ACADEMIC

The upstream social determinants of asthma in New Zealand – A public health essay

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Abstract

Asthma is a complex respiratory condition that has a high prevalence and significant health burden in New Zealand (NZ). Proximal determinants of asthma development and severity are well established; however there exists an underappreciation of more upstream determinants that are guided by political, environmental and social elements. In particular, NZ's housing policy, climate change challenges and unaffordability of nutritious foods are significant root drivers of asthma development in the present and into the future. Importantly, upstream social determinants have an inequitable impact on asthma burden for Māori and Pacific peoples in NZ. Such disparities are perpetuated by broader elements of colonisation, institutional racism and inequitable policy development. An analysis of the distal drivers of asthma in NZ reveals a necessity for health professionals to question our nation's priorities and advocate for the targeting of upstream population level health determinants that promote equitable asthma outcomes.

Background

Asthma is a complex chronic respiratory condition that involves inflammation of the airway, bronchial spasms, and obstruction of airflow. Various stimuli cause exaggeration of these factors which, over time, can lead to remodelling of the airway structure. In New Zealand, one in eight adults and one in seven children take medication for asthma, with many more likely to experience some form of asthma symptoms.[1]

There are a number of proximal determinants of asthma development and severity. Fetal and childhood exposure to parental tobacco smoke is a well-established risk factor for asthma development.[2–5] Similarly, adults who smoke are at a greater risk of adult onset asthma.[2] Air pollution, particularly poor air quality precipitated by high nitric oxide and sulphur dioxide levels is also implicated in asthma development.[2] Further environmental causes are found in exposure to allergens such as moulds, pollen, and dust mites.[2–5] These factors are exacerbated by poor housing quality and by a warming climate.[2–4] Asthma severity in NZ is also determined by various barriers to effective prevention and management including healthcare accessibility, financial means, and inequitable care.[6] While individual factors, including genetics, have been found to play a role in asthma aetiology, wider environmental and societal factors undoubtedly have an important role in the development of asthma.[5]

In New Zealand there are stark inequities in asthma prevalence and severity between ethnic and socioeconomic groups. Māori are three times more likely to be hospitalised for asthma than non-Māori.[1] Similarly, Pacific peoples are 3.2 times more likely to be hospitalised than non-Pacific peoples.[1] Hospitalisations for asthma were also three times greater for those living in the most socioeconomically deprived areas than for those living in the least deprived areas.[1]

Asthma affects all age groups; however, the rates of asthma hospitalisation are five times greater for children less than 15 years old.[1] Social determinants are perhaps most pertinent to those under 15 years of age as they directly relate to the development of the disease. The incidence of asthma is much higher in children than in adults.[7]

Asthma has a range of impacts on individuals depending on severity and individual circumstance. Asthma patients experience frightening symptoms which can directly and indirectly (through the avoidance of triggers) have a negative effect on wellbeing.[8] Asthma mortality has been increasing since 2009 and is disproportionately higher for Māori and Pacific patients than for non-Māori and non-Pacific patients.[1] Employment, study, relationships, and the ability to carry out roles within whānau are also significantly affected by asthma.[8,9] These are compounded by debilitating stress leading to detrimental effects on *hinengaro*, difficulties in accessing and navigating healthcare, and long term management of the condition.[9,10] For New Zealand, the cost of asthma is estimated to be just over $1 billion per annum.[1] However, this does not include the wider societal costs of caring for individuals with asthma and the impact of asthma on an individual's ability to carry out societal and cultural roles.[9,10]

This essay focuses on how colonisation and institutionalised racism drives asthma inequity in NZ as well as three major upstream determinants of asthma development: housing policy, climate change, and unaffordability of nutritious foods.

Inequities in asthma development

Māori are disproportionately affected by asthma in NZ. The reasons for this inequity are multifaceted and are present at many levels of NZ society. Institutionalised racism is an important element in all determinants of asthma development in Māori. The manifestations of institutionalised racism in healthcare policy have been highlighted in decision making that favours majorities, misuse of evidence and a lack, or ineffectiveness, of consultation and cultural competency.[11] Historical inaction in adequately addressing asthma within the Māori population is a clear underlying factor that has precipitated a long tail of disparity.[11,12] Culturally incompetent approaches to asthma prevention and management that fail to consider Hauora Māori in its entirety are likely to create significant barriers that alienate and are ineffectual for Māori.[11–13] Feedback from Māori asthma patients has made it clear that the delivery of care should be collaborative, flexible, and incorporate aspects of *wairua*, *hinengaro* and *whānau*.[10,14] Institutionalised racism exists at an individual level and at the macro level. In NZ, Māori patients are less likely to be prescribed inhaled corticosteroids for asthma or have a peak expiratory flow measurement.[15] This creates disparities in the quality of asthma care which contributes to disease severity and is likely to be influenced by a practitioner's level of subconscious bias.

