HSE

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Occupational health provision on the Olympic Park and athletes' village

Final report

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Research Report

HSE

Health and Safety Executive

Occupational health provision on the Olympic Park and athletes' village

Final report

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The construction of the Olympic Park and Athletes' Village was an enormous job, with the site extending over 500 acres of formerly mixed-use land, and involving an estimated 30,000 workers.

In order to ensure that the health of workers was protected throughout their time working on the project, a comprehensive, preventative occupational health service was established and offered to all contractors free of charge. This report examines the work of this service using a range of data from contractors, workers and the occupational health providers themselves.

The service provides an example of what good practice can look like in assisting contractors to both meet their legal obligations and also take a more informed and involved approach to workplace health management. It was viewed as one of the best occupational health services that has been in operation on a major construction site to date in the UK. The report details examples of how the service worked, and what contractors and workers valued about it.

This report and the work it describes were funded by the Health and Safety Executive (HSE) and the Olympic Delivery Authority (ODA). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE or ODA policy.

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This research is part of a suite of research projects and independent evaluations undertaken on Health and Safety on the London 2012 construction programme comprising:

- Leadership and worker involvement.
- Site communications and other health and safety Initiatives.
- CDM 2007 Regulations: duty holder roles and impact.
- Safety climate tool and measuring site culture.
- Health and Safety in the supply chain.
- Occupational health programme provision on the Olympic Park and Athletes' Village.
- Food safety and sustainability.
- Preconditioning for success.

All the research reports should be read in conjunction with the paper below, which provides an overview of health and safety on the London 2012 construction programme:

- Delivering health and safety on the development of the London 2012 Olympic Park and Athletes' Village.

Full research reports for all projects will be published at a later date.

ACKNOWLEDGMENTS

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Members of the Park and Village Health teams have helped us to understand the nature of the complex and extensive service that they offered and provided us with timely and detailed data to allow analysis of their performance. Karen Baxter, Melodie Gilbert, Eric Ball and Stephanie Martin-Halls, in particular, dealt with our evaluation demands with good humour and a supportive approach, and for that we are grateful. Karen Elson, Clare Ramsden and Ros Seal have also helped us during our work by providing support from within ODA, giving us access to the site and their data and helping us get to grips with the complex working arrangements. Other members of staff at the Institute for Employment Studies (IES) have also helped with the research at various points, particularly Jenny Savage, Gill Brown, Stefan Speckesser and Sally Wilson. Geoff Pike of Employment Research administered the on-site worker survey. In addition, Mike Evans shared his conclusions from a cost–benefit assessment of the occupational health (OH) provision on the construction of Terminal 5, adding greatly to this element of the work.

Finally, we must thank all the people working on the Park and Village who took time out of their working day to contribute to the research. We thank those managers who helped us set up case studies or took part in our telephone survey. We are grateful to the workers who kindly filled in our questionnaires during their lunch breaks or talked to us when we visited the site. Without these contributions the research would simply not have been possible. Everyone else who spent time talking to us has also made a valuable contribution to the research.

CONTENTS

ABBREVIATIONS

AFR	accident frequency rate
CBA	cost–benefit analysis
CDM	construction design management
CDMC	construction design and management co-ordinator
COSHH	Control of Substances Hazardous to Health
D&A	drugs and alcohol
DP	delivery partner
HAV	hand arm vibration
HIFR	Health Impact Frequency Rate
HII	Health Impact Index
HSE	Health and Safety Executive
HS&E	health, safety and environment(al)
IES	Institute for Employment Studies
IFR	injury frequency rate
KPI	key performance indicator
MSD	musculoskeletal disorder
NIHL	noise-induced hearing loss
ODA	Olympic Delivery Authority
OH	occupational health
OHMM	Occupational Health Maturity Matrix
PLT	Project Leadership Team
PPE	personal protective equipment
RAG	Red/Amber/Green
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
RoSPA	Royal Society for the Prevention of Accidents
RPE	respiratory protective equipment
SHELT	Safety Health and Environment Leadership Team
T5	Heathrow's Terminal 5
TBT	Toolbox Talk

KEY MESSAGES

The key messages and learning points established from this research are presented below.

