BMJ

BMJ 2012;345:e6673 doi: 10.1136/bmj.e6673 (Published 3 October 2012)

NEWS

Scientists debunk idea that rise in allergic diseases is due to homes becoming "too clean"

Matthew Limb

London

UK researchers say that they have dismantled the "myth" that allergic diseases have risen to epidemic levels because people now live in sterile homes and have become "too clean."

A report published today by the International Scientific Forum on Home Hygiene rejects the so called hygiene hypothesis, which first suggested more than 20 years ago that reduced exposure to infection in early childhood as a result of improved cleanliness might explain the rise of some allergies.[1]

Not only is the theory unsupported by evidence, says the report, it is "confusing and potentially dangerous" because it could put people off washing and cleaning to remove possible pathogens when the threat of infectious disease is rising.

Graham Rook, a coauthor of the study and a professor at University College London's Centre for Clinical Microbiology, said, "The rise in allergies and inflammatory diseases seems at least partly due to gradually losing contact with the range of microbes our immune systems evolved with, way back in the Stone Age."

The report says, "Rather than being too clean, it seems we may be losing contact with the right kind of dirt." It insists that hygiene remains essential but that hygiene practices can be better targeted to sustain exposure to "necessary" environmental microbes within and outside the home.

Sally Bloomfield, who chairs the forum, a global, professional, not for profit, non-governmental organisation, and who co-wrote the report, said, "The idea that children who have fewer infections because of more hygienic homes are then more likely to develop asthma and other allergies does not hold up."

The review of evidence accumulated over more than 20 years was due to be presented this week at the Infection 2012 conference of the UK and Ireland's Infection Prevention Society in Liverpool.

It says that the hygiene hypothesis took hold in the media because of its simplicity and the way it reflected a "general disquiet" about developed societies becoming "cleaner than is good for us."

The researchers say that the hygiene concept has now been extended to explain the increase in other chronic inflammatory diseases, including autoimmune diseases such as type 1 diabetes and multiple sclerosis; inflammatory bowel diseases; and some cancers.

The report notes that several factors could play a role in the rise in allergies and other chronic inflammatory diseases, including many aspects of modern civilisation and some that cannot safely be changed.

It suggests that an underlying problem is impaired regulation of people's immune systems, resulting from diminished exposure to organisms that in our species' evolutionary past played a role in immunoregulation.

These organisms, which have been dubbed microbial "old friends," include the "environmental, human and animal commensal organisms" with which people "co-evolved."

Rosalind Stanwell-Smith, a report coauthor and honorary senior lecturer at the London School of Hygiene and Tropical Medicine, said that since the 1800s, when allergies began to be more noticed, the mix of microbes "we've lived with, eaten, drunk, and breathed has been steadily changing."

In part this has come about through measures to combat infectious diseases, such as the introduction of clean drinking water, safe food, and sanitation and sewers. These measures, and the overuse of antibiotics, may have inadvertently altered exposure to the microbial friends that inhabit the same environments, Stanwell-Smith said.

Modern homes have a different and less diverse mix of microbes than rural homes of the past, but this is not to do with people's cleaning habits, says the report.

The report says that although deficiencies in microbial exposure could be important in the rise in allergies and chronic inflammatory diseases—driven also by genetic predisposition and modern lifestyle factors such as different diets, stress, inactivity, and pollution—it is not yet clear how the trend can be reversed.

Rook said, "There are lots of ideas being explored, but relaxing hygiene regimes won't reunite us with our old friends—just expose us to new enemies like *E coli* 0104."

Stanwell-Smith said, "Allergies and chronic inflammatory diseases are serious health issues, and it's time we recognised that simplistically talking about home and personal cleanliness as the cause of the problem is ill advised, because it's diverting attention from finding workable solutions and the true, probably much more complex, causes."

1 Stanwell-Smith R, Bloomfield S, Rook G. The hygiene hypothesis and its implications for home hygiene, lifestyle and public health. http://bit.ly/OCK2tj.

Cite this as: *BMJ* 2012;345:e6673