Lessons from COVID-19

How the fight against COVID-19 can be used as a model for
effective pest management

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In the editorial of the last edition of the **FAOPMA Magazine, I discussed how the strategies implemented to combat COVID-19** closely parallel that of successful pest management.

In this article, I wish to expand on the previous discussion. I will be examining how one country, Taiwan, has effectively managed to minimize the COVID-19 disease burden and the various strategies they employed to achieve this amazing result. These approaches can then be used as a model for bed bug eradication. While a number of countries have had excellent results in protecting their people during the COVID-19 pandemic, the strategy of Taiwan has been very well documented and hence the focus on this countries' achievement.

Being an island nation has afforded Taiwan some protection from COVID-19. However, the country is tiny, barely 140x400km, and densely populated with close to 24 million people. Population density is a key risk factor for infectious diseases; the more people within an area, the greater the potential for mass outbreaks (hence the high rate of COVID-19 infections on cruise ships). Yet to date (7/Aug/2020) Taiwan has had just 477 COVID-19 cases and only seven deaths. By comparing these figures with other nations, one can obtain an idea of just how successful Taiwan has been in fighting the disease.

Table 1 lists a mix of nations; some that have managed to have relatively few disease cases, and

others that have been an unmitigated disaster. There is no question that the US and the political leadership of that nation has failed to protect their people. Not only have they had the most cases (over 5 million at the time of writing), the most deaths (over 162,000), the highest rate of infections (151.9 per every 10,000 people, which equates to one sick person in every 66 people), the highest number of cases in the one day (over 78,000), they also have had one of the highest death rates in the world. Even though the US makes up only around 4.3% of the world's population, they have had over 26.1% of the world's COVID-19 cases and 22.7% of all COVID-19 deaths. The sad fact is that the COVID-19 disease control strategy by the US government has been a complete and utter failure, and these statistics are going to become much worse in the upcoming months. It almost seems like that their COVID-19 policy is Darwinian in nature, namely get sick and become immune…or die.

Certain trends can be observed in the Table. The countries that have largely failed to implement effective COVID-19 mitigation measures have had more cases, a higher rate of infections, more deaths, and a higher death rate. The latter is due to hospitals becoming flooded such that equipment like ventilators are not available for everyone and medical staff are unable to provide adequate care.

Furthermore, there is also one extremely crucial benefit in reducing COVID-19 cases numbers

Country	No. Cases	Population	Cases Per 10,000	Deaths	Death Rate (%)	No. Tests	Testing Rate*
USA	5,032,179	331,198,130	151.9	162,804	7.0	63,139,605	13
Brazil	2,917,562	212,710,692	137.2	98,644	5.0	13,206,188	5
United Kingdom	308,134	67,922,029	45.4	46,413	15.1	17,515,234	57
Italy	249,204	60,452,568	41.2	35,187	15.0	7,099,713	28
China	84,528	1,439,323,776	0.6	4,634	6.0	90,410,000	1070
Singapore	54,555	5,854,932	93.2	27	0.0	1,474,372	27
Japan	42,263	126,435,859	3.3	1026	4.0	938,739	22
Australia	19,862	25,528,864	7.8	255	2.0	4,631,419	233
South Korea	14,499	51,273,732	2.8	302	2.1	1,606,487	111
Taiwan	477	23,821,199	0.2	7	1.5	82,737	173

Table 1. COVID-19 related statistics for ten countries.
*Testing rate = number of tests divided by number of positive patients. Updated 7/Aug/2020.
Source: Worldometer (www.worldometers.info/coronavirus/)

early; more on this later. Interestingly however, there are many lessons here relevant to bed bug management.

Thus how has Taiwan been so effective at reducing COVID-19 infections? Their strategy has revolved around the following elements:

- Preparation,
- Prompt action,
- Quarantine,
- Enhanced Surveillance,
- Cooperation,
- Factual Messaging,
- Evidence Based Solutions.

If all these elements sound familiar, then yes they are the hallmark of integrated pest management, and thus also directly relevant to bed bug control. Let's look at each of these items in more detail to see how the Taiwanese COVID-19 strategy relates to bed bug management.

Preparation and Prompt Action. In 2003 there was a pandemic of Severe Acute Respiratory Syndrome, more commonly known as SARS (which is also a coronavirus like COVID-19). In Taiwan, some 73 lives were lost and around 346 people affected by the disease. As a consequence, the government

implemented planning for future outbreaks. When China announced the emergence of a new coronavirus in Wuhan, the government of Taiwan immediately initiated actions to stem the virus. This included ramping up the production of face masks and other personal protection equipment.

