

Draft

**GUIDANCE:
OCCUPATIONAL HEALTH
MANAGEMENT
OF NEW AND EXPECTANT
MOTHERS EMPLOYED IN THE
NATIONAL HEALTH SERVICE**

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OCTOBER 2002**

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1. INTRODUCTION

THE OVERALL AIM OF THE GUIDELINES

- 1.1 The intention is to devise standards of practice for the occupational health management of new and expectant mothers employed in the National Health Service.
- 1.2 As the implementation of such guidance will have significant human resources implications, it is essential for occupational health to ensure that their Human Resources Department supports these standards and that they are reflected within the appropriate trust policy.
- 1.3 These guidelines represent the current views of best practice and would meet the requirements of relevant legislation and regulations.

EXAMPLES OF RELEVANT LEGISLATION, REGULATIONS AND GUIDANCE

- 1.4
 - European Union Council Directive 1992¹
 - Employment Protection (Consolidation) Act 1978²
 - Management of Health and Safety at Work Regulations 1999³
 - The Employment Rights Act 1996⁴
 - Ionising Radiations Regulations 1999⁷
 - Manual Handling Operations Regulations 1992⁹
 - Control of Substances Hazardous to Health Regulations 1994¹¹
 - Workplace (Health, Safety and Welfare) Regulations 1992¹²
 - Maternity Rights. A Guide for Employers and Employees 2002¹³

BACKGROUND

- 1.5 The European Union Council Directive¹ introduces measures to encourage improvements in the safety and health during pregnancy, the postnatal period and breastfeeding. Equal

treatment of new and expectant mothers when compared with the rest of the workforce is specified. The need for risk assessment is identified which will help to guide subsequent management.

1.6 Other items of legislation also make reference to the protection of pregnant healthcare workers which reinforce the EU Council Directive principles²⁻⁴.

1.7 The Health and Safety Executive (HSE) has published regulations and guidance documents of general application to pregnant workers^{3,5} while more specific HSE publications provide guidance regarding infections⁶, ionising radiation^{7,8}, manual handling⁹ and cytotoxic drugs¹⁰.

1.8 COSHH Regulations¹¹ remain applicable. The Workplace (Health, Safety and Welfare) Regulations¹² specify the provision that needs to be made for workers who are breastfeeding.

1.9 The Department of Trade and Industry publish guidance¹³ regarding statutory maternity rights and maternity leave which include time off for antenatal care, protection against detriment or dismissal on grounds of pregnancy or childbirth.

1.10 There is a considerable body of published research relating to hazards at work and pregnancy outcome, a proportion of which applies to healthcare workers and has been the subject of scrutiny in order to assist in forming opinion that guides occupational health decisions¹⁴.

1.11 In conclusion, therefore, a need has been identified to produce guidance which attempts to draw together the various sources mentioned above.

2. BIAS IN RESEARCH ON REPRODUCTION AND WOMEN AT WORK

2.1 A number of problems in the methodology of research into reproduction and work have been highlighted by Joffe¹⁵ and are summarised as follows:

- Failure to match control groups
- Response bias
- Infertile worker effect, i.e. childless status associated with employment during childbearing years.
- Social class effects –
 - a) favourable social conditions may mask a true adverse work outcome
 - b) deprivation leading to increased need to remain at work due to low income despite unfavourable obstetric factors.

2.2 Care is, therefore, needed in the critical evaluation of studies as biases pull in opposing directions. While investigating the possible influence of work on reproduction, effects which lead to an overestimate of risk appear to be stronger.

3. THE NEED FOR STANDARDS OF PRACTICE

- 3.1 A study¹⁴ has indicated some of the variations in management of pregnant healthcare workers in the NHS. For example, 40% of the responders to a survey of heads of NHS occupational health departments did not have a written policy on management of pregnant healthcare workers.
- 3.2 Frequently, attention is drawn to presumed associations between occupational activities or exposures and adverse pregnancy outcome such as miscarriage, low birth weight and congenital abnormality.
- 3.3 An occupational health department needs to aim for a well informed and consistent approach to management queries and employee's concern
- 3.4 Agreement to a minimum standard of practice allows practitioners a benchmark from which improvement in performance can be planned and measured. Standards therefore, form the basis for audit and professional revalidation.
- 3.5 Finally, occupational health practitioners should be mindful of the need to see referrals as individuals for whom, although management will be based on guidance and standards, the clinician involved will apply personal skills and judgement case by case. Occupational health should also ensure that the employee is not disadvantaged in employment rights and conditions of work because of pregnancy.

