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Clearing the air for a healthier future: A closer look at Chai Jing's documentary 'Under the Dome'

To what extent does exposure to PM 2.5 in China contribute to health issues among the population, and how can we mitigate these effects?

The rapid growth of urbanisation and industrialisation in China has come with significant costs to China, with severe effects on the health of its population. The combustion of coal and emissions from vehicle engines and power stations are considerably higher than in any other country (IQ Air, 2023). This has resulted in significant levels of pollution, most notably Particulate Matter 2.5. The World Health Organisation's (2021) guidelines for annual average concentrations of PM 2.5 is 5 μg/m3. However, the yearly concentrations of PM 2.5 in Chinese cities are 12 times higher than the WHO's guidelines (Ali, et al., 2023).

This blog post addresses the research question, "To what extent does exposure to PM 2.5 in China contribute to health issues among the population, and how can we mitigate these effects?". To achieve this, it will begin by discussing and analysing Chai's (2015) documentary.

A Summary of 'Under the Dome: Air pollution in China' (2015) by Chai Jing

'Under the Dome' is a TED-style documentary presenting hard facts intertwined in personal anecdotes and interviews.

Chai opens the documentary by telling us a touching story of her daughter, who was born with a tumour. Chai recalls that she was aware and afraid of air pollution at that moment as she was now responsible for her daughter's breath. This resulted in Chai restricting her daughter from stepping outside due to the high pollution. In 2013, 175 were too polluted to take her daughter out. She recalls feeling like she had kept her child like a 'prisoner'. Although nothing she says is new information, the way Chai has formulated her documentary to be more in-depth and relate to real-life people would have made it a great way to start a debate surrounding public health issues due to pollution in China.

Throughout the documentary, great emphasis is placed on Particulate Matter (PM) 2.5 and its effects on the environment and, most importantly, our children's health. PM 2.5 is a fine particle with a diameter of less than 2.5 micrometres (Indoor Air Hygiene Institute, no date), making it completely invisible to the naked eye. (Taskforce for Lung Health, no date). In her documentary, Chai (2015) refers to this as a 'war where you cannot see your enemy'.

Personal reactions

The documentary 'Under the Dome', created by Chai in 2015, aimed to provide significant insights into the health and environmental issues caused by pollution in China. Using anecdotes and gathering people's experiences of the smog in China made the documentary significantly impact me as a viewer, as it was very eye-opening. This approach in documentary-making is essential in raising public awareness about an issue as critical as pollution. Although I watched this documentary almost a decade later, it is still as hard-hitting of a problem today.

One poignant story that deeply impacted me was a little girl who had never seen stars or white clouds. All she had ever seen was a "little blue" sky. Along with her story and Chai's daughter, they made me reflect on my childhood. I could not imagine the night sky without stars or white clouds on sunny days. Her story further fuelled my interest in environmental issues and the need to make changes for future generations. We should work towards creating a better world where children like her can experience what nature is supposed to be like. Especially since PM 2.5 pollution has detrimental effects on our health and is one of the biggest health concerns in China (Xu, et al., 2021), it is crucial to take responsibility to protect children who have had no part in the higher concentrations of PM 2.5.

What is the impact of PM 2.5 on China's population?

In Chai's (2015) documentary, she recounts her request to Peking University to place her in a room with high concentrations of PM 2.5 to analyse how her body reacts to such an environment. However, her request was refused as the air she breathed in every day outside was already much higher in PM 2.5 than the test room's 'ethical safety value'. Chai (2015) highlights that we live in an 'exposed experiment cabin' filled with PM 2.5 all our lives, which can harm our health.

The documentary highlights that PM 2.5 is a very fine particle that can enter the respiratory system, leading to irritation and inflammation of the respiratory airways. It has been reported by the California Air Resources Board (no date) that short-term exposure to PM 2.5 can result in 'acute and chronic bronchitis, asthma attacks' and 'respiratory symptoms. Furthermore, prolonged exposure can lead to 'premature death.' Research has found that exposure to PM 2.5 leads to the growth of cells in the lungs that carry cancer (The Francis Crick Institute, 2022). This can be seen in Chai's (2015) documentary, where she found that Benzopyrene (a carcinogenic) in Beijing is 14 times higher than the standard in China. Pollution has led to 'cancer villages' in China (Cui, 2020)

