



Local Air Quality Management policy and practice in the UK: The case for greater Public Health integration and engagement



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ABSTRACT

The UK's Local Air Quality Management (LAQM) regime is designed to protect people's health from the ill-effects of air pollution, but it is failing to achieve its full potential. The Public Health aspects of, perspectives on, and integration and engagement in, LAQM have been poorly considered to date. This critical literature review assessed LAQM-related strengths and limitations in order to explore how Public Health, through greater integration and engagement, can add value to the regime.

'Structure' and 'process' weaknesses were identified, including: a poorly defined Public Health role, a narrowly-scoped prescribed process, risk assessment uncertainties, ineffective communications, shallow evaluations and disconnected policies. Separately and cumulatively, these have hindered Public Health integration in LAQM policy and practice and stunted the regime's evolution. Engaging Public Health in LAQM future design and delivery can help solve these problems, by improving risk assessments and raising awareness of air pollution and other health-influencing relationships, targeting action in high-need areas, coordinating air pollution mitigation and health improvement interventions, and connecting different policy areas.

Increasing Public Health integration and engagement in LAQM can enhance the existing regime. Acting now is timely from both LAQM and Public Health perspectives. This review's findings should be used to inform debates and decisions around the future development of Local Air Quality Management arrangements both in the UK and beyond.

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1. Background

Exposure to air pollution is a significant determinant of health (World Health Organization, 2015; Lim et al., 2012); it reduces life expectancy by increasing mortality and morbidity risks from heart disease and strokes, respiratory diseases, lung cancer and other effects (World Health Organization, 2013). In the UK, the health burden is substantial; around 29,000 deaths and 307,000 lost life-years (Gowers et al., 2014), and 23,500 deaths and 277,000 lost life-years (Department for Environment, Food and Rural Affairs, 2015a), are attributed annually to PM_{2.5} and NO₂ exposure, respectively. On average, the life expectancy of every person is reduced by 7–8 months (Department for Environment, Food and Rural Affairs, 2007).

Despite general UK air quality improvements, problems persist, especially at the local level – as evidenced by the declaration of some 620 Air Quality Management Areas (AQMAs) across 250 (62%) UK Local Authorities (as of April 2015) (Department for Environment, Food and Rural Affairs, 2015b). Consequent local-level health impacts vary considerably, not only influenced by differential air pollution exposures but also by individual and population-level susceptibilities (Lipfert, 2004). The triple jeopardy of air pollution, impaired health and social deprivation can compound problems by creating disproportionate and amplified disease burdens between and within regions (Goodman et al., 2011; Jerrett et al., 2001).

Effective air quality management must therefore be based on a good understanding of local air pollution problems and solutions in a broad Public Health context (Bowen, 2002). In the UK, the Local Air Quality Management (LAQM) regime provides the framework to support collaborative action to assess and reduce local air pollution problems to protect health. Despite its intentions and underpinning principles, the Public Health aspects of, perspectives

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on, and level of integration in, the LAQM regime have been poorly considered to date.

This paper critiques available literature to assess LAQM-related strengths and weaknesses, and explore ways in which Public Health, through greater integration and engagement, can add value to the process. This review is likely to be relevant beyond the UK context.

1.1. UK Local Air Quality Management

LAQM originates in the 1997 National Air Quality Strategy (1997) and Part IV of the 1995 Environment Act (HM Government, 1995). The National Air Quality Strategy outlined a consistent UK approach to air quality management, committed to ensuring access for all citizens to outdoor air without significant health risk (Department of the Environment, 1997). National policy measures were to tackle larger-scale issues such as vehicle fuel quality, engine technology standards and emissions from combustion processes, but most of the air quality improvement task falls to Local Governments. This recognised that pollution sources are best managed at the lowest administrative level through proportionate, collaborative action that takes account of the local context (Department of the Environment, Transport and the Regions, 2000).

The Strategy stated that health should be protected from the effects of air pollution through national and local-level action to comply with Air Quality Objectives (AQOs) for key air pollutants: benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter (PM₁₀) and sulphur dioxide. AQOs (specified in the UK Air Quality Regulations (HM Government, 1997) and modified by UK Devolved Administrations and European Air Quality Limit Values (European Council, 1999) were set at levels below which effects are unlikely (even in sensitive groups) or exceedingly small. LAQM is concerned with seven of these pollutants; the secondary formation and trans-boundary characteristics of ozone place its management beyond the remit of LAQM.