4. SOURCES OF INFORMATION

4.1 The guidelines have been formulated from a number of sources including:

- Legislation
- Regulations, Approved Codes of Practice and Guidance
- Research and audit based evidence of existing hazards
- Meetings and correspondence with professional colleagues

4.2 It is hoped that good clinical and management practice will be encouraged. Review of guidance and standards with close involvement of occupational health practitioners should lead to consensus agreement and acceptance of standards.

5. GUIDANCE SPECIFIC TO THE NATIONAL HEALTH SERVICE

5.1 In this guidance, the hazards chosen for comment are as follows:

- Anaesthetic gases
- Cytotoxic drugs
- Ionising radiation
- Physical exertion
- Irregular hours and shift work
- Infections

5.2 However, in the NHS, a wide variation of circumstances will be encountered and the aim is not to formulate specific guidance for every possible situation. Therefore, the occupational health practitioner will frequently base conclusions on general principles combined with risk and clinical assessment.

6. MODEL STANDARDS OF OCCUPATIONAL HEALTH MANAGEMENT OF NEW AND EXPECTANT MOTHERS IN HEALTHCARE WORK

STANDARD 1.1: RISK ASSESSMENT

- 6.1 **Where an employee's occupation in the Health Service involves risk to the health and safety of a new or expectant mother or her child, then risk assessment should be undertaken which is the responsibility of the relevant manager or employer.**
- 6.2 **Assessments should be clearly recorded on forms designed for the purpose.**

STANDARD 1.2: CLINICAL ASSESSMENT

- 6.3 **Subsequent to risk assessment or following referral, clinical assessment of the employee will be the responsibility of the occupational health department and may be conducted by an occupational physician or suitably trained and qualified occupational health nurse. Results of risk assessments should be made available to the occupational health department. Referrals should be in writing but may be initiated by telephone or face to face contact with the manager. Referrals may also be initiated by a concerned employee.**

STANDARD 1.3: PREVENTIVE MEASURES

6.4 Where a risk has been identified, the employer will take the necessary steps in order to control the risk.

6.5 Preventive measures may be directed to remove the source of the hazard. The employer may implement workplace strategies to reduce the risk from the source such as protective equipment or hygiene measures. The employee is expected to take individual responsibility for co-operating with preventive measures.

STANDARD 1.4: ALTERATION OF WORKING CONDITIONS AND HOURS

6.6 In some instances it may not be possible to avoid risk in a particular workplace in which case the employer will need to consider change in hours of work, alternative safe tasks or paid leave.

STANDARD 1.5: CERTIFICATION

6.7 New or expectant mothers who are night workers should be offered alteration of working hours or paid leave. The employee must obtain a certificate from her general practitioner or midwife confirming that this course of action is necessary as part of health and safety measures.

STANDARD 1.6: NOTIFICATION

6.8 In order for the employer to take action with regard to new and expectant mothers, notification must be given in writing of pregnancy, delivery within the previous six months or breastfeeding.

- 6.9 **A certificate of confirmation written by the employee's general practitioner or midwife should be provided to the employer in a reasonable period of time.**
- 6.10 **When breastfeeding continues beyond the six months following delivery, the employer needs to be informed so that control of risk may continue.**

STANDARD 1.7: PROVISION OF INFORMATION

- 6.11 **Employers are responsible for supply of appropriate information to women of reproductive capacity, at the recruitment stage and during employment. Information should include the risks associated with pregnancy or breastfeeding and how these risks are to be controlled.**
- 6.12 **Information provided by occupational health may take the form of leaflets or additions to the employer's website, if available, and should be reinforced by managers when the opportunity arises.**