- The occupational health (OH) provision on the Olympic Park and Athletes' Village has been recognised by the construction industry and beyond as an example of good practice, and one of the best implemented on any major construction project in the UK.
- The inclusion of occupational hygienists in an integrated team with clinical staff enabled a co-ordinated approach across the preventative and clinical aspects of the service.
- The OH team adopted a 'health like safety' approach, encouraging contractors to see health risk management as part of their day-to-day activities, and something that was simple to integrate with existing safety management.
- The OH intervention had clear impacts on the attitudes and behaviours of workers and managers on site
- The OH team took part in senior management meetings and encouraged contractors to share their experiences with one another as a way to maximise learning and promote good practice.
- In engaging with workers on well-being initiatives, the OH team sought wherever possible to use it as a 'way in' to engage on wider OH and safety concerns.
- The OH team proactively engaged with managers and workers initially offering simple solutions to contractors' problems as well as innovative approaches to workers (e.g. health-based competitions) that took OH messages to them on site.
- Earlier engagement with design teams and further training on OH awareness for designers, architects and CDM co-ordinators are necessary if health risks are to be more effectively designed out before they reach work sites.
- Senior level commitment and leadership on the part of clients and contractors are vital if standards of OH are to be improved in the construction industry
- The cost benefit analysis of the OH provision indicated that the provision of treatment services and health surveillance on site can have substantial economic benefits, such that the costs of offering other services can be offset.
- Whilst the scale of OH provision or the exact model may not be replicable on all future projects, there are elements that could be transferred across the industry, and/or appropriately scaled for more modest budgets.

EXECUTIVE SUMMARY

This report presents the results of a research project which examined the performance of the occupational health (OH) provision on the Olympic Park and Athletes' Village. The research was commissioned by the Health and Safety Executive (HSE) and the Olympic Delivery Authority (ODA). The report is based on information provided by the OH team of clinical staff and occupational hygienists on the site (called Park Health when working on the Park, Village Health when working on the Village and Park/Village Health when referring to whole site provision), as well as data collected from managers and workers on the site, and from other stakeholders.

RESEARCH METHODS

The main data collection took place during 2009 and 2010, with some additional work to update results and consult further stakeholders taking place in 2011. The data in this report has been compiled from the following sources:

- working with the Park/Village Health team to identify and analyse data on the services they have provided, using information from 2008
- a telephone survey of 164 managers to gain a view of managerial attitudes towards the OH provision on the Park and Village
- a paper-based survey of 1,183 workers administered in work canteens
- case study work with eight contractors across the Park, involving managers, sub-contractors, supervisors and workers, to gain an understanding of how Park/Village Health worked in practice
- interviews with other stakeholders, including HSE inspectors, representatives of the construction industry, union representatives, employers attending OH master classes on the site run by the Park/Village Health team, and other interested parties (e.g. OH providers, government policy experts) to gain a broader perspective on the possible legacy of the project.

PARK/VILLAGE HEALTH STRATEGY

The OH service was set up as part of a commitment to protecting the health and safety of workers on the Olympic build. It offered support to managers from a team of occupational hygienists and OH professionals working in an integrated way to prevent and treat occupational ill-health and promote healthy behaviours. The service was guided by a clear strategy and targeted the main OH hazards facing construction workers (vibration, noise, respiratory, hazardous substances and manual handling). The strategy was updated yearly and helped to ensure a co-ordinated approach across the preventative and clinical elements of the service. The Park/Village Health team also developed an approach called 'health like safety' which attempted to integrate good OH management practice into day-to-day working by using existing safety management tools such as near-miss reporting and maturity matrices as the basis for tools to target health risks.

USE OF AND VIEWS ON PARK/VILLAGE HEALTH SERVICES

Seventy-five per cent of managers had used Park/Village Health for support whilst working on the site. The support of occupational hygienists, who assisted contractors to take a more preventative approach to OH, was seen as useful and an innovative addition to the more

traditional OH presence on site. The 'health like safety' approach worked well, and contractors appreciated the clear and easy-to-understand feedback and recommendations that they received as a result of participating in initiatives like the Health Impact Index (HII) and the Occupational Health Maturity Matrix (OHMM). Using these tools on site also resulted in useful intelligence being gathered about how contractors approach health risk management. This has revealed a lack of understanding of some elements of OH amongst contractors, particularly in relation to their legal obligations regarding health surveillance and, further, what health surveillance actually meant in practice.