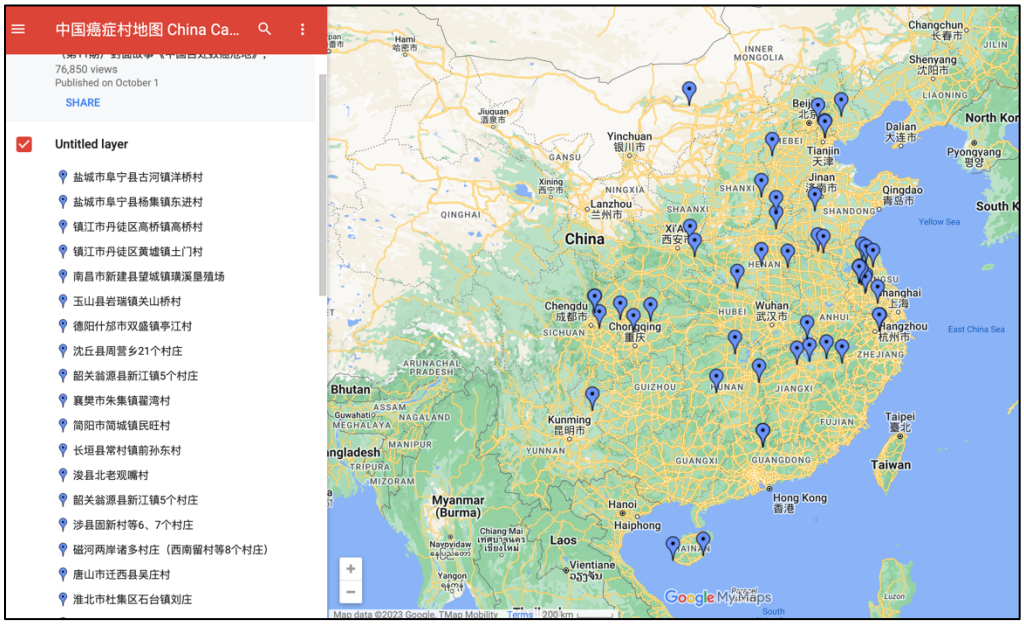

Figure 1: Google map created by Deng Fei to show the concentration of 'cancer villages throughout China (Google maps, no date)

Chai (2015) states that the population of premature deaths due to poor air quality is 500,000. However, as time has gone on, we find ourselves facing the fact that 1.7 million deaths were linked to PM 2.5 in China in 2019 (Health Effects Institute, 2020). Therefore, it is crucial to understand the impact of PM 2.5 on the respiratory system so China can take the necessary steps to address and mitigate its poor air quality issues (Xing, et al., 2016).

Who is most vulnerable to PM 2.5? Research suggests that over 65 are suffering from chronic heart or lung disease, and young children are most susceptible to health issues caused by PM 2.5. There are currently over 190 million people over 65 in China today (Gries, no date). Chai (2015) refers to this as a 'war against humans' as the most vulnerable are at risk. As China deals with an ageing population, this is cause for concern as the elderly are most vulnerable to diseases associated with air pollution (State of Global Air, no date). According to a study by Xu, et al (2021), an ageing population in China would increase PM 2.5-related deaths by 35.7-52.2% in 2030. Furthermore, as the working age of China's population is decreasing and has been since 2015 (Gries, no date), alongside premature deaths, this will exacerbate the issue of China's decreasing labour force. Therefore, China must continue to reduce PM 2.5-related deaths.

What have policy makers done and could do to tackle social and economic factors that contribute to urban air pollution?

China has begun to address the high levels of PM 2.5 in the atmosphere. In 2013, the Airborne Pollution Prevention and Control Action Plan (APPCAP) was announced to limit air pollution. The APPCAP successfully reduced PM 2.5 concentration in the atmosphere and decreased deaths linked to PM 2.5 by 6.8%, showcasing that China has made some progress in reducing premature deaths and improving overall population health from pollution. One of the significant points in the action plan was to control 'remote pollution' from cars by restricting the number of vehicles on the road in megacities such as Beijing and Shanghai (China Business Council for Sustainable Development, 2013). However, as we learn in Chai's (2015) documentary, from 2004-2013, zero vehicles were recalled despite regulations on cars without emission devices. In July 2023, China pledged to enforce stricter vehicle standards, highlighting the lack of enforcement and regulations over the past two decades (Lew, 2023). Nonetheless, it is hopeful that China is now taking steps to address this issue.

In 2020, President Xi Jinping committed to combating air pollution and reducing coal usage by 2026 while halting the construction of new coal-fired projects (Brown, 2021). Additionally, Xi has pledged that China will achieve carbon neutrality by 2060 (Hawkins, 2023). However, China has built over 60 coal-fired power stations nationwide (Brown, 2021). This increase in power stations conflicts with China's stated goal. It will not aid in decreasing PM 2.5 pollution levels, hindering the production of cleaner air and thus continuing harmful effects on our bodies.

Furthermore, China could create highly skilled jobs in sustainable industries (The World Bank, 2022) to support their transition to be carbon neutral and support the population that may worry about losing their jobs in power plants and steel production, briefly mentioned in Chai's documentary. By training and reskilling workers in fossil fuel industries (The World Bank, 2022), China can make an easier transition to reduce the PM 2.5 in the atmosphere and bring more attention to the 'haze' covering China by educating its population more.

Conclusion

To conclude, it is evident that pollution in China results in adverse health effects, such as respiratory diseases. Although China is aware of the pressing need to reduce its emissions and lower PM 2.5 concentration in the atmosphere, it continues constructing power plants and very loosely regulating car emissions, as discovered in Chai's documentary.

With an ageing population, it is imperative that China's policymakers step forward to reduce more unnecessary premature deaths due to air pollution so their already reducing workforce isn't compromised further. Phasing out fossil fuel industries and creating jobs in sustainable industries will serve to make a smoother transition to creating a healthier environment for people. Moreover, PM 2.5 has implications for other countries as it can 'travel large distances' (Liu, 2019), putting those in different countries at risk of disease due to China's pollution.

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