Since 1997, relevant European Air Quality Directives have been consolidated as the European Ambient Air Quality Directive 2008/50/EC (European Parliament, 2008), three revisions of the UK National Air Quality Strategy have been published (the latest iteration being the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Department for Environment, Food and Rural Affairs, 2007)) and the UK Air Quality Regulations have been updated (HM Government, 2010). Through LAQM, resources (including monitoring network developments, data collection and collation and modelling techniques, policy and technical guidance and expert ‘helpdesks’) have been made available to facilitate process implementation and enhance Local Government expertise, capabilities and capacity.

Despite some process-reporting streamlining and modifications of AQO timescales, values and/or exceedence limits, LAQM's two-stage effects-based approach (i.e. air quality assessment in the context of likely public exposure) has remained largely unchanged since its inception (Longhurst et al., 2009; Barnes et al., 2014) (Fig. 1). Undertaken in periodic cycles, LAQM's two stages are:

- i. Review and assessment: a phased risk-management approach to review air quality in locations where the public is likely to be regularly present constitutes Updating and Screening Assessment. If AQO breaches are confirmed or likely (determined by monitored or modelled data) and the exposure duration is appropriate to the averaging period of pollutant(s) AQO(s), a Detailed Assessment and Air Quality Management Area (AQMA) declaration is required. As a minimum, AQMAs should define the area of technical exceedence.
- ii. Action Planning: following AQMA declaration, Local Governments must develop and implement an Air Quality Action Plan

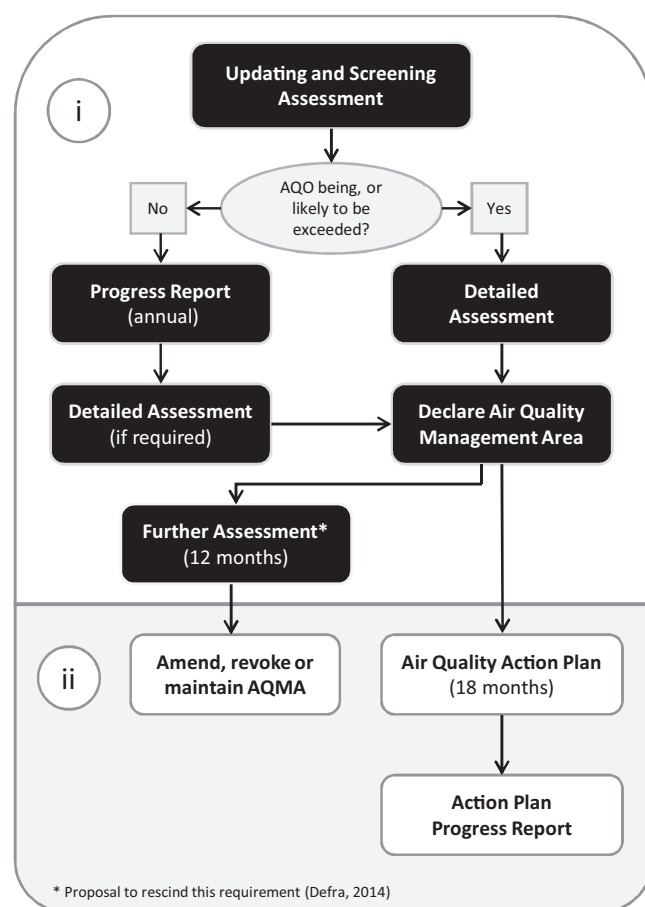


Fig. 1. Overview of the two-stage LAQM process (as of July 2015) (Defra, 2014).

(AQAP) of collaborative, proportionate, cost-effective and time-bound mitigation and management measures. In these areas, Local Governments must work towards achieving specified AQOs. Further Assessments test the validity of the AQMA declaration and provide further evidence (e.g. source apportionment) and quality assurance to support AQAPs.

1.2. The Public Health role

Public Health is ‘the science and art of promoting and protecting health and well-being, preventing ill-health and prolonging life through organised efforts of society’ (Faculty of Public Health, 2010). Practice is scientific insofar as it requires rigorous, evidence-based approaches to protect and improve population health based on critical understandings of disease patterns, distributions and causes (including links with wider health determinants) and knowledge of what works to bring about change. The *art* of Public Health refers to harnessing social, political, economic and cultural societal assets to facilitate collaboration around common causes (Riordan, 2015).

Working across health protection, health improvement and health service quality domains (with health intelligence support) Public Health agencies have core responsibilities that can support the design and delivery of LAQM (Table 1). This paper proposes that the tailored application of these can enhance the LAQM process. No matter how Public Health is structured or where located, e.g. whether embedded in Local Government (England) or in the NHS (Wales, Scotland and Northern Ireland), the type of support that can be offered to LAQM is consistent throughout the UK, although it is accepted that the level of support may vary.

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