There were a number of examples where the hygiene team was able to work with contractors to recommend healthier materials, processes and working practices on the site. There was little success in working with designers to fully 'design out' risks. Park Health made attempts to work with designers, but once the work had reached site it was often too late to have a real impact. Designers and construction design and management co-ordinators (CDMCs) often lacked understanding of the potential health consequences of design decisions.

Sixty-seven per cent of workers recalled using the Park/Village Health service during their time on the site and 25 per cent had used the walk-in treatment centre. Those who had worked on site for longer and who worked on a project that was more engaged with Park/Village Health were most likely to have used the OH service. Having access to on-site treatment support was seen as valuable, particularly given that 20 per cent of workers had no access to a GP and 55 per cent no access to OH on other sites. The clinical team delivered a total of 113,666 clinical interventions, including over 63,000 pre-employment checks, over 14,000 safety-critical medicals as well as a range of other functions[1]. The greatest single health problem affecting the workforce was musculoskeletal conditions. Workers also received appropriate health checks for conditions that they were at risk of developing because of potential exposure in their work.

Over 80 per cent of workers recalled having received a briefing on an OH issue, either from Park/Village Health or a contractor, whilst working on the site. Twenty-five per cent of managers had used Park/Village Health to provide a briefing to their workforce. Workers with higher exposure levels to specific health hazards were more likely to receive briefings on those hazards whilst working on the Park and Village, demonstrating effective targeting of information.

Reactions to the service have been extremely positive and large proportions of both managers and workers believed that the OH provision, attention to health risks and general health and safety standards were better on this site than on others they had worked on.

POTENTIAL IMPACT AND LEGACY OF THE SERVICE

Working on the Park and Village has affected the way that workers and managers view OH issues, as well as their behaviour. Almost 90 per cent of workers believe that their awareness of OH risks has improved, with less experienced workers most likely to have made improvements. Working with Park/Village Health has helped managers become more familiar with OH issues and improved their general ability to manage OH risks; they will take these skills with them onto future projects. Communication about OH, however, needs to ensure that technical language is avoided. Park/Village Health have found that describing 'long-term' health risks and 'slow accidents' has helped them to highlight the difference between these and safety issues.

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[1] *from August 2008 to May 2011 inclusive*

The promotion of OH issues across the site offers the potential for achieving a more lasting legacy through:

- setting new standards for good practice in OH provision for major projects, but also demonstrating that this is scalable through their work with smaller and specialist sub-contractors
- demonstrating the importance of client commitment to OH and what can be achieved with genuine top-down leadership on the issues and bottom-up worker involvement
- simplifying the process of, and removing the mystery surrounding, OH management
- demonstrating how to communicate with workers about health issues, often using competitions or well-being issues to introduce OH [1]
- encouraging sharing of good practice amongst contractors
- providing more evidence about the importance and potential benefits of involving OH professionals in the design stage of a project.

CONCLUSIONS

This research had four[2] main aims, and the conclusions have been formulated to address them.

1. Was ODA's aim met for its OH intervention model and practice on site to represent best practice? *There is agreement that the OH service on the Park and Village was one of the best that has been implemented on any major construction project in the UK to date. It was well thought of by workers and managers on the site and received widespread recognition within the construction industry and beyond.*

2. Was the model consistent with cost–benefit evidence from similar interventions elsewhere? *Making direct comparisons with other interventions was not possible for the whole service. A cost–benefit analysis suggests that the benefits of the programme of clinical treatments and health surveillance pay for the entire service (either almost or with a substantial financial return, depending on whether wage or production cost estimates are used to calculate the benefits). Contractors also identified a range of financial and other benefits from taking a more active approach to OH management. These could not be quantified.*

3. Did the interventions that were made through the OH programme impact on the attitudes, behaviours and exposures to health risks of people on site? *Where contractors had engaged with Park/Village Health, there was evidence from survey and interview data that both worker and manager attitudes and behaviours had been affected. The more engaged a contractor was with Park/Village Health, the greater the observed changes. There were a number of contractors and a small proportion of workers who chose to opt out of contact with Park/Village Health. In these cases the impact is likely to be much reduced or negligible.*

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1 Engaging with workers on well-being issues helped to build the trust needed to achieve ill-health prevention benefits, and encourage-take up of the clinical services. Workers were more comfortable raising workplace issues and using OH services after they had been in contact with the team about well-being issues.

