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ZOONO ANTIMICROBIAL PROTECTION:
HOTEL CASE STUDY

Introduction

Zoono is an innovative technology that aims to improve health and well-being by providing pioneering, durable germ protection. Zoono Group Ltd is a Global Biotechnology company that develops, manufactures a suite of long-lasting, scientifically validated antimicrobial solutions. As a company, Zoono not only believes in its technology being able to provide enhanced antimicrobial protection within industry, healthcare, transport, and household settings, but regularly carries out in-field trials to prove it. It is important to note the limitations of traditional disinfection products using active ingredients such as bleach or ammonia. These products are only effective whilst wet and recontamination of surfaces and skin can occur once the product has dried. Misconception about how long alcohol-based hand sanitisers remain effective for has come to light in various studies published online, with some members of the public not realising these products are only effective for around two minutes.

Testing is carried out within public transportation to assess the performance of Zoono Z-71 Surface Sanitiser when utilized in conjunction with the normal cleaning routine. It is widely accepted that germs spread quickly in areas where there are high volumes of people, through close contact and via environmental surface contamination. The high levels of footfall in busy buildings makes the opportunity for germs to spread very easy. The trials are designed to assess the benefit of applying Zoono by taking ATP measurements pre-application and at several time points post-application, as a method of assessing product efficacy and its ability to reduce levels of surface contamination over time.

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The Zoono Technology

Zoono is a non-leaching, colourless and alcohol-free surface sanitiser that will modify the way the surface interacts with microbes. Zoono Microbe Shield is scientifically proven to be a longer-lasting water-based protectant that has a similar toxicity level to Vitamin C. Zoono provides an invisible protective barrier that covalently bonds to a range of surfaces to provide long-lasting protection against numerous pathogens including bacteria, fungi, and viruses. A positively charged layer of microscopic pins attract and lyse negatively charged pathogens. This invisible layer of pins causes the cell wall to rupture resulting in the pathogen breaking up with lethal effect.

It is well documented that bacteria and viruses can last for long periods of time on hands and surfaces (Hirose et al., 2020; Rawlinson, Ciric and Cloutman-Green, 2020). It is also evident that traditional disinfection has limited disruptive effect, as they are only active when in their wet phase, allowing recontamination to occur once the surface has dried. Surfaces that look and smell clean can quickly become a source of numerous pathogens, enabling the spread and transmission of disease. A recent study found COVID-19 present on a hospital bed was able to spread to 18 other surfaces within 10 hours (Rawlinson, Ciric and Cloutman-Green, 2020). This is where Zoono products come into play. Zoono bridges the gap between routine cleaning processes, modifying the surface to be disruptive to bacteria and viruses between routine cleaning. Zoono works as part of the greater solution for Infection Prevention and Control (IPC), posing as a new and important tool for the enhancement of IPC in the future.

Benefits of Zoono Microbe Shield include:

- Longer-lasting, effective for up to 30 days
- Ready to Use formulation
- Water based (does not contain alcohol)
- Does not promote microbial mutation (superbugs)
- Shelf-stable for 3 years
- Non-damaging to surfaces
- Not flammable
- Non-staining
- Odourless

Zoono has quantitative data supporting its efficacy from many internationally recognised laboratories. Zoono also enjoys registrations and approvals in numerous major countries, including Europe, America and Australasia.

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Case Studies: Surface Testing

Test Set Up

Testing was conducted to assess the performance of Zoono Z-71 Surface Sanitiser when utilised in conjunction with the routine cleaning routine. The testing was conducted from 8th May – 5th June 2019 in Dorint Hotel Group based in Germany, EU. The testing was conducted in conjunction with a representative from Dorint Hotel Group to oversee that the testing was conducted fairly. During the test period, there were no alterations to the routine cleaning and housekeeping protocols. This was specifically designed so the addition Zoono to the cleaning routine was the only factor being changed/assessed. This means the difference between the Post-Zoono application results and the Baseline results can be attributed solely to the addition of Zoono Z-71 and the enhanced, long lasting protection against germs it provides.

Two rooms were selected to participate in the study, one of which was a Zoono treated room and one of which was the control room. Both rooms were cleaned throughout the 4-week trial period as per the normal cleaning routine. Within each of the rooms, the same 10 test locations were selected and are as follows: Sink Tap, Toilet Seat, Remote Control, Shower Tray, Hair Dryer Handle, Shower Cubicle Handle, Shower Tap, Toilet Flush, Toilet Brush Handle and Toothbrush Holder.