STANDARD 1.8: TIME OFF FOR ANTENATAL CARE

- 6.13 **Women are entitled to paid time off to keep appointments for antenatal care, made on the advice of a doctor, midwife or health visitor. Antenatal care includes medical examinations, relaxation classes and parent craft classes¹³.**
- 6.14 **Women are entitled to be paid at their usual rate of pay for the time they take off to keep antenatal appointments**
- 6.15 **In early pregnancy adjustment in working arrangements may be advised to accommodate fatigue and morning sickness.**

STANDARD 1.9: MATERNITY LEAVE

- 6.16 **All pregnant employees are entitled to eighteen weeks ordinary maternity leave regardless of length of service. Women who have completed one year's service with their employer are able to take additional maternity leave.**
- 6.17 Women can start maternity leave any time from the eleventh week before the baby is due provided they give the employer at least twenty-one days' notice before they wish to start their maternity leave of (a) the pregnancy (b) the expected week of childbirth and (c) the start date of maternity leave.
- 6.18 An employer cannot allow a woman to return to work for two weeks immediately following the date of the childbirth.
- 6.19 Consideration needs to be given to rest breaks for breastfeeding and the expression of breast milk. Facilities for chilled storage of breast milk should be provided.

STANDARD 1.10: POLICY

- 6.20 **Principles of management of individuals should be based on written policies subject to appropriate interpretation on a case by case basis.**
- 6.21 Policy should be a subject of agreement between the management, Occupational Health and Human Resources Departments who may have educational needs in order to make informed decisions. In development of policy, consideration should be given to the employee, the occupation and factors specifically related to the pregnancy.
- 6.22 Risk management should be based on concepts set out in COSHH Regulations¹¹ and other advisory documents^{1-3,8,9,12}.

- 6.23 Conclusions and action taken should be discussed fully with the employee. With the employee's consent, further consultation with the general practitioner or obstetrician may be required.
- 6.24 Policy should include a statement of the individual's maternity rights as published in standard guidance¹³.

STANDARD 1.11: RECORD KEEPING

- 6.25 **Managers are responsible for keeping appropriate records as required by published regulations¹¹. Management also retains responsibility for reporting of adverse events under RIDDOR¹⁶.**
- 6.26 **The occupational health department will keep and maintain an employee's medical record and communicate details of this, usually only to the general practitioner, obstetrician or the employer, with the informed consent of the employee.**

STANDARD 1.12: OCCUPATIONAL HEALTH ADVICE TO EMPLOYEE / EMPLOYER

- 6.27 **The employee must be able to discuss any potential risks or concerns relating to their pregnancy and work with their manager and, if requested, with occupational health.**
- 6.28 Methods of achieving this standard may include the use of standard advice at pre-employment and induction, together with mandatory training. In addition, checklists should be available to managers for the identification of potential concerns whenever they are made aware that an employee is pregnant.

- 6.29 Where requested, the occupational health service will advise managers and employees on any necessary modifications within the workplace. This may include the need for restriction of specific duties, e.g. shift work, moving and handling. Alternatively, suspension, redeployment and ongoing review may be advised.
- 6.30 The employee should be reminded of their own responsibility in relation to maintaining health and safety standards.

STANDARD 1.13: ETHICS AND CONFIDENTIALITY

- 6.31 **Principles of confidentiality and ethics, as outlined in General Medical Council and Faculty of Occupational Medicine Guidance¹⁷, will be adhered to.**

STANDARD 1.14: DISCRIMINATION

- 6.32 **Policies and procedures will be such that, where reasonably practicable, the new or expectant mother is not placed at a disadvantage in comparison with other employees as a result of management of health and safety issues.**

7. ANAESTHESIA

STANDARD 2: THE MANAGEMENT OF NEW AND EXPECTANT MOTHERS POTENTIALLY EXPOSED TO ANAESTHETIC GASES

- 7.1 The occupational health service should see any employee where the individual or the manager has a concern relating to work with anaesthetic gases and pregnancy. This may be particularly relevant where the employee has a poor obstetric history.**
- 7.2 Where the occupational health service has inadequate information regarding the working environment, e.g. presence of a reliable scavenging system and access to anaesthetic exposure levels, it may be necessary to consider modification of work.**
- 7.3 Alternative safe tasks or paid leave may need to be considered and are more relevant in the first trimester of pregnancy where the aim is to achieve as low a risk as possible of spontaneous abortion**
- 7.4 Control of risk may be achieved by reducing gas inductions, patient turnover and increasing employee's distance from the source. Work should be in well ventilated areas.**

