intolerance associated with tobacco exposure were greater in men than in women and in white people than in African-Americans.

The number of people with diabetes or glucose intolerance is rising owing to population growth, ageing, urbanisation, and the increasing prevalence of obesity and physical inactivity.[9] Though some studies have shown a dose-response association between smoking and the incidence of diabetes, others have failed to do so.[10 11] The study of Houston et al clearly showed that both active and passive smoking were associated with the development of glucose intolerance among young adults.[8] Their study has several strengths, but also some limitations. The strengths include the large sample size (about 4600 participants), stratification by sex and race, validation of passive smoking by serum cotinine concentrations, long term follow-up (15 years), an adequate participation rate (>74%), and controlling for potential sociodemographic, biological, and behavioural confounders. However, the effect of smoking on the incidence of glucose intolerance occurred irrespective of waist:hip ratio, baseline insulin, and C reactive protein levels, markers that have been associated with the development of diabetes and presence of smoking habits in previous studies.[9 10] Potentially, the measurement of these markers at various time points during the follow-up might clarify whether or not they constitute a causal pathway between smoking and glucose intolerance.

In addition, the authors reported that smokers and never smokers with passive smoke exposure were more often African-American and less often women than never smokers with no passive smoke exposure, while current smokers also had less education, drank more alcohol, and had higher fat intakes than never smokers with no passive smoke exposure. Although these sociodemographic and lifestyle characteristics were taken into account in the analyses, residual confounding might still exist, and the variability and misclassification usually observed in measuring healthcare, socioeconomic, and lifestyle variables might mask the true findings.

The tobacco industry has vigorously contested allegations that passive smoking is dangerous,[12] but the evidence for the harmful effects of passive smoking keeps growing, and this study by Houston et al provides evidence for a new risk from exposure to tobacco smoke. The finding needs confirming, but in the meantime most non-smokers wish not to be exposed to tobacco smoke against their will. The momentum for bans on smoking in public places continues.

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Community acquired pneumonia in primary care

Doctors cannot target antibiotics and reduce resistance until new diagnostic tests prove feasible and affordable at the point of care

Practice p 1077

In Europe 90-95% of antibiotic use occurs outside hospitals, and community acquired lower respiratory tract infections (LRTI) are the leading reason for prescribing antibiotics.[1] Few conditions in medicine are so controversial or have resulted in so much promiscuity in prescribing. The escalating resistance of common bacterial respiratory pathogens to antibiotics in the community[2] will be contained only by reducing prescribing in everyday practice and targeting antibiotics selectively. We have known this for a long time. But it is difficult to target antibiotics appropriately, particularly in LRTI.

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Several problems underlie this clinical uncertainty about which patients with LRTI benefit from antibiotics and which do not. The update on diagnosis and management of pneumonia by Hoare and Lim in this week's *BMJ* nicely illustrates this controversy (p 1077).[3] Results of trials indicate that most patients with initially uncomplicated infection will probably have limited benefit, but this evidence is scant: the relevant Cochrane review included only 750 patients.[4]

There are no comprehensive studies of sufficient size powered to assess benefit in clinical subgroups; the value of detecting microbial aetiology; the role of

the so called "atypicals"; the distinction between viral and bacterial infections; and the distinction between pneumonia and other less severe lower respiratory tract infections. No studies on the aetiology of community acquired LRTI have included control groups. Moreover, there have been no adequately powered studies to develop prediction rules for adverse health outcomes in patients with community acquired LRTI in primary care which could help to restrict antibiotic treatment to high risk patients.[5] In the absence of evidence to inform robust clinical decision making, doctors try to target antibiotics in an ad hoc manner, each using their own arbitrary criteria. Hoare and Lim base their definition of pneumonia, correctly, on radiographic findings—but chest x rays are seldom done in primary care, and the clinical significance of minor radiographic consolidation is debatable.[6] Hoare and Lim's proposed first line treatment at home for pneumonia (amoxicillin, erythromycin, or clarithromycin) does not reflect community practice in Europe. Only doctors in the UK use erythromycin and amoxicillin extensively for treating LRTI, whereas in Nordic countries penicillin is still used extensively, and in southern European countries amoxicillin, clavulanic acid, the new macrolides, and new fluoroquinolones are mainly used.[7]

Microbiological diagnostic testing for patients with LRTI is almost never done in community settings. Hoare and Lim recommend serology for atypical pathogens and viruses. Commercial serological assays for diagnosing *Mycoplasma pneumoniae* infection are probably not reliable for managing patients with LRTI, however.[8]

Hoare and Lim recommend urinary antigen tests for *Streptococcus pneumoniae* and *Legionella* for patients with severe pneumonia. Although Guchev and colleagues showed that the *S pneumoniae* urinary antigen test allowed targeted use of amoxicillin or clarithromycin in community acquired pneumonia,[9] this does not greatly move practice forward. The main challenge in primary care is to determine which of the many patients who currently receive antibiotics do not need them. Furthermore, this test cannot distinguish patients with pneumococcal pneumonia from those with nasopharyngeal carriage of pneumococci (particularly in children).[10] Finally, recent guidelines by the European Respiratory Society do not recommend routine microbiological investigations for patients with LRTI in community settings.[11]

The arsenal of microbiology tests has not changed much since the time of Pasteur. The rapid nucleic acid detection assays and amplification techniques, developed as diagnostic tools for LRTI, show much promise, but they are still too slow, expensive, limited in the number of target pathogens, and complicated.[12] It is only a matter of time before rapid, flexible, timely, and affordable nucleic acid tests deliver what we need, and molecular diagnostics is expected to boom in the next decade.

Several researchers and companies are moving towards "all-in" microfluidic devices offering sample preparation, nucleic acid amplification, and multiparametric detection. When these tests can detect within hours (or even minutes) many pathogens in nasopharyngeal swabs, throat swabs, nasopharyngeal aspirates, and sputum, more focused and efficient management of patients with community acquired LRTI will become possible.

Genomics is expected to yield important advances, but innovation in genomics will not be translated into better patient care without proper development of feasible and acceptable practical interventions. These interventions will require rigorous evaluation: if they are acceptable from a clinical and cost effective point of view, they should be appropriately disseminated and incorporated into routine care.

Few, if any, new antibiotics are in the development pipeline. Microbiological diagnosis of LRTI currently depends mainly on 19th century methods. A new scientific project, genomics to combat resistance against antibiotics in community acquired LRTI in Europe (GRACE; www.grace-lrti.org), will coordinate the activities of primary care doctors and medical research scientists from many institutions in 14 European countries, aiming to bring the management of LRTI in the community into the 21st century. If—through projects such as GRACE—the new microbiological tests prove efficient, effective, and cost effective at the point of care then doctors may at last have the information they need to target antibiotic treatment.

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