Initial ATP Readings were taken prior to the application of Zoono (in both Control and Zoono treated rooms), and this was used as a baseline reading that was taken to be representative of the normal levels of surface contamination when cleaning with the normal housekeeping protocols. Zoono Z-71 was then applied via fogging at 20 microns or lower and allowed to dry for 30 minutes. A secondary reading was then taken to assess surface contamination levels immediately post-application of Zoono. Further readings were taken in both the control room and the Zoono treated room at 7, 14, 21 and 28-days post initial application of Zoono. Accurate records and photographic evidence of locations were recorded in order to ensure the same areas were tested at each reading.
ATP is a measure of a molecule called Adenosine Triphosphate which is present in all living organisms and is measured in Relative Light Units (RLU). Whilst ATP is a measure of all living matter, it is widely accepted within the food and healthcare industries as a quick, useful measure of environmental contamination.

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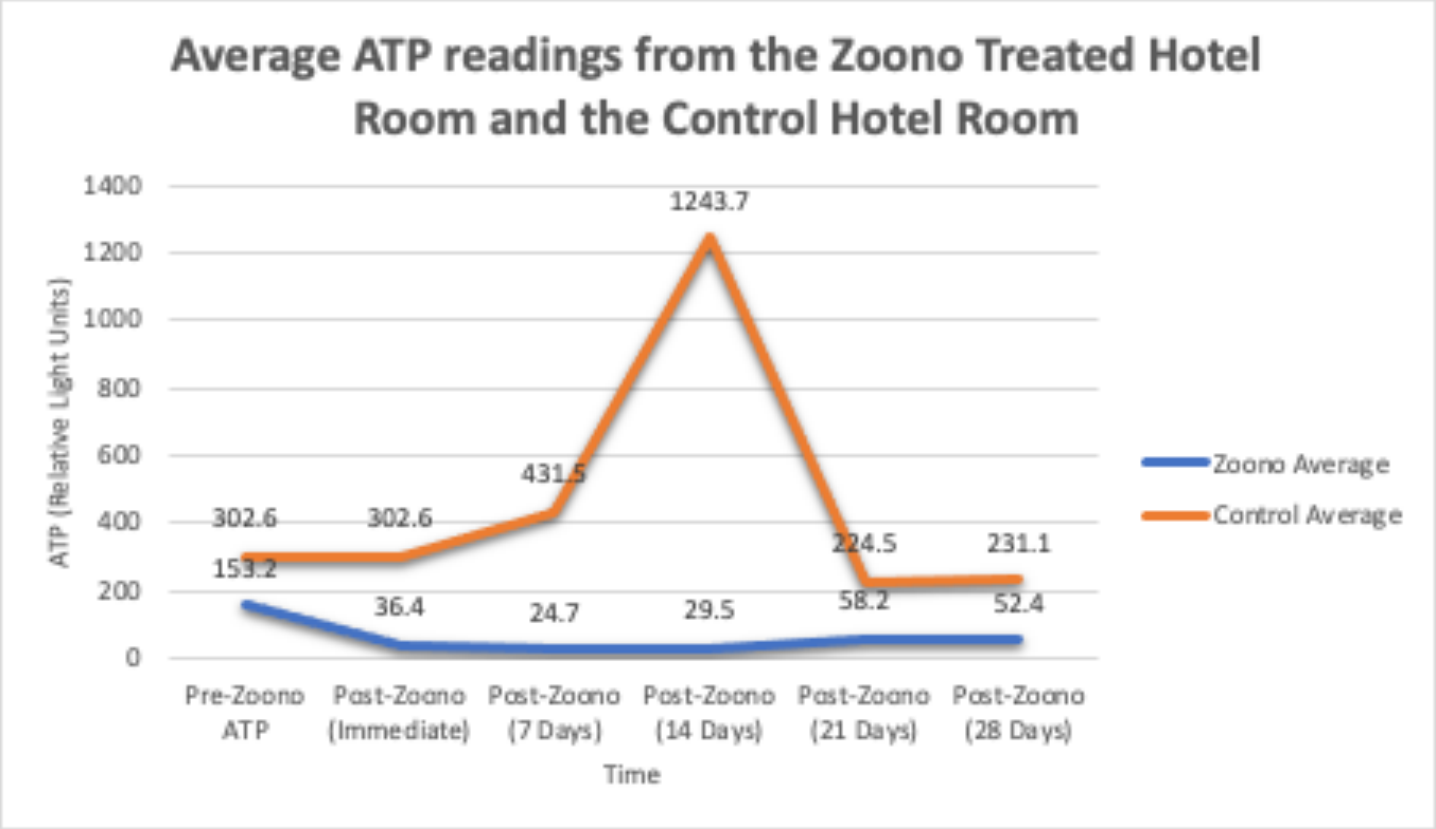
The Data

Graph 1 – The Average of ATP readings taken from the Zoono Treated Hotel Room and from the Control Hotel Room from the 10 selected locations in each room.



Data Discussion

The blue line on Graph 1 shows the average readings from the selected locations within the Zoono treated room. A substantial initial decline of 76% can be seen after the initial application of Zoono, that either continues to decline or remains low throughout the duration of the testing. All readings from initial application through to 28-days later are <60 RLU which is considered 'clean' within the food and healthcare industries. From the baseline reading until the 28-day post Zoono application reading, a reduction of 66% in surface bio-load has been achieved.