- 7.5 All discussions should be documented within the employee's occupational health record including the need for temporary redeployment if control measures are not reasonably practicable.
- 7.6 Where the employee continues to have concerns following full consultation and review of evidence, this may also lead to the decision to advise redeployment.
- 7.7 The evidence for an association between exposure to anaesthetic gases and adverse pregnancy outcomes is weak and largely based on data published prior to the introduction of more effective scavenging systems and the increased use of intravenous and local analgesia¹⁸.

8. CYTOTOXIC DRUGS

- 8.1 Studies have suggested an association between adverse events in pregnancy and occupational exposure to cytotoxic drugs¹⁹⁻²³. The HSE study by Mason et al²⁴ found no evidence of drug absorption by ward staff who were using dermal control measures such as disposable gloves at times of possible contact. In addition, the preparation of cytotoxics was by a specialised pharmacy preparation unit. The study also points out that some areas such as sluice rooms have relatively high surface contamination.
- 8.2 A previous study by Mason et al²⁵ involving pharmacy staff found evidence of low level absorption from urine measurements in units using positive and negative pressure isolators in drug preparation. Measurable amounts of cytotoxic drugs were detected on floors and on disposable gloves used by technicians.

STANDARD 3: MANAGEMENT OF NEW AND EXPECTANT MOTHERS INVOLVED IN PRODUCTION OR ADMINISTRATION OF CYTOTOXIC DRUGS

- 8.3 **Consensus opinion arrives at the standard of management after considering the research available.**

8.4 The process of production and administration of cytotoxic drugs should be subject to comprehensive risk assessment and management to include:

- Dermal control measures**
- Consideration of areas of potentially high contamination such as sluice rooms**
- Use of specialised pharmacy preparation units**

8.5 With satisfactory risk control, then ordinarily work may continue. However, there is sufficient indication at present to advise against work in a drug preparation unit during pregnancy. In addition, occupational health departments may need to address employee's individual concerns.

9. IONISING RADIATION

- 9.1 There is considerable evidence to indicate that the reproductive risks of radiation are reasonably well controlled. An analysis of the doses of radiation received during work in radiology departments showed that 99.3% of radiographers and 99.7% of nurses received annual doses below 1mSv²⁶. This compares favourably with background dose from natural sources of radiation of about 2.2mSv per year.
- 9.2 The investigation by Draper et al²⁷ found no causative association between parental occupational exposure to radiation and childhood leukaemia or lymphoma.
- 9.3 To date, the Radiation Effects Research Foundation (RERF) has found no long term genetic effects in the 80,000 children (known as the F1 population) born between 1946 and 1984 to survivors of the atomic bombings at Hiroshima and Nagasaki²⁸. However, there is still the possibility that genetic effects could appear as late onset multifactorial disorders that were not visible in infancy. This hypothesis is under evaluation.

- 9.4 Risk assessment will determine the action, if any, to be taken in order to protect new and expectant mothers who can usually be reassured that it is unnecessary to avoid work involving radiation.
- 9.5 Nevertheless, employers and employees will wish to keep radiation dose as low as possible. In the x-ray department an employee should keep as far away as practicable from the patient and the x-ray device while in operation. The protective screens provided should be used. Alternatively, a lead apron should be worn if it is necessary to attend to a patient during exposure.
- 9.6 In units where patients are treated with radiotherapy implants, lead shields should be used and the minimum length of time practicable should be spent with the patient.
- 9.7 Careful risk assessment should be used to determine whether to continue work with unsealed radionuclides which may include patient care during imaging and management of spills of radioactive materials.
- 9.8 The Ionising Radiation Regulations⁷ specify the legal radiation dose limits which must be adhered to with regard to women of reproductive capacity, new and expectant mothers.
- 9.9 It has already been stated that most healthcare workers receive low doses below 1mSv annually and, therefore, risk assessments will normally indicate that dosages will not approach the legal limits.
- 9.10 For comprehensive information, the relevant HSE Guidance⁷ should be consulted.
- 9.11 For women of reproductive capacity, a maximum external dose limit of 13mSv in any consecutive period of three months applies concurrently with the total body dose limit of

20mSv per annum. If it is likely that this dose may be exceeded, appropriate discussion of risks must be held with the employee including the need for timely notification of pregnancy or breastfeeding.