Colonisation is another important explanation for inequities in Māori asthma prevalence. Colonisation disrupted important health determinants for Māori through the loss of land, income, social organisation, and resources.[16] This has an impact on asthma development

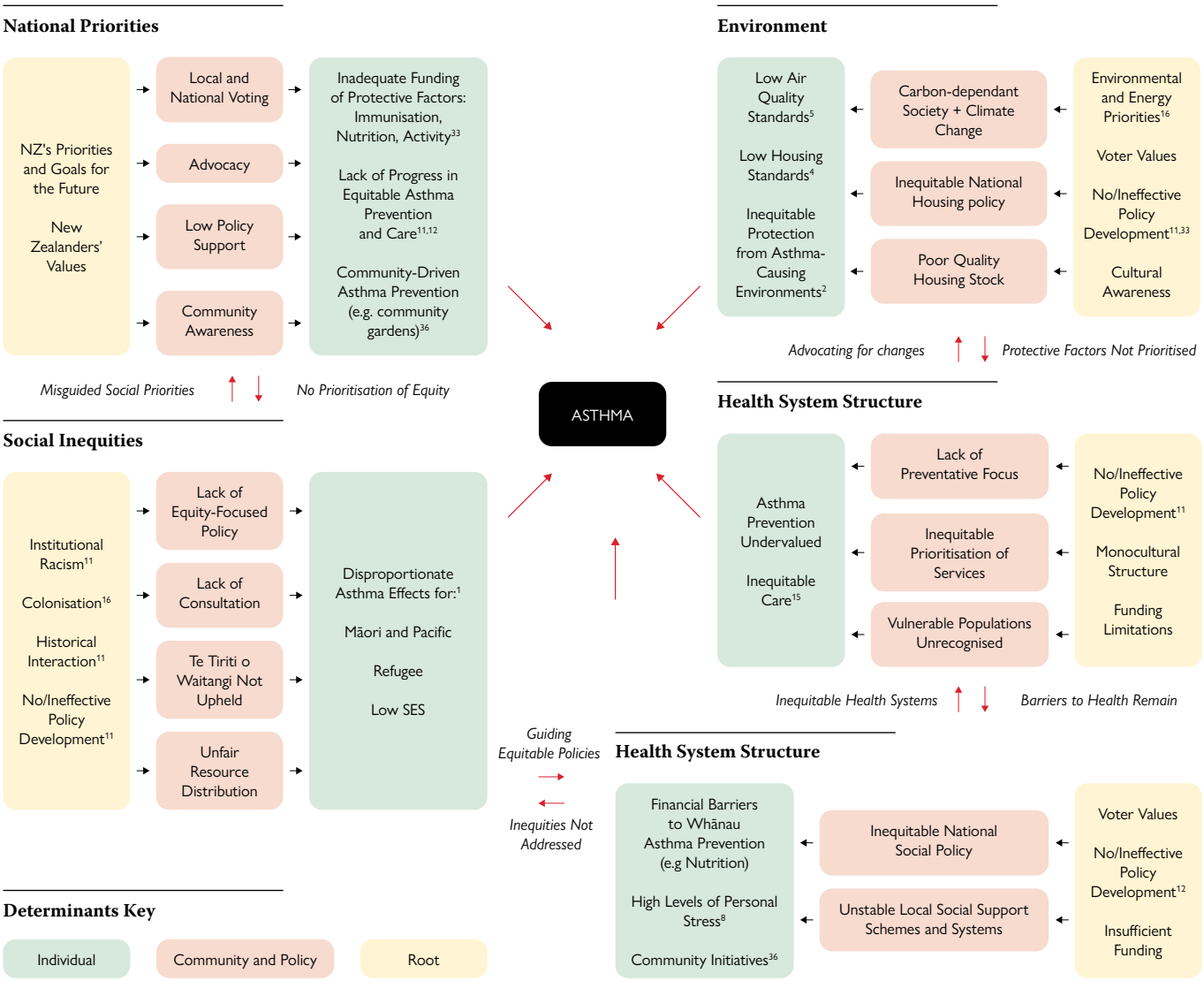

Figure 1: Infographic illustrating the social determinants of asthma development and severity. Distal "root" factors are in yellow, community and policy factors in orange, and individual factors in green.