The orange line shows the average readings from the selected locations within the Control room. There was no change in frequency, duration, or strength of the routine cleaning protocol during the test period. The variable nature of cleanliness achieved over the 4-week testing period is evident from Graph 1. At the end of the 28-day testing period, the control room showed 4.4 x more surface contamination than the Zoono treated room. Looking at the spike at the 14-day test point, the level of surface contamination was 42 x higher in the control room.

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Observations

- Immediate reduction in surface contamination of 76% when compared with baseline results From the starting point of the trial (Pre-Zoono application) to the end of the trial (28 days later) there was an overall reduction of 66% in surface contamination
- Average ATP readings were <60 RLU at 28-days post-application of Zoono
- At the 28-day test point, there is more than 4.4 times greater surface contamination on the untreated control areas, compared with the Zoono treated areas.

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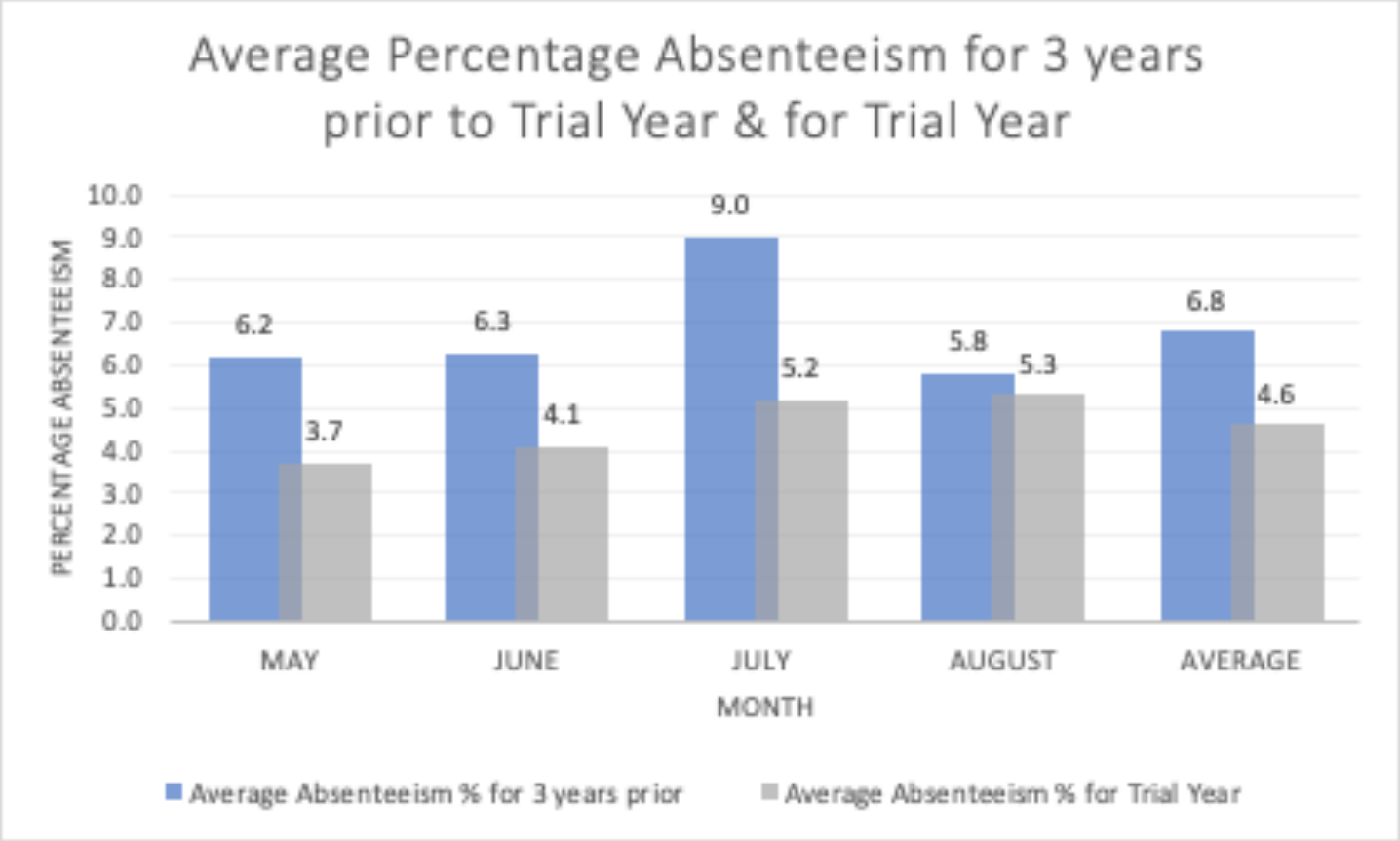
Case Studies: Absenteeism

Test Set Up

During the winter months of 2015, a trial was completed for a major international insurance company in Auckland, New Zealand. The 100-seat call centre received wall mounted hand-sanitiser for application of Zoono Hand Sanitiser at the start of each working day. Also, all working areas were treated with Zoono Z-71 Surface Sanitiser via fogging at 20 microns, areas included workstations, staff equipment and communal areas.
The success of the trial on the levels of absenteeism within the company were determined by comparing the absenteeism rate over the trial-winter with the absenteeism rates for winter from the previous three years (2012, 2013, 2014).

The Data

Graph 2 – The Average Percentage Absenteeism for the 3 years prior (2012, 2013, 2014) to the trial year (2015) in blue and the Percentage Absenteeism for the Trial year where the workplace was treated with Zoono Surface Sanitiser & the staff given Zoono Hand Sanitiser



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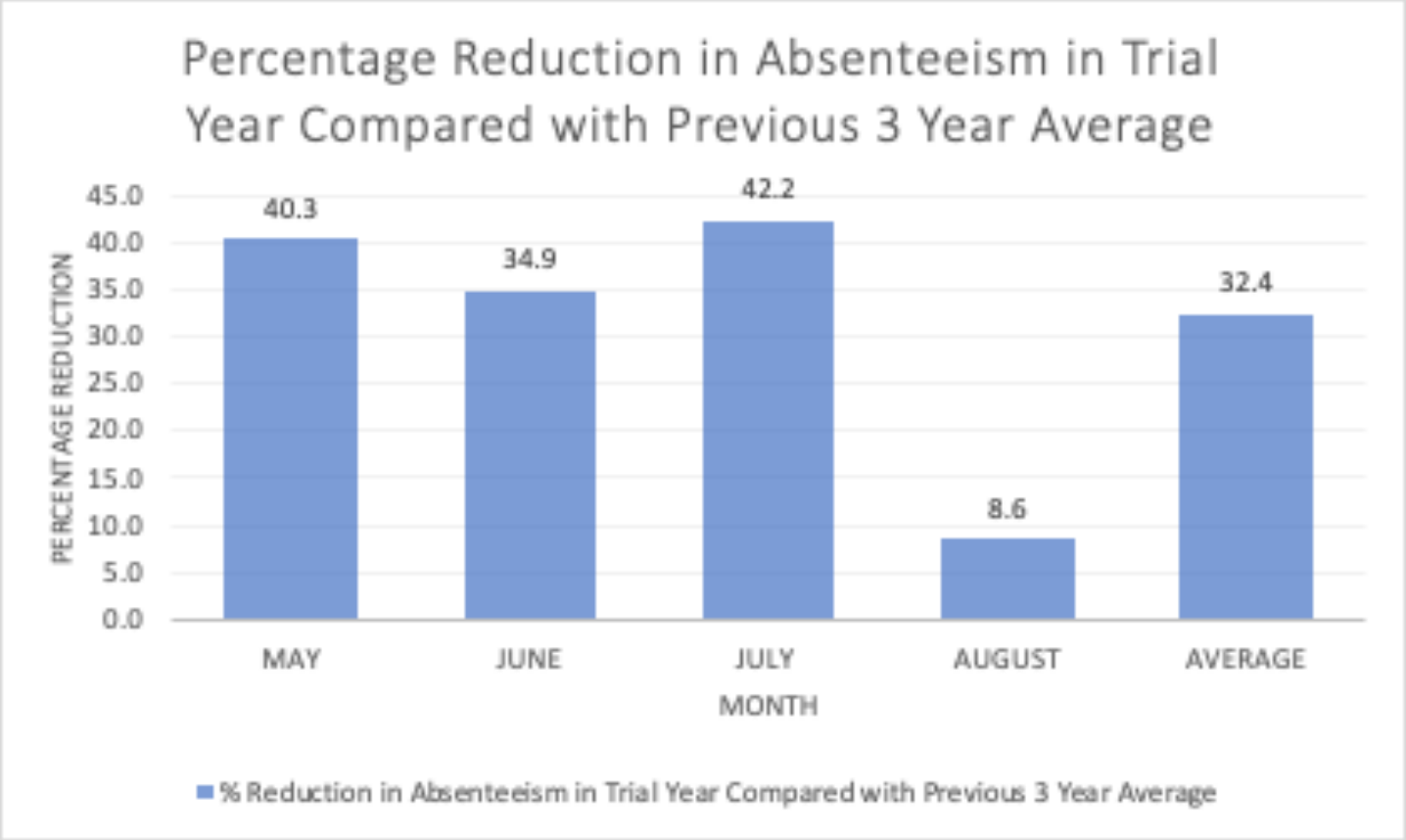
The Data

Graph 3 – The Percentage Reduction in Absenteeism in the Trial Year (when utilising Zoono products), compared with the previous 3 year average for absenteeism.



