Does health evidence support or undermine our regulatory approach to air quality?

A trio of papers on air pollution in New Zealand (NZ) appeared in a recent issue of this Journal\textsuperscript{1–3} and were commented on in the accompanying editorial by Simon Kingham.\textsuperscript{4} Subsequently the authors wrote responses to the editorial,\textsuperscript{5–7} focussing on supposed flaws in the approach of the WHO, EU, USEPA and NZ Government in converting epidemiological evidence into policy.

However, in our view, the original papers and the responses to Kingham are based on a selective and incomplete understanding of the epidemiological evidence and do not justify major changes to current policy.

In their paper \textit{How toxic are fine particles emitted from home fires in Christchurch, New Zealand?} Palmer \& Mann\textsuperscript{1} assert that NZ-based research undermines this country’s regulatory approach to managing the health risk arising from poor air quality. This is because regulation ascribes equal weighting in toxic effect to particles arising from wood smoke as from any other source, despite the HAPINZ study\textsuperscript{8} identifying an apparent seasonal difference in effects of PM\textsubscript{10} on daily mortality. The evidence for this seasonal difference is limited to a single study in a single location and should be interpreted with caution.

Given the substantial physico-chemical differences between woodsmoke and other urban particles it is highly plausible that they are involved in different biological responses leading to different health endpoints. However, as Kingham\textsuperscript{4} illustrates, international research on this issue is not currently consistent, hence the ‘persistence’ of all the world’s leading authorities (WHO, EU, USEPA) continued precautionary assumption of equal toxicity until we have strong evidence to the contrary.

Palmer \& Mann finish their paper by stating “Lowering concentrations of PM\textsubscript{10} by reducing the emissions from home fires may not ameliorate the adverse effects from to [sic] PM\textsubscript{10} pollution.” This sounds like a testable hypothesis, given that such reductions in wood fire emissions and PM\textsubscript{10} are currently happening in Christchurch and other NZ towns (www.mfe.govt.nz/environmental-reporting/air/air-quality). We should monitor any resulting changes in health, by repeating previous analyses using the most recent available data.

Hoare\textsuperscript{2} objects to what he considers the over-stating of the mortality effects attributed to PM\textsubscript{10} by both Kingham and the HAPINZ study. A recent cohort study\textsuperscript{9} suggests that in NZ, the long-term effects of air pollution on mortality are similar to those found in overseas studies.

Evidence of the effects of air pollutions on morbidity continues to emerge and research continues to show that the mortality risk posed by PM\textsubscript{10} is substantial, even in towns and cities with much lower concentrations than Christchurch. A systematic review of triggers for (non-fatal) myocardial infarction\textsuperscript{10} found PM\textsubscript{10} to be an important factor. The triggers with the greatest population attributable fraction were
exposure to traffic and a 30 µg m$^{-3}$ change in PM10, whilst a change of 10 µg m$^{-3}$ was “still within the range of the public health relevance of other known triggers.”

Moller\cite{7} argued that Kingham’s editorial “…implicitly supported the current orthodoxy in regard to air pollution and employed arguments which were found to be dubious in the papers of Hoare, Moller and Palmer.” These three papers did indeed discuss uncertainties and limitations in fashioning policy out of epidemiological evidence—the HAPINZ study was far from perfect but was not methodologically flawed. Neither Palmer, Moller nor Hoare offered any quantitative solutions likely to provide greater effectiveness or efficiency compared to the current regime.

We agree that the health risks posed by low indoor temperatures are substantial and important, particularly for disadvantaged communities.\cite{11,12} However, given political will, we believe that Christchurch can be redesigned using clean, affordable and efficient technologies that provide healthy environments for all—both indoors and out.

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References: