Herpes simplex: patterns of infection in patients attending a genitourinary medicine clinic, 2007–2012

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More than two-thirds of the world's population is infected with herpes simplex virus type 1 (HSV-1) or type 2 (HSV-2), which cause mucocutaneous genital herpes disease both in immunocompetent and immunocompromised individuals.[1–3] Genital herpes can lead to painful ulcerative genital lesions and is associated with considerable morbidity and socioeconomic burden. In addition, there appears to be an alarming synergy between HSV-2 and human immunodeficiency virus (HIV) infections. These complications highlight the need for an effective therapy and prophylactic and therapeutic herpes vaccines.[4,5]

Despite significant advances in antiviral therapy and education about safe sexual practices, the prevalence of HSV infection continues to rise in the UK and genital herpes remains a significant public health problem.[6] Laboratory confirmation of clinical diagnosis is important because other conditions present similarly and atypical presentations of genital herpes can also occur. Accurate diagnosis of genital herpes is important because the diagnosis is often fraught with emotions, including anger, disbelief, low self-esteem, fear of rejection by present and future sexual partners, and depression.[7]

In 2007, the Quest Diagnostics Heston Laboratory, in collaboration with the genitourinary medicine (GUM) clinic at the West Middlesex University Hospital (WMUH), introduced a direct antigen immunoassay (IDEIA herpes simplex virus kit, Oxoid, Ely, Cambridgeshire, UK) to detect herpes simplex antigen from clinical swab specimens. The advantage of the direct antigen test was the reporting of preliminary results (i.e., 'negative' or 'presumptive positive') within 48 h. The disadvantage was the lack of differentiation between HSV type 1 and type 2.

The laboratory carried out a validation study using swabs obtained at GUM. During patient examinations, two viral transport swabs were taken of any suspicious lesions and sent to the immunology department at Heston. One swab was analysed using the direct antigen immunoassay, while the other swab was couriered to the virology department of Northwick Park Hospital for routine HSV culture. The validation results showed that the assay had an overall sensitivity and specificity of 96.3% and 92.1%, respectively, using tissue culture as the gold standard. A number of samples showed discordant immunoassay and culture results, corresponding with previous reports in the literature.[8,9]

During a six-year period (2007 to 2012), the laboratory analysed 2285 genital samples, and found an average positivity rate of 27.2% (Fig. 1), an age range of 14 to 80 years (median 32 years), and a male:female ratio of 1:1.34. This ratio for positives remained fairly constant, apart from a dip in 2008, when it reached almost 1:1 (Fig. 2). Looking at the age distribution pattern for HSV-positive patients, the 25–30 age group appeared to be disproportionately represented, especially in 2009 (Fig. 3).

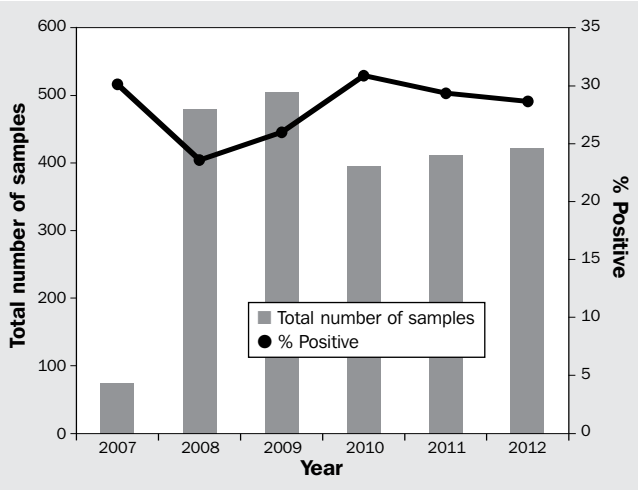

Fig. 1. Positive herpes infection by year.

Interestingly, 14 samples (0.7%) gave repeatedly 'equivocal' results with the immunoassay (Table 1). These swabs were sent for confirmation by tissue culture. Eight of the samples had no detectable virus, two were positive for HSV-1 infection, and two were positive for HSV-2 infection. The remaining two samples were positive both for HSV-1 and HSV-2 infection. The first sample was from a 77-year-old man who previously had been reported as a case study.[10] The second sample was from a 31-year-old man who had (according to the clinical details) different HSV types from lesions on either side of the penis. These mixed infection cases fit in with previous reports that describe the increasing number of mixed infections.[11–14] Additional mixed infections could have been missed because the immunoassay did not differentiate the HSV types. Finally, one sample (from a 32-year-old woman) gave an equivocal HSV antigen immunoassay result and a

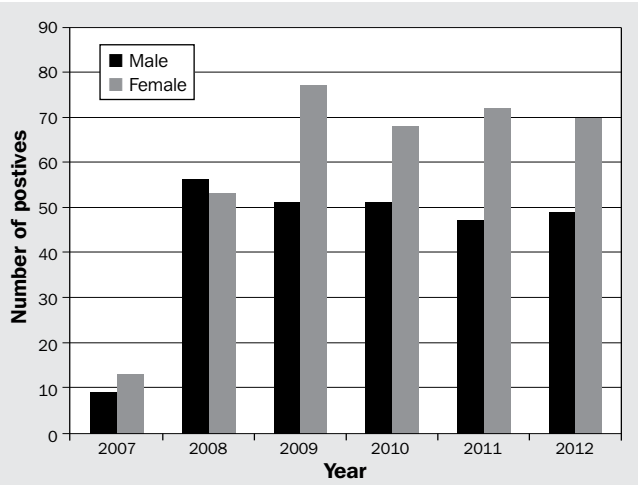

Fig. 2. Number of HSV positives by year and gender.

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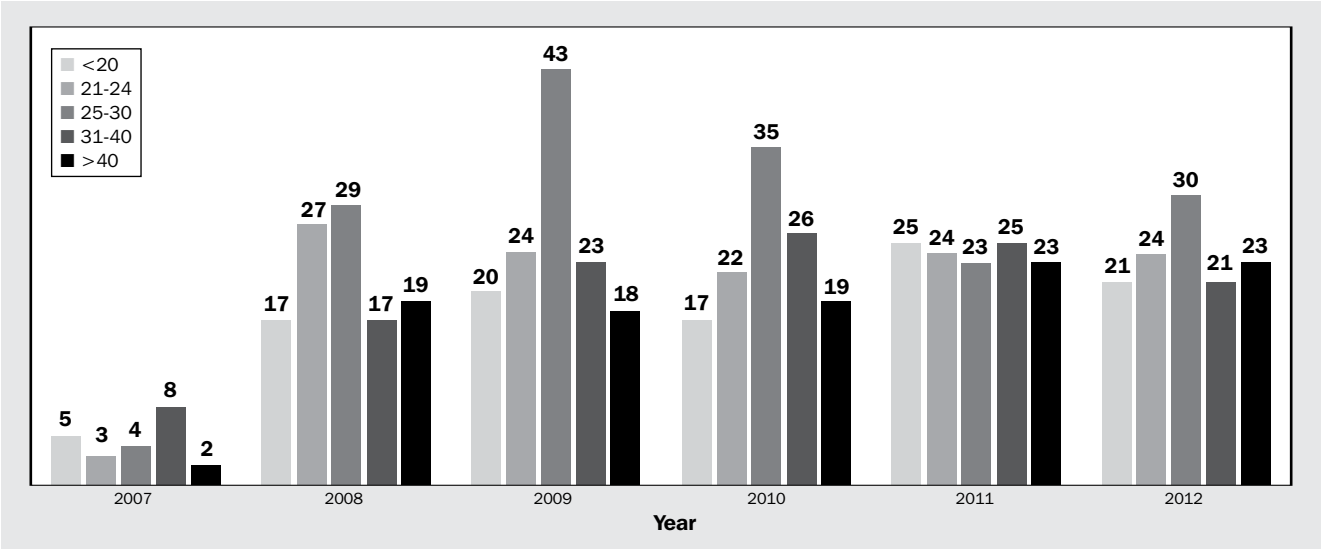

Fig. 3. Age distribution of the HSV patients

negative tissue culture result but was shown to be positive for *Chlamydia* infection.

The quiet pandemic of genital herpes continues to be a public health problem both in developed and developing countries. Various campaigns in the 1980s raised awareness of sexually transmitted diseases, particularly HIV, and these coincided with substantial declines in HIV transmission and syphilis diagnosis among men who have sex with men. Since 1995, however, there have been substantial increases in GUM attendances requiring treatment, notably for gonorrhoea, syphilis and genital herpes.[15,16] Apart from education and awareness, the best hope of controlling the increasing prevalence of HSV infection is the development of an effective vaccine. However, in spite of several clinical trials, the first as early as the 1920s, no vaccine candidate has been proven sufficiently safe and efficient to warrant commercial development.[17]

The use of the antigen detection immunoassay, although now superseded by PCR methods, allowed clinicians at the GUM clinic to advise their patients and treat when appropriate to limit the spread of genital herpes, without waiting for tissue culture results. Among GUM patients who tested positive for HSV between 2006 and 2012, there were more women than men (1.34:1), a disproportionate number of patients in the 25–30 age group, and a small number of mixed HSV-1/HSV-2 infections. □

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Table 1. Equivocal HSV antigen samples.