Data Discussion

Graph 2 shows the average percentage absenteeism for the 3-year average during winter prior to the trial winter (blue bars). This was accepted as the typical level of absenteeism during these months for the purpose of the trial. During the trial months, where Zoono was utilised (grey bars), the absenteeism percentage can be seen to be significantly lower than the average for the three years previously. The average level of absenteeism during the 3-year average is nearly 1.5x greater than the absenteeism during the trial winter.

Graph 3 shows the percentage reduction between the three years prior and the trial year. The overall average reduction in absenteeism through the winter months when using Zoono was 32.4% when compared with the previous 3-years. The highest reduction in absenteeism is 42.2% in the month of July. When comparing the reduction in absenteeism with just the previous July (2014) there was a reduction of 56.9% (12.13% absenteeism in 2014 compared with 5.23% absenteeism in 2015).

The use of Zoono products within the workplace does not negate for any false sick-days, where those members of the team off 'sick' are not genuinely unwell. If these factors could be accounted for, it is expected that the actual reduction in absenteeism as a result of genuinely illness would likely be greater.

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Observations

- Average absenteeism reduction of 34.2% when using Zoono products, compared with average absenteeism from previous 3 years
- Reductions in absenteeism as high as 42.2% can be seen when using Zoono, compared with the previous 3 years
- When compared with the previous year's absenteeism, reductions of up to 56.9% can be seen, which has potential for a huge increase in productivity and subsequently be more cost efficient

Cost Efficiency

It is estimated that in the UK, workplace absence can cost businesses £29 billion/year. It has been established that employers investing in their workplace health and wellbeing can expect to receive increases performance and productivity from its workforce (Employee Benefits, 2018). Some employer consequences of absenteeism include decreased productivity, increased costs and higher resultant pressure on employees working without a full team. A study conducted within a multi-department site found cost reduction of approximately £9,500/ month (across 6,000 sqm) when using Zoono. Another study conducted at a much larger site (approx. 93,000 sqm) found savings of 13% per month (£118,000) when compared with their previous cleaning routine.

Conclusions

Revolutionising the way surfaces are protected with Zoono's antimicrobial technology can help prevent the spread of potentially harmful germs within the home and workplace. Given health, disinfection and personal protection has been catapulted to the forefront of the media over the last year, there is no better time to invest in advancing both personal safety, and the safety of colleagues, visitors and clients. Given the benefits associated with using Zoono within public transport, adopting Z-71 into the cleaning routine would benefit overall levels of health and wellbeing, significantly reduce levels of surface contamination, increase staff productivity as well as reducing absence.

It would be of benefit to employ the use of Zoono Hand Sanitiser within the workplace for staff to use at the beginning of each shift, also making the product readily available for travellers to use upon entry. This would further help reduce the spread of germs via high touch point areas and skin-to-skin contact. Zoono Hand Sanitiser should be used in conjunction with good hand hygiene to remove large particles that can block the Zoono antimicrobial layer from being able to work.

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Appendix 1
Raw Data: Surface Testing

		08.05.19	08.05.19	15.05.19	22.05.19	29.05.19	05.06.19
Treatment	Location	Pre-Zoono ATP	Post-Zoono (Immediate)	Post-Zoono (7 Days)	Post-Zoono (14 Days)	Post-Zoono (21 Days)	Post-Zoono (28 Days)
Zoono (Room A)	Sink Tap	21	0	12	6	225	6
Zoono (Room A)	Toilet Seat	205	46	13	24	23	17
Zoono (Room A)	Remote Control	113	15	105	113	10	151
Zoono (Room A)	Shower Tray	64	33	13	14	8	6
Zoono (Room A)	Hair Dryer Handle	497	57	5	45	6	143
Zoono (Room A)	Shower Handle	84	10	31	14	23	66
Zoono (Room A)	Shower Tap	120	81	39	41	207	97
Zoono (Room A)	Toilet Flush	97	30	12	13	32	25
Zoono (Room A)	Toilet Brush Handle	319	84	15	7	29	11
Zoono (Room A)	Toothbrush Holder	12	8	2	18	19	2
Zoono (Room A)	Zoono Average	153.2	36.4	24.7	29.5	58.2	52.4
Control (Room B)	Sink Tap	62	62	174	215	119	584
Control (Room B)	Toilet Seat	50	50	70	39	85	23
Control (Room B)	Remote Control	154	154	1304	3881	295	484
Control (Room B)	Shower Tray	2188	2188	1810	7394	336	268
Control (Room B)	Hair Dryer Handle	82	82	93	109	300	241
Control (Room B)	Shower Handle	202	202	348	215	492	25
Control (Room B)	Shower Tap	163	163	324	424	490	314
Control (Room B)	Toilet Flush	18	18	42	31	50	233
Control (Room B)	Toilet Brush Handle	61	61	116	73	42	110
Control (Room B)	Toothbrush Holder	46	46	34	56	36	29
Control (Room B)	Control Average	302.6	302.6	431.5	1243.7	224.5	231.1