- 9.12 When the employer is notified of pregnancy or breastfeeding, the equivalent dose to the fetus should not exceed 1mSv during the remainder of the pregnancy.
- 9.13 In a breastfeeding employee, exposure should be restricted to prevent significant bodily contamination.
- 9.14 Employees are designated as classified persons if they are likely to receive a dose exceeding 6mSv per year. When classified, the employer must make specific arrangements with regard to individual dose records and health surveillance. In 1998 no occupational group of female classified workers had a mean annual dose greater than 1mSv.

STANDARD 4: NEW AND EXPECTANT MOTHERS AT RISK OF EXPOSURE TO IONISING RADIATIONS

- 9.15 **When employees are occupationally exposed to ionising radiations, the risk assessment will encompass the hazards to women of reproductive capacity throughout pregnancy and during breastfeeding.**
- 9.16 **Radiation dosages received by healthcare workers have been found to be low risk. Nevertheless, exposure should be reduced to the minimum achievable.**
- 9.17 **The following are examples of measures that may be taken to reduce risk:**
- **Maintain as much distance as possible from a radiation source**

- **Use protective screens and lead aprons where appropriate**
- **Keep time spent with radioactive implant patients to a minimum**
- **Carefully assess and control exposure to unsealed radionuclides**

9.18 In the event that exposure approaches legal limits specified by the Ionising Radiation Regulations, detailed guidance in the regulations will be upheld and includes:

- **Adherence to recommendations regarding dose limits**
- **Appropriate discussion of risks with the employee**
- **Provision of timely notification of pregnancy or breastfeeding by the employee**

10. PHYSICAL EXERTION

10.1 In healthcare work, activities require lifting, standing, walking and climbing stairs. There are physical problems associated with posture and the physical changes of pregnancy such as weight gain and musculoskeletal pain associated with ligament laxity. Musculoskeletal difficulties may continue to occur sometime after childbirth.

10.2 There may be resultant problems in working comfortably. Physical dexterity, agility and speed of movement may be affected by abdominal size. Physical changes may cause problems while seated at a workstation. Any concerns should prompt a review of ergonomic considerations.

10.3 Risk assessment will lead to appropriate advice dependent on a combination of social, medical and occupational factors determined on a case by case basis.

- 10.4 Detailed general guidance regarding manual handling is given in Manual Handling: Guidance on Regulations⁹. Regulation 4 states that the employer should consider if any activity puts the pregnant employee at risk.
- 10.5 Research explores the end points of pre-term labour, low birth weight and placental infarcts and their association with measures of fatigue, standing or carrying heavy loads.
- 10.6 Methodological difficulties are evident as described previously and the range and content of physical activity causes difficulty in comparison and interpretation²⁹⁻³⁸.
- 10.7 In any event, with observation of good lifting practice within a minimal lifting policy, then any potential risk to the mother or fetus is reduced to the lowest practicable level.

STANDARD 5: PHYSICAL EXERTION IN PREGNANCY AND THE POSTNATAL PERIOD.