Similarly with bed bugs, those that provide accommodation for others such as hotels, staff and student accommodation, guest houses, and low-income housing, should have a bed bug management plan in the event that bed bugs turn up in their facility. A good bed bug management plan should feature the following; staff responsibilities (namely who undertakes the various tasks), staff training, the control process, what documentation is required, and preventative actions. Ideally the management plan is reviewed on a regular basis to ensure that it maintains relevance. If bed bugs are then found in the facility, the management plan is immediately enacted and guides the entire control program. By detecting early, bed bugs are less likely to establish and spread throughout the facility.

In 2011, I wrote and released '*A Bed Bug Management Policy & Procedural Guide for Accommodation Providers*' and made this free to everyone via the web site, www.bedbug.org.au. This site also holds

the industry standard, '*A Code of Practice for the Control of Bed Bug Infestations in Australia*'. Everyone is welcome to download either of these documents and adapt them for their own circumstances. Thus there is no excuse in not being prepared for bed bugs.

Interestingly, George W. Bush (also known as 'George Bush Junior') developed a highly innovative pandemic disease plan in 2005 that was later updated in 2017. With an astounding sense of poor timing, this plan was dismantled by the Trump government in late 2019. I suspect that history will not look kindly upon this short-sighted decision.

Quarantine. Taiwan introduced strict quarantine measures when cases started to appear in the nation to slow down infections. COVID-19 positive patients were isolated until they recovered and physical distancing implemented to reduce the risk of viral transmission. Similarly, if a room within a multiple-occupancy dwelling is found with bed bugs, it should be immediately closed off and no one allowed into the room until the treatment process begins. Quarantine is about stopping the spread of the undesired element, be it bed bugs or the viral contagion.

Enhanced Surveillance. Early detection is the key for both reducing disease and the spread of bed bugs. In the case of the COVID-19 pandemic, Taiwan immediately initiated daily monitoring and symptom checks of high risk people, they introduced tracing Apps for monitoring disease cases, and began widespread testing to identify asymptomatic cases.

President Trump keeps telling the world how much testing his country has undertaken (and lately even disgracefully suggested that they should reduce

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testing to decrease the number of cases). In fact the number of tests undertaken in the US has been very high, around 63 million, and only second to that of China. However, a more appropriate comparison is to relate the number of tests undertaken against the number of positive patients. When there are a lot of sick people (or rooms with bed bugs), then there will be a disproportionately higher number of people in society infected with the virus (or a greater proportion of rooms infested with bed bugs). By undertaking widespread testing the aim is to identify everyone who could be carrying the virus with the objective to isolate them before they spread the disease to others. In this respect the US has done very poorly; for every positive COVID-19 case, there has been only 13 tests undertaken. In

comparison, Taiwan has undertaken 173 tests for every positive case, and China some 1,078. The widespread testing of these latter two countries is probably the main reason why they have had such low rates of COVID-19 in the community.

With the detection of any bed bug infestation, all adjoining rooms need to be inspected. Like COVID-19, contacts of the person with bed bugs should be investigated to find additional infestations (this is known as 'contact tracing'). In apartment complexes, if bed bug infestations become frequent, then every room in the building should be inspected. Take for example the case of a staff accommodation block with 320 rooms on the campus of one of the major hospitals in Sydney. Bed bugs were initially reported in May 2003 from one room, but was poorly treated, with the outcome that the infestation spread. Some two years later, bed bugs had not only spread but had been reported from 10% of the rooms. It was then decided to examine every room, and another 10% of rooms were found with bed bugs. If not every room was checked, then the infestation could have spread to all the rooms and still be active today.

It is also important to inspect rooms even if the resident claims that they have no bed bugs. So often I have found such people to be the source of the infestation in a building. Too often management believes the statements of no bed bugs with people, and the consequence is that the infestation goes unchecked and can cause reinfestation throughout the building for months to even years later. Again, there are parallels here with COVID-19, as widespread testing aims to detect the asymptomatic individuals (those that do not develop disease symptoms) as they can still spread virus to others.

Clearly, surveillance is key not only in minimizing both bed bugs and COVID-19 disease, but also to rapidly stop outbreaks from either.

Cooperation. Political governments in nations with successful COVID-19 control have been united. Party politics have been put aside and a bipartisan approach adopted. Politicians often have stepped out of the limelight to allow medical experts to dictate the control plans. John Dickinson, known as the founding father of the United States of America coined the phrase, "*United We Stand, Divided We Fall*"

and this expression cannot be more demonstrated with the political actions of those nations hard hit by COVID-19. So often we see the leaders of these nations criticize and blame others. Both Trump and Bolsonaro (President of Brazil) have denounced lock down actions where they have been undertaken by the opposition. The outcome has been nations that have become socially divided with rampant disease activity. The consequences have been the emergence of other social problems such as the racist attacks by those in power leading to the Black Lives Matter rallies in the US.