2 The research originally had one further aim: to determine the extent to which on-site interventions impact on motivation, performance, expectations and making 'employer/industry of choice'. However, due to the changing economic backdrop to the work, and the altered position of the construction industry (i.e. from a tight to a loose labour market), this objective was no longer felt to be relevant.

4. Did the interventions impact on future behaviours of key stakeholders who were on the ODA site at the time of the research (client, principal contractors, contractors, workers)? *There was evidence from survey and interview data that managers and workers did intend to carry forward learning from their time on the Park and Village. Managers, in particular, learned a lot from working with occupational hygienists, and from the 'health like safety' approach. Where there was senior management commitment to the principles of good OH management, learning from the Olympic Park was more likely to have been embedded in company policies.*

1 INTRODUCTION

This report outlines the findings of the Institute for Employment Studies (IES) who have spent almost three years studying the occupational health (OH) provisions and management on the Olympic Park and Athletes' Village construction sites. The research was conducted on behalf of the Health and Safety Executive (HSE) and the Olympic Delivery Authority (ODA). This first chapter provides the reader with some background about the Park and Village construction projects and the methods used in the research.

1.1 INTRODUCTION TO THE OLYMPIC BUILD

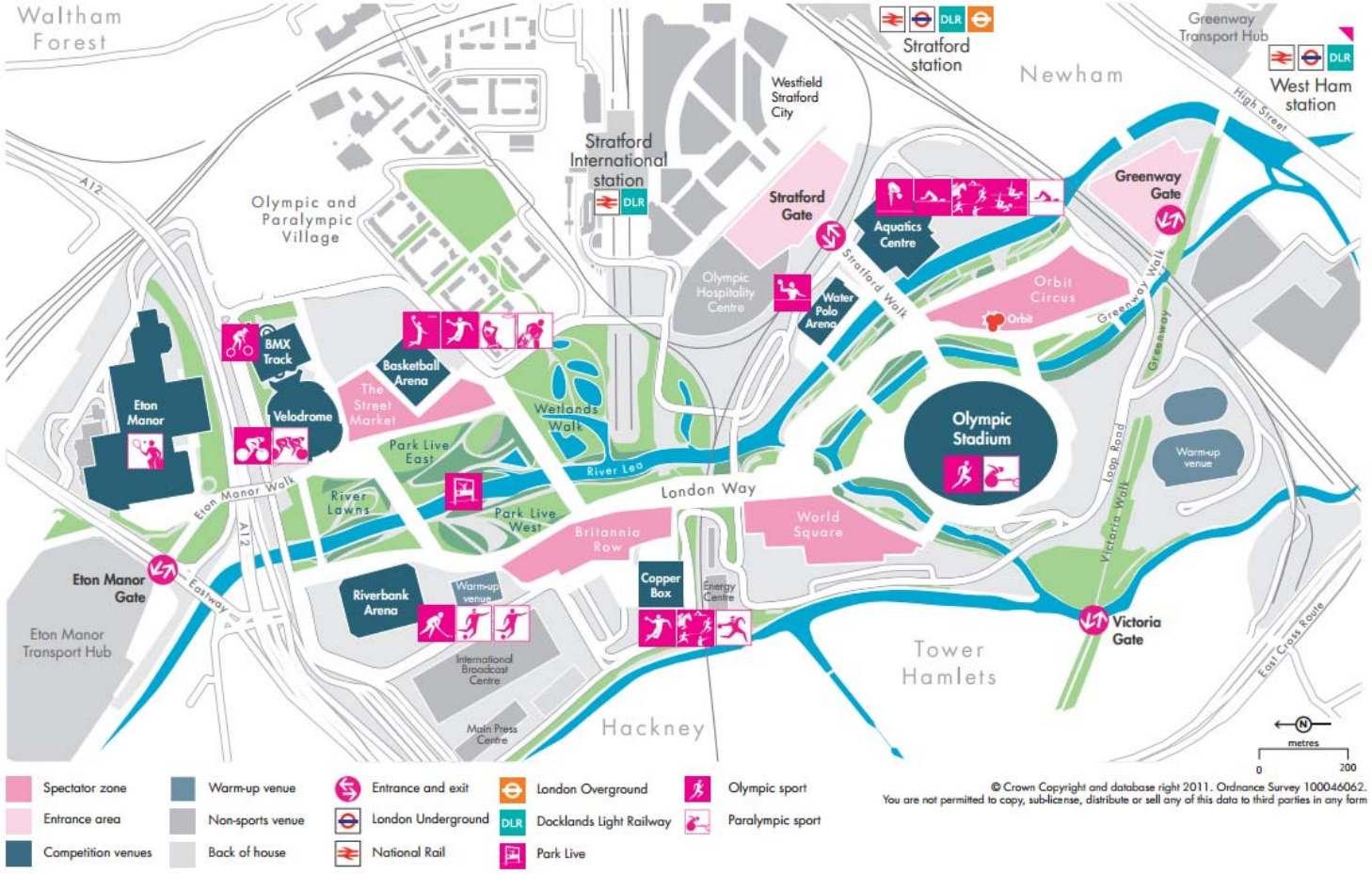
The ODA is the public body responsible for developing and building the new venues and infrastructure for the London 2012 Olympic and Paralympic Games and their use after 2012. One of the key responsibilities of ODA is building the Olympic Park, where much of the action in 2012 will take place. ODA was established by the London Olympic Games and Paralympic Games Act, which received Royal Assent in March 2006.

