likely to find in a typical workplace?

In the workplace, you're most likely to get a combination of bacteria types. There are aerobic spore bearing bugs that come from the air, and then micrococci, which are normal skin contaminants.

When you think of an office with hundreds, maybe even thousands of individuals present, those bacteria are going to bombard every touchpoint surface, and they sit there quite happily waiting for someone to pick them up. Many of the harmful bugs don't even need to touch damaged skin to cause infection, for example, Norovirus is a highly infective pathogen and you only need very limited contact with it to become unwell.

What do we need to understand about how bacteria and viruses spread?

The micrococci from people will likely be the main source of contamination. – people move around a building, they open doors, they touch things. It doesn't really matter how well they think they've decontaminated themselves through handwashing, they will still carry harmful pathogens on their hands which then get transmitted to any surface that they touch. Just being present in a space results in microorganisms being shed - it's not just about what you touch. For example, if you look at your mobile phone after speaking on it for a while – you can actually see the effect of the microorganisms you've shed through your breath.

While bacteria are rarely airborne, that's not the case for viruses, which often are. All of the airborne bugs will land on surfaces and be moved by mechanisms that we don't naturally consider. People walking through a space, air currents, air conditioning, all lift those microorganisms and mean that transmission is a constant.

The main issue is that generally an office space will be cleaned once a day – people come in, admire how clean it all looks and assume that it is hygienically safe. Those same people, just by being there and using the space, re-contaminate it. Surface level cleaning, while aesthetically and psychologically important, is not adequate to decontaminate an office and make it microbiologically safe.

Why is it important to understand the different bacterial and viral risks is important?

Most people hear about dangerous, nasty bugs, but don't hear about them in context. If you understand the bacteria and viruses, how they move, and the impact they have, then you have a better awareness of the bigger picture. As humans, it's in our nature to risk assess, so understanding the pathogens that are present means that you can approach cleaning and disinfection from an educated perspective. It's not necessary to be trained as a microbiologist but having a foundation of knowledge allows facilities managers to make more informed assessments of the risk. This means they can understand what technologies are needed to help minimise risk and determine the personal behaviour required to keep building users safe.

What is the potential impact on health from these bacteria and viruses?

This is complicated to answer as some bugs can cause infection in low numbers, others require high numbers. Unlike the food and pharmaceutical industries there are no guidelines as to what numbers are safe, even in hospitals, there are no regulations. Only food factories and pharmaceutical facilities measure microbiological numbers and test for different species. When we look at a typical workplace, it's no easier – different individuals have different levels of resistance to pathogens, young people are generally more effective as resisting infection, while those who are older, or immunocompromised may be less able to do so. The aim is to reduce the number of pathogens to the lowest levels that technology can deliver on any particular day. Regular monitoring is key to that. You will never eradicate microorganisms from a workplace, but the lower the levels, the lower the risk.

What is the difference between "hygienically clean" and "clinically clean"?

Whether hygienically or clinically, "clean" doesn't really mean anything – what we should be aiming for is a workplace that is microbiologically safe. Cleaning, while important to remove debris and soil, is not an antimicrobial process. ATP testing has become an industry standard but it is only a measure of cleaning and not safety. I could wipe a surface with the sleeve on my elbow and achieve a good ATP result. Microbiological safety is reliant on disinfection which is technologies such as UV or hydrogen peroxide vapour, are important.

How do we ensure microbiological safety for building users?

It's very easy to detect bacteria – there are lots of labs that will analyse swabs and send you a report about the pathogens that are present and at what levels. But identifying and understanding viruses is more difficult. This level of analysis is necessary, as is a review of cleaning and disinfection processes, which should also be validated.

To ensure microbiological safety, this swabbing and analysis can't just happen once – workplaces are constantly re-contaminated by the people in them, so as much as cleaning and disinfection happens regularly, so should swabbing, analysis and validation of disinfection techniques.

What innovations and new technologies are the most effective?

Particularly in the wake of the pandemic, new products and technologies are being launched constantly, many with spurious claims. It is important to consider innovation and new technologies but it is essential to look for actual microbiological results and microbiological validation in a "real life" workplace and not just in a laboratory setting.

The industry as a whole needs to push for measurable standards by government scientific institutions.

Chapter 3 –
Fundamentals of a healthy building

When it comes to our general wellbeing, or that of our spaces, we are usually conscious of the elements we can see but not the other elements that are invisible to the human eye like the bacteria on surfaces or the air we breathe.

