Guidelines on prevention of transmission of hepatitis C virus infection in the workplace: do they work in practice?

Both health care workers (HCWs) and patients are at risk of acquiring infection with one of a number of blood-borne viruses through exposure to each other’s blood or bodily fluids. Recognition of this bidirectional risk has led to the development of guidelines and protocols designed to minimize both HCW to patient and patient to HCW transmissions. These are different, for a variety of reasons, for each of the ‘big three’ blood-borne viruses (BBV) viz HIV, hepatitis B virus and hepatitis C virus (HCV). There is no doubt that some of these guidelines are contentious. This issue of Occupational Medicine contains three articles reporting audits of the implementation of guidelines relating to the risks of HCV transmission between patients and HCWs [1–3].

There are a number of published and unpublished reports of HCV-infected HCWs who have transmitted HCV to their patients [reviewed in 4]. Such events may lead to dramatic newspaper headlines and cause considerable anxiety. Accordingly, the Advisory Group on Hepatitis, an independent advisory body to the Department of Health, formulated a set of guidelines to deal with this risk, which were adopted as UK policy in 2002 [5]. These are based on the concept that HCW to patient transmission occurs during an exposure-prone procedure (EPP) i.e. when the HCW’s blood may gain access to the open tissues of the patient. Construction of rational guidelines is not straightforward for any of the BBV, the absence of a prophylactic vaccine which could induce protection against infection being a particular problem in the context of HCV. The scope of any recommended actions needs to be commensurate with both the magnitude of the risk to patients and the rights of HCWs to pursue their careers. Furthermore, they need to be practicable and easily implemented, without incurring significant costs to occupational health services.

The magnitude of risk to patients depends on the prevalence of chronic HCV infection in HCWs who perform EPPs and the frequency with which a given infected HCW transmits infection while performing an EPP. Population estimates of HCV prevalence in the UK are around 0.5–1.0% [6,7], so on the assumption that HCWs who perform EPPs are no different from the general population, then 1 in 200 such individuals is infected with HCV (in fact, published data from relatively small-scale surveys suggest this may be an overestimate by a factor of 2 [8,9]). Look back exercises conducted on the first five HCWs in the UK known to have transmitted infection reveal a remarkably constant rate of transmission events—around 1 in 400 EPPs [4]. Thus, the risk to an individual patient of acquiring HCV infection from an EPP conducted by a HCW of unknown status is 1 in 200 times 1 in 400 i.e. 1 in 80 000 (note that this is considerably greater than the figures quoted by Steiner et al.). Given National Health Service (NHS) data indicating around half a million EPPs are performed annually, this suggests that ~5 to 10 patients each year acquire HCV infection in this manner. While this may be regarded as a rather rough and ready estimate, as it avoids consideration of such factors as the type of operations performed by an individual HCW and the frequency of needlestick injury to the HCW, it is nevertheless the best estimate we have.

In the light of such data, one reasonable option for any guidelines would be to maintain the status quo as it existed before 2002 i.e. ban any HCW known to have transmitted HCV infection from EPPs, but take no further action. A 1 in 80 000 risk could be considered acceptable, especially in comparison to the other risks taken by patients undergoing EPPs, e.g. of acquiring methicillin-resistant *Staphylococcus aureus* wound infection, or a fatal reaction to an anesthetic. At the other extreme, the only possible intervention would be to insist on screening all HCWs who perform EPPs for evidence of current HCV infection. While theoretically possible, this approach is flawed for a number of reasons, not least because this would remove, at a stroke, 1 in 200 highly skilled HCWs from clinical practice, and loss of such expertise would have a much greater negative effect on the nation’s health than allowing a few transmissions of HCV each year. Also, given the absence of a prophylactic vaccine which could protect HCWs from HCV infection, the logic of this approach would dictate that all HCWs performing EPPs would need repeat and continual screening for HCV infection throughout their careers, as the very nature of their practice puts them at risk of occupationally acquired HCV infection. Such a policy would be extremely difficult to implement, would have potential negative effects on recruitment to EPP specialties and would inevitably lead to screening of patients and discrimination against HCV-infected individuals.

The guidelines released in 2002 are a compromise [5]. They stop short of recommending screening of HCWs...
who currently perform EPPs, for the reasons outlined above. However, they do recommend screening for all HCWs entering specialty training which will require them to perform EPPs. This was felt to be fair and appropriate—an infected trainee could decide either to embark on a different career choice at a stage in training where this was still reasonable or he/she could seek therapy with a >50% chance of viral clearance, and thereby aim to embark upon their training after a 1 or 2 years’ delay. Screening at this stage would, in the long term, reduce the pool of HCV-infected HCWs performing EPPs, and therefore reduce the frequency of HCW to patient transmission events.