The site extends over 500 acres of formerly mixed-use land, including industrial, residential and 'brown field' sites. The Park area was fragmented, polluted and divided by waterways, overhead pylons, roads and railways. The removal of the overhead electricity pylons and the placing of power underground unlocked the area for development. We provide a map of the main areas on the site overleaf.

The construction phase involved creating major venues for use during and after the events of 2012 (e.g. Aquatic Centre, Olympic Stadium), as well as extensive infrastructure development and the landscaping of new parklands. More than 4,000 trees, 74,000 plants, 60,000 bulbs and 300,000 wetlands plants are being planted to create a new open green space for London – the largest planting project ever undertaken in the UK. The peak workforce was estimated to be around 12,000 people; around 30,000 people will have worked on the Park and Village over the lifetime of the project.[1]

ODA was a 'thin' construction client and appointed a delivery partner (DP) to undertake much of the work on its behalf. The DP was appointed by ODA to manage the construction programme for venues and infrastructure in the Park. DP was responsible to ODA for ensuring that the construction work wais delivered on time, to budget and to the specified quality. DP was also appointed as principal contractor for certain areas of the Park. The work was organised via such principal contractors who took overall responsibility for their individual projects; these were called Tier 1 contractors, their sub-contractors Tier 2s and their sub-contractors Tier 3s etc. Throughout this report the term Tier 1 contractors will be used in line with the terminology used on the Park and Village; these would be called principal contractors on other sites.

[1] *Taken from:* Learning Legacy Communications Guide *(2011), produced by ODA.*



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1.2 HEALTH AND SAFETY MANAGEMENT ON THE SITE

ODA has a stated commitment to achieving excellence in health and safety management. Both ODA and DP were also responsible for ensuring that contractors met health, safety and environmental (HS&E) standards. Contractors on the Park and Village have received inputs on the standards that are required from both ODA and DP. As part of the aspirations of the Games, construction work incorporated six key themes across all of the projects during every phase:

- design and accessibility
- employment and skills
- equality and inclusion
- health, safety and security
- sustainability
- legacy.