How can we discern whether our workplaces are truly safe if we don't understand what we can't see? If buildings are to be truly "healthy" and deemed "safe havens", better understanding and greater transparency of the invisible is of the utmost importance.

According to the CIPD, only 50% of UK organisations have a wellbeing strategy in place to proactively take measures to improve employee wellbeing, with 46% admitting to only taking ad-hoc action based on employee feedback - suggesting that education and awareness of issues regarding wellbeing are important in ensuring action is taken by employers. The good news is that workplace wellbeing is on the agenda for most senior leaders, with 75% saying that they have it high on their list of priorities.

The quality of a building's indoor environment can significantly impact our physical and mental health, wellbeing and productivity. There are multiple factors that contribute to making indoor spaces healthy, and it is essential to consider the entire life cycle of a building, from design and construction, to operation and maintenance. Healthy buildings have risen even higher on the agenda since the outbreak of COVID-19, with the realisation that incorporating health concerns into a building's design is not a luxury, but a necessity.

Certification and standards

More and more organisations are looking to building certifications to help communicate and translate some of these "invisible" elements of a space into quantifiable indications that their space is healthy.

Holistic certifications such as The WELL Standard and Fitwel gather information about a workspace, behaviours of the organisation and the processes that are in place to quantify how healthy and sustainable their organisation and buildings are. There are also specialist certifications such as AirRated which certifies buildings specifically for their internal air quality, offering an independent, third-party assessment. This high-level metric can be used as a kitemark for all stakeholders; owners, operators and building users, to see how healthy their indoor air is.

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Case study: Leading consultancy firm

In the new era of working, one which has seen the relationship between worker and workplace transformed, organisations are craving confidence when it comes to hygiene.

In light of the COVID-19 pandemic and the spotlight it has shone on creating safe workspaces, it is vital that cleaning regimes instil confidence in your employees and visitors, removing the fear factor and reducing the risk of a localised virus outbreak.

Enter PRISM, Churchill's flagship workplace hygiene and safety programme.

PRISM helps organisations to create safe spaces by combining the power of people, science and technology. Its key function is to provide facilities managers with critical information on bacterial and viral load touch points across their buildings. It allows for the creation and real-time

deployment of tailored infection prevention solutions without overburdening FM staff.

London HQ

At the new flagship office for our consultancy client in London, Portfolio has been providing facilities management support since day one.

The FM team comprises 12 full-time housekeepers who work during the day, along with 30 part-time staff who help to provide a 24-hour coverage – this is important as the firm's employees often use the building late into the evenings.

Although the company operates a hybrid working model, the office is still a hub of activity for individual work, meetings and client visits. And, because the firm's employees largely do not use the space within set working patterns, daily cleaning and sanitising is a crucial part of our FM work.

Combining people, science and technology

Thanks to PRISM, Portfolio's team at this building have the ability to schedule simple daily tasks and multiple cleaning and disinfection activities, pre-programming the frequency and repetition for each task on Mo:dus – our digital platform – which underpins the PRISM programme.

The programme revolves around a thorough system of scientific total variable count (TVC) analysis. This shows the number of aerobic viable micro-organisms , E.coli and total coliforms - gut bacteria present in humans and other animals - on a specified area of a surface. This provides an indication of the cleanliness and allows monitoring of cleaning procedures over time, helping us to identify areas of concern within the building and respond appropriately to reduce the risk of infection.

Once a set of swab results is entered on Mo:dus, the system will recognise if there are any high readings (above a TVC count of 200) and automatically change the cleaning regime for those areas.

Cleaning parameters can be tailored depending on the client, ensuring we provide a hygiene schedule that delivers a frequency of cleaning appropriate for the footfall of any given part of a building. When choosing focus areas for testing, we concentrate on those with heavy footfall and at-risk surfaces. To be able to do this we draw on our deep understanding of how the client workplace operates, choosing custom-made testing points based on how the building is used on a daily basis.

Of course, this only works effectively if the people relying on the system are fully versed in the technology. Churchill's cleaning operatives are highly trained, and their physical presence also offers an extra layer of assurance for building users, who can see that their workspace is being routinely cleaned throughout the day.

Case study: Leading consultancy firm

Data-driven strategies and results

The journey has been data-fuelled at every juncture. We have used our knowledge and insight of the building's usage to guide discussions and strategy, ensuring we selected high traffic area touch points for TVC swabbing – these include door handles, sink taps, fridge handles and coffee machine displays.