- 10.8 **During the first trimester, if a minimal lifting policy is in place and the pregnancy is uncomplicated, then there is no need for restriction of duties. If the pregnancy or the obstetric history of the mother is complicated, or minimal lifting is not observed, then the pregnant employee should be restricted from manual handling.**
- 10.9 **During the third trimester, restrictions from manual handling tasks are required, but these are mainly for ergonomic reasons and based on consensus rather than any clear evidence of increased exposure likely to be encountered in healthcare work.**
- 10.10 **If musculoskeletal problems are evident in the postnatal period, restriction of manual handling and excessive physical exertion may need to continue.**

11. IRREGULAR HOURS AND SHIFT WORK

- 11.1 Health and Safety Commission Guidance³ makes particular reference to new and expectant mothers who are night workers. On provision of a certificate from her general practitioner or midwife which states that the employee should not be at work for reasons of health and safety, then the employer should suspend the worker for as long as necessary.
- 11.2 The European Union Directive on working time³⁹ contains several requirements related to working hours including the right of employees to refuse to work more than forty-eight hours per week. There are also requirements for a daily rest period of eleven consecutive hours in each twenty-four hour period and a minimum weekly rest period of one day.

- 11.3 The research on effects of irregular hours⁴⁰⁻⁴³ and shift work^{40,42,43} has examined the possibility of an association with spontaneous abortion and fetal death. Studies are based on retrospective questionnaires and it is difficult to exclude the effects of confounding variables. Confidence intervals include the no risk value with one exception⁴³. It is not possible to base a firm argument for the presence or absence of risk based on the research evidence considered.
- 11.4 An assessment of difficulties with regard to working hours should lead to a clinical evaluation which will include consideration of related symptoms such as nausea and vomiting, fatigue and musculoskeletal symptoms, together with any complications of pregnancy.

STANDARD 6: THE POSSIBLE INTERACTION OF IRREGULAR HOURS AND SHIFT WORK WITH PREGNANCY AND THE POSTNATAL PERIOD

- 11.5 **The potential for harm from irregular hours and shift work should be determined. Management may be guided by the results of clinical evaluation of the effects of pregnancy such as:**
- **Fatigue**
 - **Nausea and vomiting**
 - **Musculoskeletal symptoms**
 - **Complications of pregnancy, e.g. pre-eclampsia, bleeding**

- 11.6 **Health and Safety Commission Guidance³ on certification will be adhered to and the European Union Directive on working time³⁹ provides the minimum benchmarks for reasonable working hours.**
- 11.7 **Consensus opinion suggests that new and expectant mothers should not be expected to work at nights, this being particularly important in the later stages of pregnancy, e.g. after twenty-eight weeks. There should be no compulsion to work overtime. The need for adequate rest and meal breaks should be recognised. Compensatory time off the next day should be given following any night shift.**

12. INFECTION

- 12.1 Healthcare workers are at occupational risk from an array of infections. The concerns of the pregnant healthcare worker are unique because certain otherwise mild infections may affect fetal development.
- 12.2 The management of risk of infection associated with employment needs to be a partnership between the employee, occupational health, the employer and the hospital or trust infection control organisation. Advice may be required from the hospital microbiology department or department of infectious diseases. A comprehensive written policy is recommended to

include aspects of risk assessment, educational needs for employees and managers, together with individual case management strategies.

- 12.3 An evaluation should be carried out of possible transmission of infection. This will encompass risk to women of reproductive capacity, in pregnancy and during breast feeding, remembering that it is not always possible to know of pregnancy status in the employee or the correct infective agent until after exposure has taken place.
- 12.4 Risk assessment will be based on identification of the infective agent and its mode of transmission. A review of the probability of transmission can be made depending on the type of contact possible or which has occurred.
- 12.5 The matter of individual susceptibility to infection should be investigated. Occupational health records should hold information on previous history of infection and, therefore, possible immunity and immunisation status. Further information may be required from the employee or her GP and obstetric records.
- 12.6 Decisions are then made with regard to further management which may include testing, prophylaxis and treatment.
- 12.7 Consideration may also be given to hygiene measures, work restriction or suspension as a means to control of risk.