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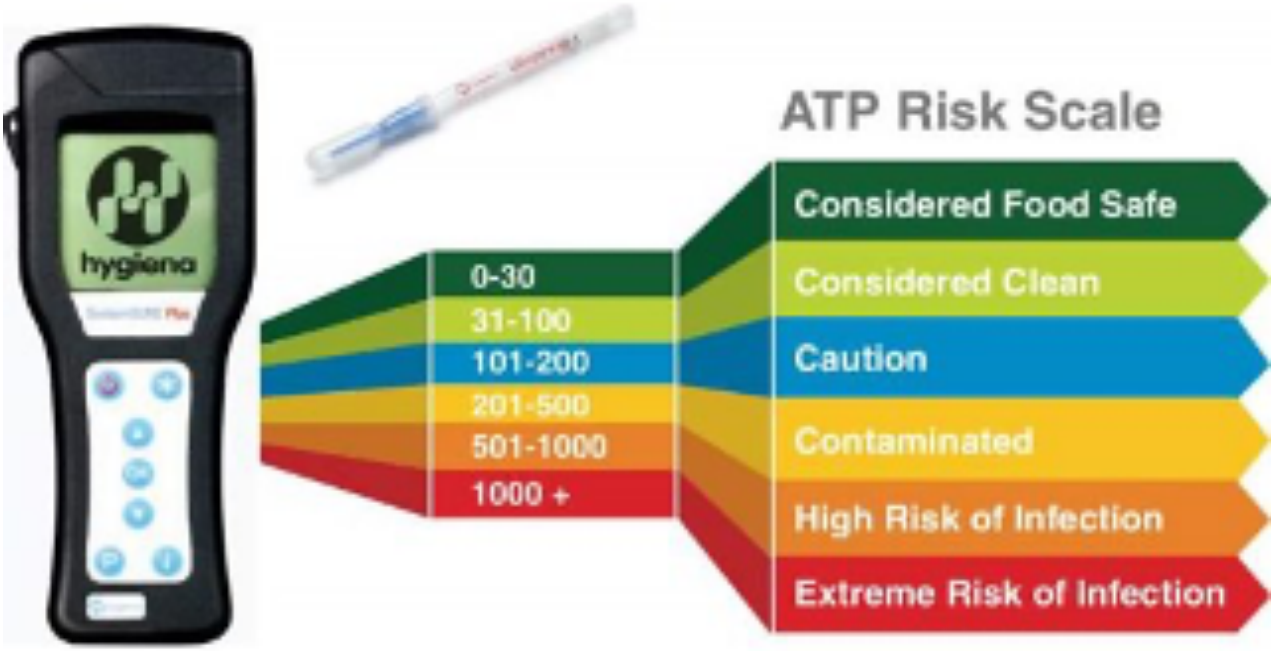
ATP Risk Scale



ATP testing was used to decipher the surface contamination levels. ATP is a commonly accepted method of testing surface contamination in many industries including Food Production & Healthcare. ATP detects the presence of Adenosine Triphosphate which is a molecule present in all living organisms in the measure of 'Relative Light Units'. The main drawbacks are the lack of specificity of the ATP reading (as it does not decipher between types of germs and cannot differentiate ATP from microorganisms, animals or plants). However, it is used widely and accepted as an estimation of surface contamination and is the only point-of-testing result that can be easily achieved & compared between industries at this time.

References

Employee Benefits (2018) Reducing Absenteeism in the Workplace [Online]. Available from: Reducing absenteeism in the workplace - Employee Benefits

Hirose, R., Ikegaya, H., Naito, Y., Watanabe, N., Yoshida, T., Bandou, R., Daidoji, T., Itoh, Y. and Nakaya, T. (2020) Survival of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and Influenza Virus on Human Skin: Importance of Hand Hygiene in Coronavirus Disease 2019 (COVID-19). Clinical Infectious Diseases: An Official Publication of the Infectious Diseases Society of America, https://doi.org/10.1093/cid/ciaa1517.

Rawlinson, S., Ciric, L. and Cloutman-Green, E. (2020) COVID-19 pandemic – let's not forget surfaces. The Journal of Hospital Infection. 105 (4), 790-791.