The ODA HS&E standard also required suppliers working on the site to ensure that their personnel actively participate in the programme for health checks and health surveillance and were made aware of health promotions. There was also clear guidance on the levels of welfare provisions that contractors were required to supply for workers on their projects (including toilet, washing, storage and changing, rest, catering, drinking water and showers).

Opportunities existed for communication across projects through a number of fora: Project Leadership Teams (PLTs), Safety Health and Environment Leadership Teams (SHELTs) and Health Safety and Environment fora. These meetings allowed key personnel from the Tier 1 contractors and their suppliers to share health and safety information. Documents such as Health, Safety and Environment Bulletins were also used across the projects to provide feedback to the project teams on overall performance. Common standards were also produced by all parties to continually deal with emerging HS&E issues.

To help contractors achieve their obligations, an on-site OH service called Park/Village Health was established. The Park/Village Health service integrated the work of OH professionals (i.e. OH doctors, nurses and a physiotherapist) with those of occupational hygienists in a combined effort to protect worker health. Park/Village Health were therefore constructed to help ODA meet its responsibilities with regard to OH and to assist ODA to drive forward good practice across the work site. HSE and ODA were keen to maximise the learning from this unique construction project and the OH service offered on it, and they commissioned this research project in order to do so.

1.3 LEGAL REQUIREMENTS

Everyone controlling work on a construction site has a responsibility to ensure that the working environment is healthy and safe. This requires planning and organisation to identify and manage the risks. Over two million people work in the construction industry in the UK and there is a high incidence of occupational ill health. The main health hazards in construction work are: manual handling, noise, vibration, dust and hazardous substances.

Management of occupational health risks is a legal requirement, which is set out both generally and specifically in:

- The Health and Safety at Work etc. Act 1974 imposes a general duty on employers to ensure the health and safety of employees (and on those affected by the work activity).

- The Construction (Design and Management) Regulations 2007 integrate health and safety into the management of the project and place responsibilities on:
  - Clients, who can remove or reduce risks to health
  - Designers, who can eliminate hazards and reduce risks
  - CDM co-ordinators, who have a key role in managing information flow
  - Principal contractors, who can plan and implement strategy to manage risk
  - Contractors, who can manage risks to which workers are exposed.
- Employers have duties to assess and prevent or adequately control the health risks to their employees under the following legislation:
  - The Management of Health and Safety at Work Regulations 1999
  - The Control of Substances Hazardous to Health Regulations 2002
  - The Control of Noise at Work Regulations 2005
  - The Control of Asbestos at Work Regulations 2002
  - The Control of Lead at Work Regulations 2002
  - The Control of Vibration at Work Regulations 2005

A key principle in controlling exposure to OH risk is the hierarchy of controls, which requires that consideration be given in the first instance to elimination or substitution of a hazardous substance and, if this is not possible, then provision of engineering controls. Use of personal protective equipment should be seen as a last resort. Health surveillance should be in place where appropriate.

1.4 DETAILS OF THE RESEARCH

This research was commissioned to examine how OH was managed on the Park and Village construction sites, and in particular to examine the contribution of the services of Park/Village Health. There was also a focus on understanding the potential legacy of the OH provision and the research project was commissioned as one of the learning legacy projects.

1.4.1 Research aims

This research had four[1] main aims. These were to assess the extent to which:

- the ODA aim was being met for its OH intervention model and practice on site to represent best practice
- the model was consistent with cost–benefit evidence from similar interventions elsewhere

[1] *The research originally had one further aim, to determine the extent to which on-site interventions impact on motivation, performance, expectations and making construction an 'employer/industry of choice' in a tightening labour market. However, due the changing economic backdrop to the work, and the altered position of the construction industry (i.e. from a tight to a loose labour market), this objective was no longer felt to be relevant.*

- interventions that were made through the OH programme impacted on the attitudes, behaviours and exposures to health risks of people on site
- interventions impacted on future behaviours of key stakeholders who were on the ODA site at the time of the research (client, principal contractors, other contractors and workers)

The main data collection took place during 2009 and 2010, with some additional work to update results and consult further stakeholders taking place in 2011.