During the first few weeks of deployment, 33 high risk touch points were identified and tested, with 24% of the tests indicating TVC above the 200 threshold. This analysis prompted the development of a tweaked cleaning regime for the client, based on a tailor-made PRISM report which was shared with the client.

The new regime, which is set up through Mo:dus, incorporates several features. For example, multiple QR codes have been placed in the swabbing areas, which are now subject to an advanced cleaning schedule, along with other areas where the level of bacteria could spread within the wider building community.

All high-risk touch points with a TVC count above 200 are cleaned and disinfected six times during the day, using a virucidal cleaner on a 50:50 dilution, alongside an electrostatic virucidal application programme which provides resistance to COVID-19 for up to 28 days.

Meanwhile, cleaning operatives scan the QR codes to inform the system when they have started and finished cleaning each area.

The tasks are assigned to them via a phone or a PC in a few easy steps, with users of the system able to view all current tasks for the day, week or month from a simple calendar function.

The results to date have been extremely promising. The TVC swab results from December were a huge improvement on the data collected in November, with 100 per cent of all high-risk touch points tested falling well within the 200 TVC limit.

This demonstrates that the changes made to the cleaning schedules have been effective. Indeed, the ongoing effectiveness of the cleaning schedule is relayed across live dashboards and reporting features, providing managers with a comprehensive overview and informing them if further changes are required.

Looking ahead

Daily activity logs and swab testing will continue to shape the cleaning schedule at the London HQ, which also undergoes a full deep clean across the entire workplace every month.

With the system now bedded in and demonstrating its value, we are helping to instil that all-important confidence in the firm's employees who are coming in to use its facilities. Relevant data can be shared with building users, so they are aware of the steps being taken to create a safe environment for them.

Chapter 4 –
A workplace hygiene programme in practice

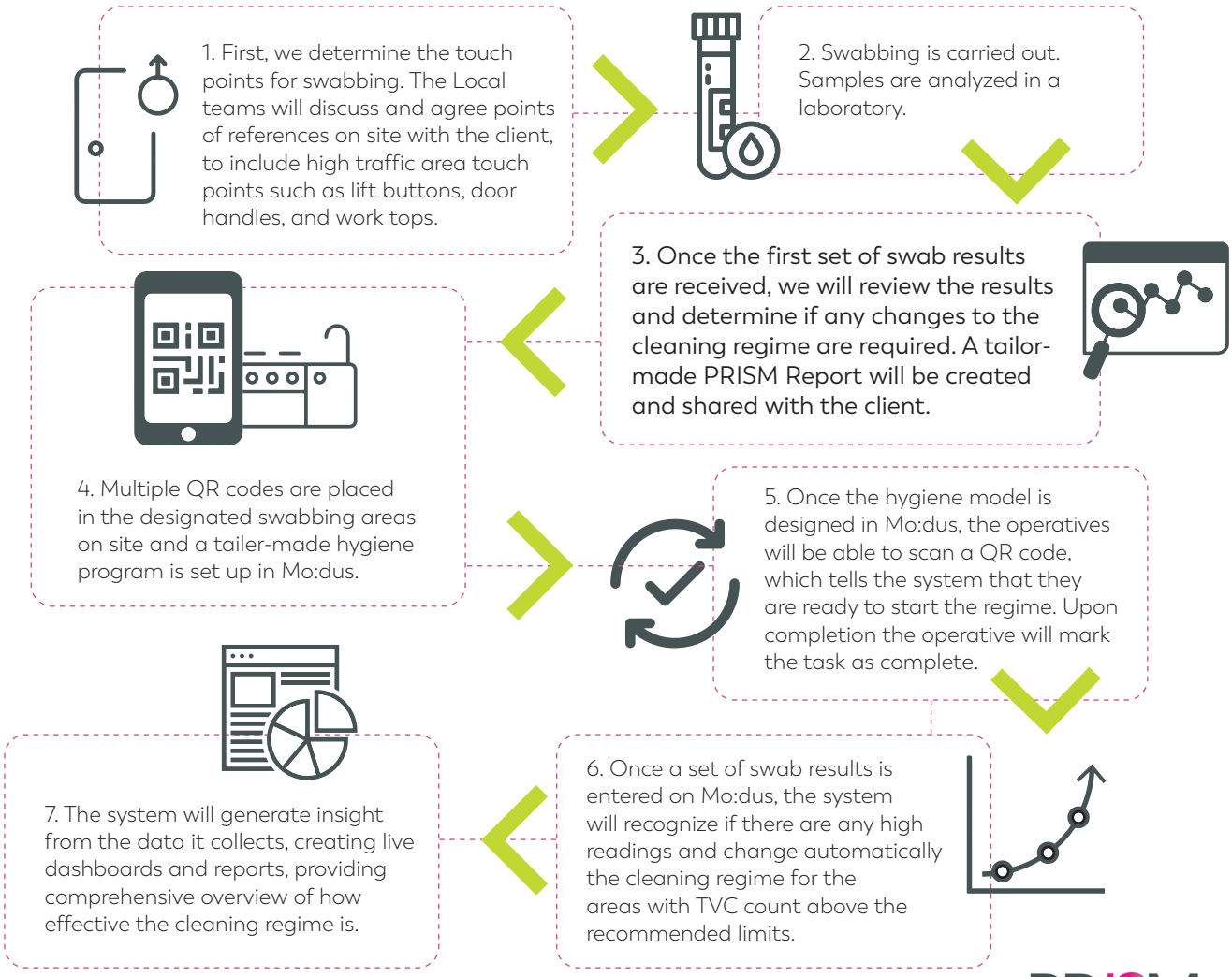
The onus is on those responsible for facilities, premises and estates, or employee wellbeing to create safe and hygienic workplaces. Poorly managed hygiene creates conditions for bacteria, viruses, and mould to breed and spread. Your building users encounter tiny particles in the air and on surfaces, which are created when they breathe, talk, cough, sneeze, or even just move.