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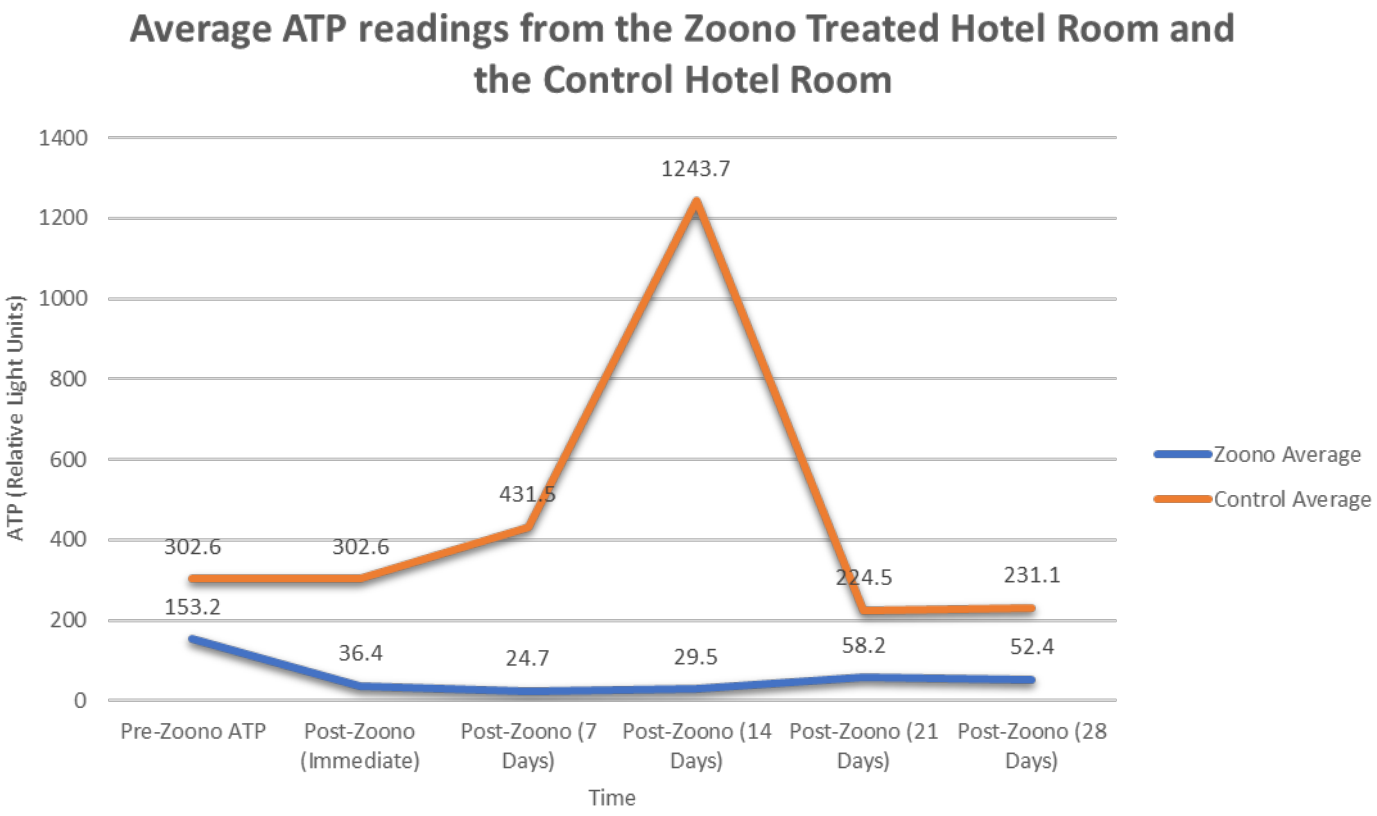
Hotel Case Study Summary

HOTEL CASE STUDY OVERVIEW



- The graph shows the average reduction from all locations tested with the use of Zoono (blue line)
- The control readings (orange line) show the variable levels of cleanliness achieved within the routine cleaning protocols
- From the starting point of the trials (Pre-Zoono application) to the end of the trials (28 days later) there was an overall reduction of 66% in surface contamination
- Average ATP readings for Zoono treated areas were <60 RLU at 28-days post-application of Zoono
- At the 28-day test point, there is more than 4.4 times greater surface contamination on the untreated control areas, compared with the Zoono treated areas
- Adopting Z-71 into the routine cleaning protocol can significantly reduce levels of surface contamination within hotels, in turn reducing spread of potentially nasty germs for staff and guests and increasing overall productivity

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Hotel Case Study Summary

HOTEL CASE STUDY: APPLICATION AND BENEFITS

- **Invest in your greatest asset:** Use Zoono and reduce sickness whilst increasing health & wellbeing of staff members. In return, staff members will feel valued and as a result be more likely to want to work harder for your company
- Zoono **protects against the potentially harmful germs** you cant see, working behind the scenes to prevent spread of illness in turn resulting in: fewer sick days (up to 34%), increased productivity, less pressure on well staff when other members of the team are off sick and **increased rate of return**
- Hotel staff are likely to come into contact with a wide range of people on a daily basis – **protect them against the risk of potentially harmful germs** that come with the job!
- Gives **guests and visitors peace of mind** that they are protected during their stay, giving your company a competitive edge in securing the health and well-being of your guests
- **Reducing use of potentially damaging and toxic chemicals** such as bleach and ammonia can help **protect your company assets for longer** - invest in your company effects in the long term by using Zoono