1.4.2 Research methods

This research involved the collection and analysis of a range of data from those working on or connected to the Park and Village build to provide a view of the work of Park/Village Health from a range of perspectives. In summary, the research involved:

- working with the Park/Village Health team to identify and analyse data on the services they have provided
- a telephone survey of 164 managers to gain a view of managerial attitudes towards the services provided by Park/Village Health and overall standards of OH management on the Park and Village
- a paper-based survey of 1,183 workers administered in work canteens by researchers from Employment Research to better understand the worker viewpoint
- case study work with eight contractors across the Park, involving managers, sub-contractors, supervisors and workers, to gain an understanding of how Park Health interventions worked in practice
- interviewing other stakeholders such as HSE inspectors, union representatives and employers attending OH master classes on the site to gain a broader perspective on the possible legacy of the project
- reviewing data from ODA and Park/Village Health (and data from another large UK construction project) on the costs and estimated benefits of the OH provision.

Reflecting on the utility of these methods, a general point should be made about the surveys. Whilst both provided interesting data from a range of managers and workers, they took place over a relatively short period of time. In future it would be useful to consider collecting data at a range of time points so that contractors and workers involved in different stages of the construction process can contribute to the findings. This would, however, have cost implications.

Full details of the project methodology are provided in Appendix 1, the respondents to the two surveys in Appendix 2, and the case study participants in Appendix 3.

1.5 SUPPORTING DATA

For reasons of brevity, much of the detailed data is presented in tabular or figure form in the Appendices. Appendix 6 provides this data in the order in which it is discussed in the main body of the report. These tables and figures are referenced throughout the main text.

In addition, to illustrate some of the work of Park/Village Health in more detail, a number of detailed examples are provided. These examples have been put together using data from Park/Village Health. They are again referenced throughout the report and are presented in Appendix 7.

2 HEALTH AND SAFETY ON THE PARK AND VILLAGE

This chapter provides the reader with an overview of ODA's key health and safety monitoring data and presents the views of both managers and workers from the Park and Village on the various measures in place on the site to protect them from OH risks.

2.1 ODA MONITORING DATA

Using a formal scorecard system as well as an accident/investigation reporting arrangement (both web-enabled) the Tier 1s, designers and construction design and management coordinators[1] (CDMCs) were required to self-monitor. They were also required to submit monthly reports on their efforts to achieve high HS&E standards, and on any accidents, incidents and significant near misses. ODA's DP also carried out assurance audits which explored the health and safety performance of projects and reported back to ODA. Health and safety issues were also discussed at monthly DP-run HS&E fora, where senior representatives from all the project contractors shared their experiences.

ODA therefore had excellent monitoring data regarding the health and safety performance of contractors on the site. ODA's health and safety close-out report[2] outlines how, by July 2011, construction on the site accounted for nearly 70 million working hours. During this time the accident frequency rate (AFR)[3] was 0.17, and the AFR since commencement on the Park was <0.15. The site has achieved 22 periods of one million working hours, four periods of two million hours and one period of three million hours without a RIDDOR-reportable injury.[4]

2.2 MANAGEMENT VIEWS ON STANDARDS

Managers were asked about the availability of personal protective equipment (PPE), work design and welfare facilities on the areas of the Park and Village on which they had worked. There was a great deal of similarity in the results. Just over 40 per cent of managers felt that the variety of PPE (i.e. hearing protection, gloves, lifting aids, low vibration machinery and cutting/dust extraction equipment) was much or a little better on the Park and Village than other sites they had worked on. Similarly, just over 40 per cent of managers felt that a range of different design elements (i.e. use of lighter weights, use of materials without solvents, avoiding processes that create dust, avoiding manual handling/breaking and use of pre-cast concrete) were much or a little more common on the site. Managers in this survey, therefore, did not distinguish, for example, between the availability of different PPE types, or welfare facilities, or between different processes designed to remove risks.