in a broader sense as fragmentation of overall health and wellbeing leads to an increased risk of asthma through the development of co-morbidities and minority stresses.[12] Colonisation effected a dramatic change in the social structure of Māori whereby whānau adopted a more Eurocentric nuclear structure, particularly in the face of rapid urbanisation.[16] Consequently, Māori are more likely to live in overcrowded homes as the more inclusive concept of whānau is difficult to manage in housing stock built for the nuclear family.[17] It is clear that overcrowding of households, along with heightened allergen exposure from increased urbanisation, has contributed to increased rates of asthma for Māori.

Housing policy

New Zealand's housing policy has an important role to play in the prevention and manifestation of asthma. Roughly 25% of households in NZ experience energy hardship which contributes to damp, poorly insulated homes that are difficult to heat.[18] It is estimated that over one third of NZ homes are either damp, mouldy or have low indoor temperatures.[19] Poor housing conditions create environments that result in allergen exposure through dust mites and mould which are important factors in the aetiology and severity of asthma.[5,19,20] It is estimated that in NZ, nearly one third of asthma sufferers live in damp or mouldy housing and annually, 11 deaths from asthma are attributable to housing conditions.[19]

Māori are overrepresented in the highest deprivation areas in NZ and are therefore disproportionately affected by poor housing quality.[21,22] There is clear evidence that the development of asthma in isolated Māori communities is closely related to poor living conditions including low indoor temperatures, dust mites and mould.[21] Poor housing quality also disproportionately affects Pacific peoples in NZ.[23] It is estimated that over one third of Pacific families live in houses that have dampness and/or mould problems and over half live in cold houses.[23] Poor housing quality is a clear contributor to the incidence of asthma in Pacific communities.

A major driver of poor housing quality is a historical lack of housing policy and regulation of thermal efficiency. There have been decades of neglected home insulation and heating regulations reflecting hesitancy and opposition within the construction industry and outdated policies that do not encourage investment in energy efficiency.[24] The rental market is a particular area of risk as the quality of a tenant's house is controlled by their landlord. With a rental home shortage in NZ, tenants are more likely to accept a poor quality of rental housing as alternatives are either unavailable or unaffordable.[24] New changes to the Residential Tenancies (Healthy Homes Standards) Regulations 2019 include higher standards for home thermal efficiency, ventilation, moisture ingress and drainage.[25] These policy changes are supported by the NZ Asthma and Respiratory Foundation which advocates for asthma prevention and control by promoting the development of a NZ housing stock that is well insulated, well ventilated, dry and warm, and free from mould.[1] While efforts are underway to improve hous-

ing standards, it is clear that unhealthy homes are still a key area for improvement in the determinants of asthma in NZ.

It is important to make an association between NZ's housing policies and social policies. Energy hardship, a condition in which people cannot afford to heat their homes adequately, affects approximately one third of NZ households in some form.[18] It has been estimated that for every one cent per kilowatt-hour increase in electricity price, the number of hospital admissions for asthma per quartile, per region, will increase by an average of approximately seven.[22] This highlights the importance of developing not just structurally healthy homes, but homes and markets that allow for affordable heating in order to create environments that are protective against asthma.

Climate change

Historical and current use of greenhouse gases, such as carbon dioxide, have already caused a global increase in average temperatures. Without urgent decarbonisation and sustainability measures this warming will continue to increase, significantly impacting on climate stability. It is widely accepted that climate change is having a detrimental impact on respiratory health, with an increase in NZ's mean temperature of 1°C being associated with an absolute increase in the prevalence of asthma by almost 1%.[26]

The factors driving changes in climate contribute to asthma prevalence in a number of ways. Worsening air quality is caused by an interplay between a carbon dependent society and extremes of temperature that lead to more bush fires, droughts, changes in precipitation events, and air humidity.[27] Poor air quality reduces overall respiratory health and contributes to increased exposure to asthma precipitants.[5] Alterations in the distribution of allergens is another important implication for asthma development and severity. This is particularly true for pollens which are produced in greater volumes for longer seasons when exposed to increased levels of carbon dioxide, leading to higher allergenic potential.[28] Changes in air humidity and temperature are likely to lead to mould formation; this has an important interplay with social policy with regards to housing standards, as discussed above.[27] Furthermore, climate change also causes an increase in thunderstorm activity which is a known precipitant of asthma exacerbation globally and in NZ.[29]

The burden of climate change is expected to disproportionately affect Māori and Pacific peoples.[30] This will undoubtably lead to an exacerbation of an already disproportionate burden of asthma on Māori and Pacific communities through the magnification of disparities in housing quality, affordability of goods and services, and energy hardship.