Once these pathogens exist, then viruses and bacteria can easily spread across surfaces like desks, computer equipment, phones, and tables. Airflow can move these droplets around your entire building, especially through HVAC systems, further increasing the likelihood of transmission.

Proactive, thorough cleaning can prevent the spread of unwanted pathogens and a myriad of products have hit the market claiming to deliver that solution. However, providing and maintaining a hygienically safe environment requires a more comprehensive approach.

As part of Churchill's wider matrix of virus mitigation tools and services, PRISM enables workplace, property and facilities managers to understand the bacterial and viral content of certain environments in order to implement tailored infection prevention solutions. PRISM brings the realms of people, science and technology together to proactively and transparently manage bacteria levels and actions that will deliver assurance, confidence and a hygienically safe workplace for all.

PRISM in action



PRISM
The mark of confidence in workspaces

Conclusion – Call to action

There is no doubt that the coronavirus pandemic has brought about a paradigm shift in the way we approach cleaning and hygiene in the workplace. It is increasingly clear that neglecting proper protocols and processes can result in dire consequences so cleaning has not only taken centre stage, but become a critical boardroom issue for many organisations.

The connection between employee wellbeing and the workplace has also come to fore, with concerns around health and safety requiring business leaders to prioritise how they manage their buildings. Creating a workplace that is hygienically safe is not only essential for encouraging employees to return to the office but also for retaining and attracting talent.

It is widely agreed that cleaning programmes need to be science-led. Organisations need to provide more than surface level appearance of cleanliness and provide evidence of hygiene safety. This means implementing robust hygiene programmes, reviewing and updating them and reporting on the results. It is down to facilities managers and the FM industry to ensure the safety and wellbeing of building occupants. By embracing science-led approaches, collating data, rigorous analysis and leveraging programmes like PRISM, FMs can gain a comprehensive understanding of the bacterial and viral content in their workplaces and implement tailored infection prevention solutions.

Effectively managing the hygiene safety within workplaces will mean organisations can deliver a safe and attractive environment, alleviating employee concerns and facilitating a more productive workplace. A commitment to prioritising health and wellbeing will not only protect employees and building users, but will contribute to the long-term success and resilience of the business.