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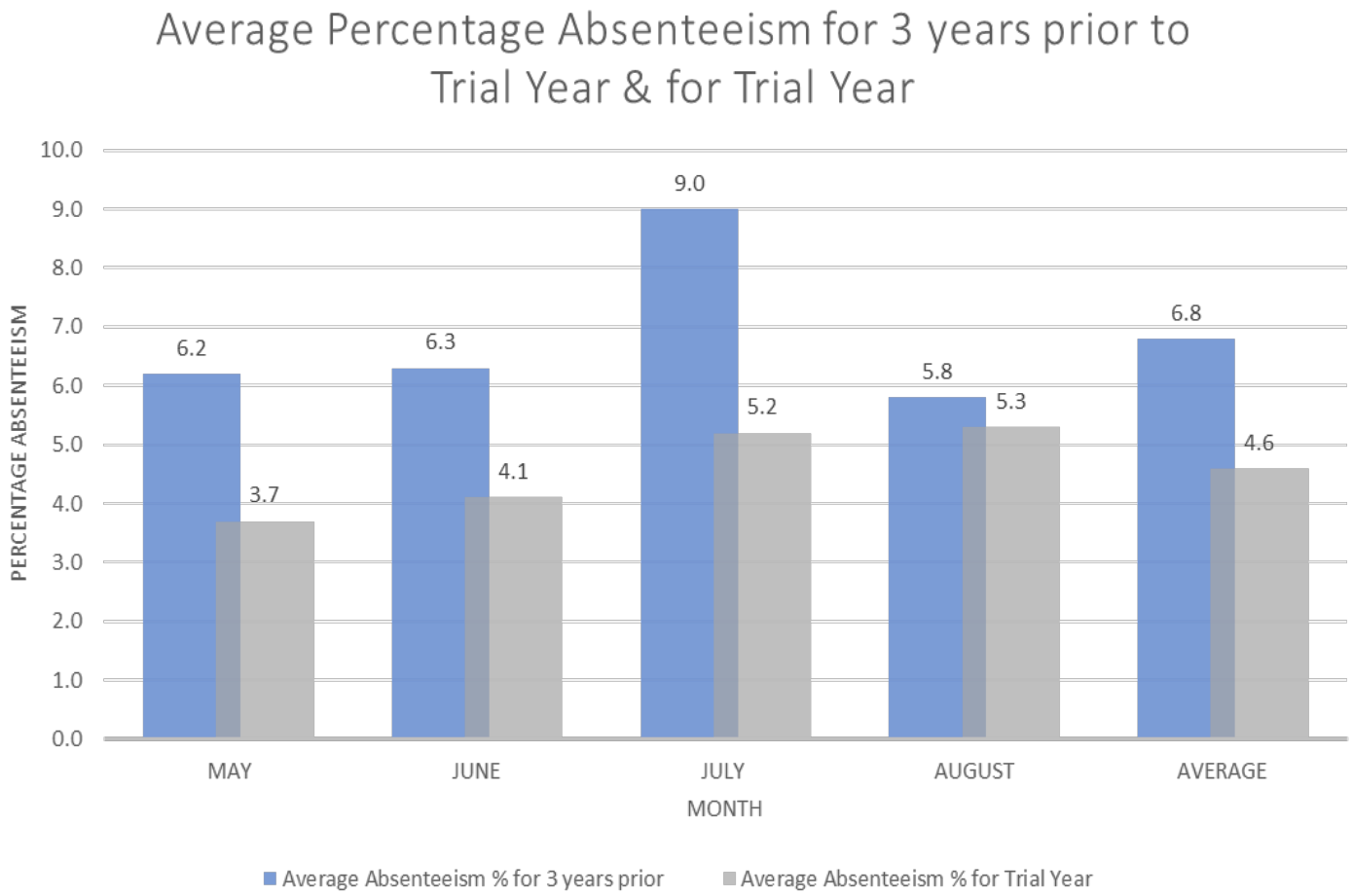
Hotel Case Study Summary

ABSENTEEISM CASE STUDY OVERVIEW



- The Graph shows the average percentage absenteeism for the 3-year average during winter prior to the trial winter (blue bars)
- When Zoono was utilised (grey bars), the absenteeism percentage can be seen to be significantly lower than the average for the three years previously
- An average reduction of 34.2% in absenteeism when using Zoono products within the company offices (fogging surfaces once/month and hand sanitiser available to all staff)
- Reductions in absenteeism as high as 42.2% can be seen when using Zoono
- Utilising Zoono products would benefit overall levels of health and wellbeing, significantly reduce levels of surface contamination, increase staff productivity as well as reducing absence.