STANDARD 7.1: NEW AND EXPECTANT MOTHERS AT RISK OF INFECTION

- 12.8 **Control of risk of infection should be a partnership between the employee, occupational health, the employer and the hospital or NHS trust infection control organisation and be the subject of a written policy.**

12.9 **Risk assessment will be carried out and the following issues should be included:**

- **Assessment of risk to women of reproductive capacity, in pregnancy and during breastfeeding**
- **Identification of infective agent and mode of transmission**
- **Review of type of contact, stage of pregnancy and probability of transmission**
- **Review of individual susceptibility to infection with reference to medical records and immunisation status.**
- **Consideration of risks identified post exposure**

12.10 **Decisions on management may include consideration of the following:**

- **Hygiene measures**
- **Prophylaxis**
- **Provision of information and consultation with the employee**
- **Consultation with infection specialists**
- **Testing**
- **Treatment**
- **Follow-up to include discussion of issues such as seroconversion and possible vertical transmission of infection**
- **Modified duties**
- **Paid leave**

CYTOMEGALOVIRUS

12.11 Cytomegalovirus (CMV) is a member of the human herpes virus group and is the most common cause of congenital viral infection worldwide. When in utero infection occurs during the first two trimesters of pregnancy, this can give rise to defects of vision, hearing or intellectual development. CMV is a commonly transmitted viral infection among children in group child care environments.

- 12.12 Infection among children in group day care is nearly always asymptomatic, presumably occurring because of mobility, poor hygiene and lack of toilet training.
- 12.13 Because children excrete the virus in urine and saliva for prolonged periods, such children serve as substantial reservoirs for CMV
- 12.14 Studies of CMV transmission in the population and in hospitals⁴⁴⁻⁴⁸ have recorded higher rates of CMV seroconversion in carers of children.
- 12.15 The risk of CMV seroconversion in the offspring of such carers has not been determined. It is suggested that the differing rates of seroconversion in differing centres may be influenced by hygiene practices.
- 12.16 Inadvertent exposure to CMV occurs frequently and transmission of the infection can be prevented by adherence to hand washing and standard hygiene precautions.

HUMAN IMMUNODEFICIENCY VIRUS

- 12.17 Information from the Public Health Laboratory Service⁴⁹ on follow-up studies of exposed healthcare workers suggests that the overall rate of HIV transmission from a single percutaneous (e.g. needlestick) exposure to HIV infected blood is around 0.32%, 95% CI 0.18% - 0.45%. The risk may be slightly higher with a deep penetrating injury or when a substantial volume of blood has been injected.

12.18 The risk of seroconversion after a mucocutaneous exposure to HIV infected blood is 0.03%.

12.19 Nurses and clinical laboratory workers account for 72% of definite occupational HIV infections. (73 documented seroconversions worldwide out of 102 specific occupational exposures)

12.20 If exposure occurs during pregnancy, the use of post exposure prophylaxis will require careful evaluation and discussion with relevant specialists.

HEPATITIS B AND HEPATITIS C

12.21 Transmission of the virus depends on concentration in the blood or body fluid, volume of fluid inoculated, loss of infectivity during transfer and route of entry. Healthcare workers who have been exposed via needlestick injury to a patient who is HbeAg positive acquire the infection in 19-40% of cases^{50,51}. Vertical transmission of Hepatitis B virus from mother to baby is highest during the third trimester occurring in more than 75% of cases.

12.22 Similarly, there is a direct relationship between serum plasma concentration of Hepatitis C virus and infectivity. The transmission risk following needlestick is reported as 0-10%.

12.23 New and expectant mothers will require the same management principles as other employees including education on safe procedures to avoid blood or body fluid contamination and needlestick injury. Safe sharps' disposal should be reinforced.

12.24 The hospital or trust immunisation policy should be adhered to.

12.25 In the event of exposure to a blood borne virus, testing prophylaxis and follow-up should be individually considered. There will be a need for counselling including discussion of risks of seroconversion and vertical transmission of infection.

RUBELLA

12.26 Rubella is a mild infection with teratogenic effects on the fetus during pregnancy. The virus is able to produce miscarriages, stillbirths and the congenital rubella syndrome. Widespread rubella immunisation has resulted in dramatic declines in incidence rates for all age groups.

12.27 Serum specimens obtained as soon as possible after the appearance of rash and again 2 weeks later can establish the diagnosis with a rise in antibody titre. Infected patients shed the virus from the nasopharynx for 1 week before to 1 week after the onset of rash. Transmission is by droplet spread.