Bed bug management is also a cooperative venture. As a pest manager you will require the client to do certain things. They may be asked to prepare the room for treatment, you may require hotel engineers or housekeeping to dismantle beds and bed heads, to remove electrical outlets and various furnishings. You may require assistance to access certain areas for inspection and treatment. Then at the completion of the job, you may need cracks and crevices sealed, old signs of bed bugs removed, and other activities to reduce the risk of future infestations. Without cooperation, bed bugs treatments often fail.

Factual Messaging and Evidence Based Solutions. Public information is key to minimizing disease outbreaks, however it must be consistent, factual, and based on solid scientific evidence. Misinformation has been an unwanted side effect of the COVID-19 outbreak and it is creating confusion in the community. Key political figures have talked about using malaria drugs, bleach, and even light to combat the virus, when there is not one scrap of evidence to suggest that any of these have any benefit. In fact a number of people have even died as a result of following such ill begotten suggestions. Expert advice should come from *experts*, namely infectious disease experts who have worked on viruses, not from someone who believes in their own dogma. Political leaders should wear face masks and become role models for how the disease needs to be controlled, and not act like petulant children who refuse to follow expert advice.

This is no different with bed bug management. For example, there have been many dubious products come onto the market that are claimed to catch or kill bed bugs. This includes many traps

and pyrethroid based products such as mattress encasements. Often such devices are not tested against bed bugs, not tested against the right strain, or the person testing the product has been highly paid or has a commercial interest in the product. The Australian bed bug standard, '*A Code of Practice for the Control of Bed Bug Infestations in Australia*' has kept most of these products out of the local market, but this is not the case in other parts of the world. Always check that any bed bug management option is promoted within an industry standard or has been tested by independent researchers.

The other aspect in combatting both viral contagions and bed bugs is being factual about the extent of the problem. Recently, a spokesperson from the White House talked about 'embers' of infections in spite of a ranging inferno of virus flaming its way across the country. Astonishingly, this statement was made at a time when cases passed 50,000 in one day within the US. By down playing the problem, then people in the community do not take the situation seriously and are less likely to undertake basic preventative actions. Misinformation such as this then fuels the flames of the pandemic. Similarly in Brazil, over 23,000 deaths have officially been reported as 'acute respiratory infections', whereas medical experts believe that most died from COVID-19. It is worth noting that the two most COVID-19 impacted nations in the world are constantly down playing (i.e. lying) about the extent of the problem.

Likewise, being honest about the bed bugs problem is the first step in controlling the pest. Falsifying the extent of the issue can be very damaging in both the short and long-term. Take for example a case back in 2003 when there was a landmark law suit; a hotel in Chicago was fined USD$186K in punitive damages over bed bugs. The management of the facility refused to accept that there was a problem, and talked about bed bugs in euphemistic terms. They often called them 'ticks' to downplay the situation. As a consequence, the bed bugs were not treated and became rampant throughout the building. The ensuing law suit made worldwide news and set a precedent for litigation that is still often quoted to this very day. No hotel would want this level of publicity! The first step towards solving any issue, be it bed bugs or COVID-19, is admitting that there is a problem.

Final Thoughts. We have all seen bed bug numbers explode in recent years and this has been due to ineffectual control strategies. The rise in bed bug numbers due to poor pest control virtually mirrors the lack of disease control with COVID-19 in countries like the US and Brazil.

Perhaps the most important argument for Taiwan's COVID-19 disease mitigation strategy is that while the initial cost was high, in the end not only has the country saved thousands of lives, the strategy has prevented the loss of potentially billions of dollars. Furthermore, Taiwan have minimized ongoing costs after the pandemic ends. Many people who recover from COVID-19 develop chronic health problems, including persistent pulmonary (lung) damage, post-viral fatigue, and protracted cardiac (heart) complications. These patients become an ongoing financial burden to the health system of the nation. It is has been estimated by the World Monetary Fund that the global pandemic will wipe off USD$2 trillion dollars from the world GDP over the next two years. Those countries that have been heavily impacted will be paying this debt off for years. If only they had the foresight of Taiwan, then the number of deaths and the associated costs would have been far less.

In fact we have known this for years in bed bug management. By detecting early and acting quickly, the infestation is more easily controlled and costs reduced. As an example, in the case of the staff accommodation block mentioned above, if the room with the initial bed bug infestation was treated properly, control costs would have been around AUD$400. By the time the infestation had spread to encompass 20% of the rooms, costs skyrocketed to over AUD$40,000; a hundred fold increase!

Clearly, the parallels between COVID-19 and bed bug management are profound. Having been involved in bed bug management since the start of the modern resurgence, I cannot help but think that COVID-19 disease reduction strategies are *very* obvious. Perhaps I should have titled this paper "*COVID-19 Control, Lessons from Bed Bug Management*"! ◼

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