It is widely agreed that a global collaborative effort is needed to reduce the effect of climate change on asthma prevalence and severity.[26,27,30] Decarbonisation, renewable energy utilisation, and air quality improvements are necessary areas of focus for mitigating a decline in respiratory health. However, it must be recognised that societal and political measures risk exacerbating asthma disparities if a careful and equitable approach is not taken.

Unaffordability of nutritious foods

There is mounting evidence demonstrating an association between diet and asthma development and severity. High levels of dietary fruits, vegetables and whole grains have been associated with a reduced asthma risk, as have low levels of high-fat meats and dairy products.[31] Similarly, it has been shown that patients with severe asthma are more likely to consume high fat, low fibre diets than non-asthmatic individuals.[32] It is important to note that a well-balanced diet that is rich in fruits, vegetables, and fibre is likely to provide whole body health benefits thereby reducing comorbid conditions that can contribute to the development and severity of asthma.[31] Indeed, dietary interventions for obese and overweight adults have shown marked improvements in asthma control.[32] Obese and overweight states have been found to increase the risk of asthma by 40–90% and with the rate of obesity in NZ at 30% and increasing, the role of nutrition in asthma prevention and management is a key modifiable determinant.[32] This highlights the importance of families being able to access food that meets high standards of nutrition and is affordable.

There are significant barriers to maintaining a healthy diet in NZ. Affordability is likely the greatest barrier with the price of a "healthy food shop" continuing to increase and often constituting over 42% of a household's income.[33] Increases in food prices are driven mainly by increases in production and distribution costs, and availability.[34] With the need to pay rent, electricity, and various other living costs, families are often unable to afford healthier options; two out of five households in NZ experience food poverty.[35] Incomplete nutrition undoubtably contributes to higher rates of asthma. Yet again, inequities between Māori and non-Māori households highlights the multi-faceted nature of the disparities in the social determinants of asthma.[35]

While the upstream determinants of food pricing are complicated and deeply rooted in economic forces, there are several community-led initiatives that aim to provide a self-sufficient way of improving access to nutritious food. One such initiative is the implementation of community gardens. These gardens provide nearby residents with the opportunity to access fresh produce and are often set on land that is community centred such as schools, marae, or council land.[36] In this way, community gardens improve the nutritional status of residents both through increased access to nutritious food and through increased awareness and positive perception of nutritional needs. This is expected to help prevent the development of chronic conditions such as asthma.[37] Māori led community gardens (māra) have been shown to improve residents' nutritional status which is expected to have a positive effect on the health of Māori communities.[38] Community gardens also have the added benefit of providing exposure to manageable amounts of local allergens on produce. This allows the development of immune tolerance, which has been shown to reduce asthma rates.[39] This underlines the importance of focusing not only at broader economic and political levels but also at a community level in approaches to the prevention and management of asthma.

Conclusion

It is clear that many upstream factors are linked to proximal causes of asthma. For example, social policy influences housing, accessibility of care, community initiatives and many other determinants. It seems that at the heart of these determinants is our identity as New Zealanders: the values we hold, the priorities we have for our population, and how prepared we are to face the problems that drive poor health outcomes and inequities. This raises some important considerations for future practice and policy. The first is the need to see a patient's presentation as a product of the complex, interconnected web of social determinants that have developed as a result of powerful upstream factors. These factors are deeply embedded in our policies, communities, and indeed, in our priorities as a nation. Secondly, upstream determinants, with their many connections to proximal elements, are targets that may yield the greatest results with respect to prevention and management. Policy development and population health initiatives should have a clear focus on addressing these high level determinants. Thirdly, in advocacy and in the way we conduct our professional careers, health professionals should stand by the priorities all New Zealanders deserve, address upstream determinants, uphold Te Tiriti o Waitangi, and always consider and ensure that our actions endeavour to promote equitable outcomes.

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