12.28 Fetal infection may occur following maternal rubella at any stage of pregnancy. Miller and co-workers⁵² prospectively evaluated 1016 woman with confirmed rubella during pregnancy. 407 (40%) continued their pregnancy to term. The rate of congenital infection following maternal rubella was 81% during the first 12 weeks of pregnancy, 54% at 13 to 16 weeks, 36% at 17-22 weeks, 30% at 22-30 weeks and then rose to 60% at 31-36 weeks and 100% for those occurring in the last month of pregnancy. Cardiac defects and deafness occurred in all the infants infected during the first 10 weeks of gestation and deafness alone in a third of those infected at 13-16 weeks. No rubella defects were noted in those infected after the 16th week.

12.29 Occupational Health policy should ensure the confirmation of rubella immunisation and immunity in women of reproductive capacity.

- 12.30 In the event of occupational exposure of an unimmunised employee, a risk assessment should be carried out with consideration of testing, if appropriate. The employee will require counselling on the risk of infection depending on results of serological tests and stage of pregnancy.
- 12.31 Ordinarily, the employee's general practitioner, midwife and obstetrician will be involved in clinical management decisions.

HUMAN PARVOVIRUS B19

- 12.32 B19 is the primary aetiologic agent of aplastic crisis (AC) and erythema infectiosum (EI). These are primarily illnesses of school age children. 30-60% of adults may have immunity. Incubation period for clinical EI and AC is usually 4-14 days. Patients with EI are not likely to be infectious once the rash develops or within a few days afterwards. Patients with AC are likely to be infectious at the onset of illness and up to a week later.
- 12.33 EI is typically a facial rash ("slapped cheek" appearance) that spreads to the extremities and trunk often with a reticulated (lace) pattern. In up to 60% of patients, rash is preceded by 1-4 days of fever, malaise, myalgia and respiratory or gastrointestinal symptoms. Most patients feel well by the time rash develops. Adults may develop the above presentation but are more likely to have arthralgia.
- 12.34 The link between B19 infection and fetal death has been demonstrated to be causal. The pathological picture is of hydrops fetalis. It is uncertain whether B19 produces congenital anomalies. It has been suggested⁵³ that 5% of women infected during the first 18 weeks of pregnancy experience fetal death. A study of household B19 exposure⁵⁴ shows a secondary attack rate of 50% of susceptible adults.

12.35 Determination of the B19 status of an exposed pregnant healthcare worker may assist an individual risk assessment.

VARICELLA ZOSTER (VZV) INFECTION

12.36 VZV is the causative agent of two diseases: varicella (chickenpox) the primary infection, and zoster (shingles) a secondary infection due to reactivation of latent VZV.

12.37 Serious morbidity is common if infection occurs in neonates. 90% of persons over 20 years of age have evidence of past varicella infection.

12.38 Varicella transmission is by droplet route and is more efficient the closer the contact. Patients are infectious 24-48 hours before the onset of rash and remain infectious for 5 days. Immunocompromised patients may be infectious for longer.

12.39 Secondary attack rate of varicella in a household setting has ranged from 61-87%. The risk of transmission of zoster is reported as one-third that of varicella.

12.40 Infection is more severe in adults and particularly in pregnancy. Between 1985 and 1993, 8 maternal deaths were reported in the UK in association with maternal varicella pneumonia.

12.41 Congenital varicella syndrome includes dermatonal scarring, ocular abnormalities, mental retardation and early death. Incidence of the syndrome following maternal infection is 2% and the highest risk is between 13 to 20 weeks ' gestation.

12.42 Neonatal varicella may result if the mother has the onset of clinical varicella during the two weeks prior to birth.

- 12.43 At the pre-employment stage, a previous history of varicella is reasonable evidence of immunity. Susceptible pregnant healthcare workers should be advised of the risks and recommended to avoid coming into contact with VZV patients.
- 12.44 Risk assessment should be undertaken in the event of a susceptible pregnant healthcare worker's contact with VZV. Serology testing may be carried out and consideration given to varizella zoster immunoglobulin (VZIg) administration in susceptible individuals, in consultation with a virologist and the employee's obstetrician.
- 12.45 Acquisition of VZV infection by the healthcare worker during pregnancy will require specialist obstetric care.

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