The success of guidelines is not, however, measured by how logical and sensible they appear to be, but by how well they are implemented in real life settings. The audits of the implementation of HSC 2002/010 by Steiner et al. (in all 15 Scottish health boards) and Gibson and Kennedy (in 51 NHS Trusts in London and the Southeast of England) in this issue are therefore of great interest [1,2]. Both report similar findings. A large majority of health boards (87%) and Trusts (85%) had implemented the guidelines. Only two NHS Trusts had failed to do so because of cost implications. Problems encountered in both settings were a lack of clarity as to who should be screened, and how often. Apparent misinterpretation of the guidelines has paradoxically led to more HCWs being tested for HCV infection than was the original intention of the guidance document, as there are reports of medical students and also EPP-competent HCWs being tested, either because they were new to the employing organization or because they were locums, neither of which is a stated reason for testing in HSC 2002/010. An additional issue raised by these two audits is the extent to which results generated elsewhere should be accepted as valid, particularly where it is not possible to be certain that the samples used to generate those results were truly validated samples (IVS). Better recording of IVS status of samples/results would no doubt help.

The philosophy of the guidance is that screening of an individual HCW is only required once, when that HCW is about to undertake training which will involve performance of EPPs. A negative test is then sufficient to allow the HCW to begin training, and there is no further compunction to test that HCW for HCV infection at any later date. The only other recommendation for testing is if an individual HCW believes him/herself to have been at risk of acquiring HCV infection, something which may arise through their lifestyle (e.g. injecting drug use), occupational exposure (needlestick injury), or through being exposed to needles in countries with high prevalence of HCV infection and where infection control procedures may have been inadequate. Note that HCV testing in these latter circumstances is HCW initiated i.e. it relies on an individual HCW knowing that he/she has been at risk and that he/she has a responsibility to report that risk, and so testing is not ‘screening’, but rather post-exposure management.

It would have been of interest to know how many HCWs had been tested under the auspices of HSC 2002/010, how many were identified as being HCV infected and what happened to those particular individuals in terms of their career progression and possible redeployment to other posts. These data are not reported, but in Scotland, it appears that only two-thirds of the health boards have a redeployment policy in place [1].

The precepts expounded in HSC 2002/010 have now been extended in new Department of Health guidance [10] aimed at ‘HCW new to the NHS’. This extends screening for HCV infection to all new entrants to the NHS who will perform EPPs, and therefore includes fully trained EPP-competent HCWs (e.g. surgeons) coming from abroad or even UK-trained surgeons returning from a period of work abroad to start or restart performing EPPs in the NHS. Further controversy surrounding this latter guidance arises because of the recommendation to screen those individuals for HIV infection as well. It will be important in due course to audit the implementation of this more broad-base screening in these wider contexts.

In contrast to the above discussion on protecting patients from HCV-infected HCWs, Williams et al. [3] report an audit assessing compliance with guidance aimed at protecting HCWs from infected patients. Two striking messages emerge. First, although guidelines suggest repeat testing of needlestick recipients at intervals up to 6 months after exposure, less than a quarter of all recipients achieved full compliance. As the authors suggest, it may be better to concentrate efforts on encouraging recipients to come back for a single attendance at some time between 6 and 12 weeks after exposure, at which time a sample could be tested for both anti-HCV and HCV RNA. Published data suggest that the vast majority, if not all, transmissions should be identifiable in this time period i.e. the frequency of late (after 12 weeks) sero- or geno-conversion is very low [11]. Second, a significant minority (40%) of HCWs who reported needlestick exposure to a source known (or proven to be) HCV-infected failed to attend for any further follow-up at all. The audit period (1991–99) was before recognition that early treatment of HCV infection could achieve extremely high clearance rates (>95% [12]), so it is possible that some non-attendance was on the basis that nothing much could be done in any case. Whatever the reasons, it is clearly important now to emphasize to recipients of HCV-positive needlesticks that they must attend for follow-up—if they are unfortunate enough to have acquired infection, they have an excellent chance of clearing it with appropriate therapy. More recent trial data suggest that recipients who become infected with HCV genotypes 2 or 3 can wait for up to 20 weeks to see if they achieve spontaneous clearance before starting a course of pegylated interferon injections, which may only need to be as...
short as 12 weeks, while with genotype 1 transmissions, it is probably best to start a 24-week course as soon as transmission is identified [13,14]. In the light of these data, any HCW (or indeed, any other individual with evidence of recent HCV acquisition) should have their HCV RNA genotyped and be referred immediately to an appropriate specialist for consideration of initiation of therapy. It would be sensible for occupational health departments to ensure that such referral pathways are in place in advance of having to deal with an acute incident. Failure to identify needlestick transmission through lack of follow-up testing would constitute a tragic missed opportunity to implement an intervention of huge potential benefit to the unfortunate recipient.

William L. Irving
Department of Microbiology and Wolfson Digestive Diseases Centre, University Hospital, Queen’s Medical Centre, Nottingham NG7 2UH, UK
e-mail: will.irving@nottingham.ac.uk

References