

A year of COVID-19 lockdown is putting kids at risk of allergies, asthma and autoimmune diseases

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"Eat dirt!" is a phrase I remember well. It was in the [title of an article](#) published by Harvard University environmental health professor, Dr.

Scott T. Weiss, and it captured my attention while I was learning about an immunological concept known as the "[hygiene hypothesis](#)."

The core of the idea is that we live in a microbial world: an environment full of bacteria, parasites, viruses and fungi. And that our interactions with these microbes after birth are extremely important to educate our immune systems to function properly. When we are born, our immune systems are still maturing.

I like the way researchers led by microbiologist Sally F. Bloomfield expressed it in [their study](#): "The [immune system](#) is a learning device, and at birth it resembles a computer with hardware and software but few data. Additional data must be supplied during the [first years of life](#), through contact with micro-organisms from other humans and the natural environment."

The immune system has many potent mechanisms for killing pathogens. It [needs to be carefully regulated](#) to ensure it can eliminate dangerous microbes from the body without causing excessive harm to our own tissues. The interactions we have with our environment early in life are essential for our immune systems to learn to differentiate between safe and dangerous disease-causing microbes.

Our bodies are covered inside and out with micro-organisms that, under normal circumstances, happily co-habitate with us and promote a healthy immune system. If infants, toddlers and young [children](#) are not sufficiently exposed to the microbial world around them, their ability to properly [regulate their own immune systems can be compromised](#).

To return to the computer analogy, the data that gets uploaded into the software are incomplete. This lack of data can cause the immune system to struggle to differentiate between what is truly dangerous and should be eliminated, and what is not dangerous and should not be responded to.

In plain terms, this scenario can [promote allergies](#), [asthma](#) and [autoimmune diseases](#).

Concrete jungles

Scientists are moving away from using the term "hygiene hypothesis" because it could be misinterpreted as meaning that hygiene is not good for a developing immune system. This is not true, nor should anybody advocate for actually eating dirt to gain exposure to microbes. Moderation and targeted hygiene would be best.

Specifically, we need to practice proper hygiene in the context of trying to prevent infectious diseases, but still allow our immune systems to interact with safe and essential microbes. Many [middle-income countries](#) have seen an [epidemic](#) of allergic diseases over the past several decades. This is, in part, due to increased [urbanization](#) which is akin to living in "concrete jungles" with reduced exposure to the natural environment.

Societies have also adopted behaviors that [limit exposure](#) to microbes. The overuse of [antibiotics](#) exacerbates the problem by non-discriminately eliminating good microbes along with bad ones.

Bloomfield and her team of microbiology researchers came to some important conclusions in their study: "Evidence suggests a combination of strategies, including ... increased [social exposure](#) through sport, other [outdoor activities](#), less time spent indoors ... may help ... reduce risks of allergic disease. Preventive efforts must focus on early life."

Now think about [government-led responses](#) to [COVID-19](#), which was [declared a pandemic by the World Health Organization](#) on March 11, 2020. The lockdown and restriction policies that have been enacted to help prevent the spread of COVID-19 contradict the recommendations to ensure proper immunological development in children.

[Data suggest that SARS-CoV-2](#) does not represent a greater danger to children than the [annual flu](#). Yet social interactions of children have been severely limited, including removing them from schools. Most of their extracurricular activities have been canceled and they have been discouraged from leaving their homes. Even the air they breathe is often [filtered by masks and there is prevalent use of hand sanitizer](#).

Compromised immunological development

In short, most COVID-19 policies have maximized the potential for children to develop dysregulated immune systems. As a viral immunologist, I was not overly concerned about this in the early stages of the pandemic when "temporary" measures were put in place to ["flatten the curve."](#)

However, there is cause for concern one year later, after many places in Canada and other countries have spent months in lockdowns or with very limited social contact and activities to prevent the spread of COVID-19.

The youngest among us have had their immunological development compromised for one year and growing. The more immature the immune system is, the more prone it will be to becoming dysregulated during the pandemic.

For example, the problem would likely be more prevalent in infants than toddlers. Although the [human immune system is largely mature](#) by approximately age six, some important components are still developing into adolescence. As such, the only people who can be certain that current isolation policies will have no negative impact on their immune system's ability to self-regulate are adults.

An unfortunate and under-appreciated long-term legacy of this pandemic will likely be a cluster of "pandemic youth" that grow up to suffer higher-

than-average rates of allergies, asthma and autoimmune diseases. This will hold true for children in all countries that enacted isolation policies.

Interestingly, it has been noted that the new [messenger RNA-based COVID-19 vaccines](#) that are packaged inside liposome nanoparticles [might be contraindicated](#) for some individuals with a propensity towards severe allergic responses. Ironically, we may be setting up many of our youth to develop hypersensitivities to this vaccine technology when they are older.

Raising children during the pandemic has largely occurred in isolated/sanitized environments that are unprecedented in extent and duration. These kids are at greater risk of developing hypersensitivities and autoimmune diseases than anyone before them. The immune systems of children are not designed to develop in isolation from the microbial world, so let's consider letting children be children again.

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