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Appendices

Key terms and acronyms explained

ATP	Adenosine Triphosphate is an energy molecule found in the cells of all life forms.
Coagulase positive staphylococci	A common cause of infection especially in wounds that is found on hands and in the nose and throat of healthy people, which can also be found on surfaces. MRSA is a common antibiotic resistant form of Staphylococcus aureus (methicillin resistant Staphylococcus aureus)
Coliforms	These are an indication of faecal contamination and is usually an indication of poor hand washing and disinfection practices
Decontamination	Decontamination in the context of PRISM is the removal or destruction of microorganisms from the environment.
E. coli (Escherichia coli)	A common species of bacteria that has been notorious in causing gastroenteritis from contaminated food and water and is a (Coliform)
High touch points termed “hot spots”	These are surfaces that are most commonly touched by hands such as door handles, stair rails etc. where potentially harmful microorganisms may be transferred to other people and surfaces by frequent touch.
Nucleic Acids	Nucleic acids are the DNA/RNA that can be detected on surfaces by swabbing showing the presence and identification of potential viral contamination for the purposes of PRISM.
Pathogen	A pathogen is a microorganism that is capable of causing infection/ disease.
“Smart”	Smart is the application of efficient technologies and systems best suited for the to take into consideration a number of factors such as effectiveness, cost, time, sustainability, carbon footprint, labour etc.
Swabbing	Swabbing is a method of sampling a surface (or person) for microorganisms using a basic sterile cotton wool swab. These can then be sent to a laboratory so that microorganisms present can be counted (TVC) and tested for potentially harmful microorganisms.
TVC	Total Viable Count - is the total number of bacteria and fungi detected on a sample point - can be used as a marker to measure the effectiveness of a cleaning and/or disinfection process (hygiene).
VOC	Volatile Organic Compounds are organic chemicals that can be found in the air at normal room temperature, some of which are harmful.

Overview of the key IAQ parameters

Parameter	Definition	Sources	Impacts
PM2.5	PM2.5 is defined as fine particulate matter with a diameter less than 2.5m.	The main sources of indoor PM2.5 are combustion (e.g. heating and cooking), mechanical processes and biological particles (e.g. bacteria and viruses). Construction, combustion and other anthropogenic sources combined with natural phenomenon such as dust storms and high pollen levels all contribute to indoor PM2.5 concentration.	- Fine particles like these can penetrate into the lungs and bloodstream. - Short term exposure can cause irritation of the airways, coughing and cardiovascular problems. Long term exposure to fine particles can cause premature death from heart disease and lung disease including cancer. Exposure to fine particles has also been linked to prevalent anxiety and hypertensive disorders. - For every 10ug/m3 increase in levels of PM2.5 above the previous World Health Organisation (WHO) guideline of 10ug/m3, life expectancy is seen to be lowered by one year. - Although there is a guideline set by the WHO, there is said to be no safe level of PM2.5.
CO_2	CO_2 is a naturally occurring, colourless, odourless gas that makes up 0.04% (400ppm) of outside air. It is not harmful to health unless levels reach 4.0% of air composition (40,000ppm).	CO_2 sources are human and animal respiration and combustion products. Occupied indoor concentrations of CO_2 are significantly higher than outdoor.	- Elevated levels of CO_2 can cause up to 11% reduction in productivity, 23% impairment in decision making and 299% reduction in information usage. - High indoor CO_2 levels have been seen to aggravate respiratory problems and can cause stress, kidney calcification and bone demineralisation.
TVOCs	Total Volatile Organic Compounds (VOCs) is a collective term used to define the total concentration of a group of commonly occurring VOCs.	VOCs comprise a wide range of chemicals, which may be emitted over periods of weeks or years from construction and furnishing products. Examples include sealants, paints, wall and floor coverings, cleaning products, air fresheners and air-cooling refrigerants for building services.	- Short-term exposure causes adverse effects like eye and respiratory tract irritation, headaches, dizziness, visual disorders and memory impairment. - Long term health effects include prolonged eye, nose and throat irritation as well as liver, kidney and central nervous system damage and even cancer.

Overview of the key IAQ parameters continued

Parameter	Definition	Sources	Impacts
Temperature	Room temperature is the range of air temperatures that most people prefer for indoor settings which feel comfortable when wearing typical indoor clothing.	Temperature indoors is affected by many variables from occupant density to mechanical ventilation effectiveness	- Poor thermal comfort can contribute to sick building syndrome (SBS) symptoms (headaches, itchy skin, dry or sore eyes, blocked or runny noses and rashes) and impaired cognitive performance. - The ideal temperature in an office is between 21-24°C. The general rule is that for every degree above 25°C or below 20°C, productivity drops by 2%.
Relative Humidity	Relative humidity is the concentration of water vapour present in the air, expressed as a percentage	Moisture in the air arises from respiration and activities such as cooking and washing. The amount of water vapour present in the air directly affects occupant health and comfort, and also the presence of biological pollutants such as mould spores.	- Low relative humidity (<30% CIBSE <40%) causes eyes and skin to become dry and irritated and can aggravate conditions such as asthma. It also increases the risk of developing common colds, flu and other infections. - High relative humidity (>60% CIBSE >70%) can impact feelings of lethargy and exacerbate allergies and respiratory diseases. - High levels can also affect the concentration of volatile organic compounds (VOCs).

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