Sample	Age	Gender	HSV culture
1	77	M*	HSV-1 HSV-2
2	25	F	VNI
3	18	M	HSV-2
4	39	M	VNI
5	32	F†	VNI
6	53	F	HSV-1
7	37	M	VNI
8	31	M	HSV-1 HSV-2
9	25	F	VNI
10	23	M	VNI
11	32	F	VNI
12	20	F	HSV-2
13	49	F	HSV-1
14	21	F	VNI

VNI: virus not isolated
*Case report published in 2008
†Positive for *Chlamydia*

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Examination of factors that influence residual chlorine concentration in chlorine-based sanitising solutions: implications for ward disinfection

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Chlorine-based sanitising agents are commonly used in healthcare sanitising protocols and rely on the availability of residual free chlorine (RFC) to kill vegetative microorganisms as well as bacterial endospores. Such formulations are commercially available from several manufacturers and are generally delivered in dissolvable preweighed tablet format. Simple and unambiguous reconstitution instructions accompany such tablets, detailing the number of tablets and volume of water required to obtain levels of free chlorine for various sanitising scenarios. In addition, instructions are given to dissolve such tablets in warm water.

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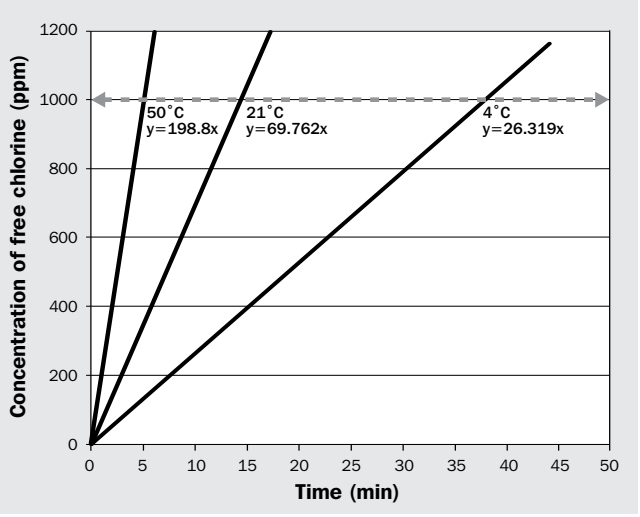

Fig. 1. Effect of water temperature on release of residual free chlorine (RFC) concentration on dissolving chlorine-based sanitising tablets.

The combination of optimal concentration and contact time in ward sanitising solutions forms an important critical control in the killing of nosocomial bacterial pathogens. Any deviation from these optimal values, as specified by the manufacturers of such sanitisers, will compromise their bactericidal efficacy. Minor deviations may not be materially important, but any major deviation may result in application of sanitising solutions with little or no killing ability. Deviation in reaching optimal concentration may result from i) underdosing due to the addition of an incorrect (and lesser) number of tablets by domestic staff, due to error or lack of understanding/education, ii) excessive organic interaction, or iii) transient underdosing due to the dissolving of such tablets at cold or ambient temperature.

Several factors routinely encountered during normal cleaning procedures by domestic staff may compromise the optimal concentration of residual chlorine during such operations. To date, no report has quantitatively examined the correlation between the temperature of water used to dissolve chorine-based sanitisers and concentration of free chlorine. In addition, there are limited data available on the quantitative correlation between type of clinical soil (e.g., blood, sputum, faeces, urine, saliva) and deactivation of residual chlorine, as well as a comparison between deactivation capacity of such individual clinical soils. Therefore, it is the aim of this short study to i) examine the relationship between various temperatures, emulating potential scenarios at ward level by domestic staff and the resulting availability of free chlorine in resulting sanitising solutions, and ii) examine the correlation between different clinical soils and deactivation of residual chlorine concentration in chorine-based sanitising solutions.

Chlorine-based sanitising tablets, based on sodium dichloroisocyanurate (NaDCC; 1,3-dichloro-1,3,5-triazinane-2,4,6-trione) were purchased from a commercial source. The appropriate number of tablets were employed, in accordance with the manufacturer's instructions, to make up solutions of 1000 parts per million (ppm) free Cl_2, which