The views on the welfare provisions were even more positive. Almost 70 per cent of managers felt that various welfare provisions (i.e. washing facilities, barrier creams, shelter, availability of hot and cold drinks and use of breaks to vary routine) were much or a little

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1 *A CDMC has a range of duties as defined in the* Construction Design and Management Regulations 2007 *and will assist and advise clients of their duties and co-ordinate health and safety aspects of design.*

2 *Olympic Delivery Authority Health and Safety Priority Theme Close Out Report, Executive Summary*

3 *AFR = number of accidents x 100,000/total hours worked*

4 *RIDDOR = Reporting of Injuries, Diseases and Dangerous Occurrences Regulations. A RIDDOR-reportable injury is one in which a major injury (e.g. fracture) is sustained or where the individual is away from work as a result for more than three days.*

more common when compared to other sites. There was therefore clearly a view amongst managers that conditions for workers on the Park and Village were good. For most managers, the facilities were better than on other sites they have worked on. Appendix 6 provides further details on these results (see Tables A6.1, A6.2 and A6.3).

The survey of managers took place at one time point in the project and that the activities at that time were limited to the construction phase of the build. The sample used in this research therefore may have different views about the impact of the OH programme on staff behaviour and attitudes than would be the case if other phases were questioned. It would therefore be worth securing resources for future projects so that surveys can be undertaken at multiple time points and other construction activities can be covered (e.g. landscaping activities and groundwork).

2.3 WORKER VIEWS

The survey asked workers a range of questions about OH hazards and control measures.

2.3.1 Hazard[1] exposure

The three most common health hazards workers believed they were exposed to on the Park and Village were manual handling, dust and airborne particles, and repetitive tasks in awkward positions (Table 2.1). Manual handling was by far the most common hazard workers were exposed to and 25 per cent believed that they were almost always required to undertake manual handling in their work.

Table 2.1 On the Park and/or Village, how much does your work involve…

Job activity	Almost always (%)	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
Manual handling	24.7	22.3	16.5	10.9	25.7
Exposure to dust and airborne particles	9.8	20.3	31.5	14.4	24.0
Repetitive tasks in awkward positions	8.1	17.7	22.1	14.7	37.5
Regular, frequent exposure to loud noise	5.9	16.5	29.3	19.0	29.3
Use of vibrating machinery	5.8	15.7	19.9	10.1	48.4
Spending long periods sitting in a vehicle	4.0	3.5	6.9	13.1	72.5
Contact with wet cement or similar products	3.5	5.6	13.3	17.7	59.9
Contact with hazardous chemicals, biological agents or abrasive substances	3.1	5.4	18.3	20.2	53.0

Source: IES/Employment Research Ltd Worker Survey 2010

[1] *This section focuses on hazards rather than risks. A hazard is anything with the potential to cause harm (e.g. working at height on scaffolding) whilst a risk is the likelihood that a hazard will cause a specified harm to someone or something (e.g. if there are no guardrails on scaffolding it is possible that a worker will fall and sustain injuries).*

An overall indicator of the levels of OH hazard to which workers were exposed was calculated, and each individual given a score from their combined response to these questions.[1] Whilst the levels of exposure were minimal amongst non-construction and managerial-level staff, that of non-managerial workers in construction jobs was higher. Thirty-three per cent of construction workers, based on this index, were subject to either mid- or higher exposure levels, indicating exposure to multiple hazards or frequent exposure to a single hazard. Appendix 6, Table A6.4 provides a full breakdown of this result.

Workers were generally positive about the ill-health prevention and protective facilities available to them on the site, and if access was needed to a particular prevention/support by a worker then it was usually available 'most of the time'. Workers had almost universal access to good welfare facilities (e.g. soaps/cleaners, washing/drying facilities, access to warm food and drink, and regular breaks). The general level of PPE on the site was also good, as there was widespread access to overalls and gloves, hearing protection and masks. Appendix 6, Table A6.5 provides a full breakdown of this result.

Access to equipment or procedures designed specifically to control OH risks (e.g. checks on noise levels, quiet days away from noise, well-maintained dust extraction equipment and use of anti-vibration handles) was less common. For the 20 per cent of workers who were frequently exposed to noise and vibration in their jobs this data suggests that more could be done to ensure access to protective equipment/procedures. Whilst this may reflect a lack of awareness amongst workers about how to protect themselves rather than a lack of available equipment on the site, it could also indicate management or monitoring failures. It seems more could potentially have been done to control the impact of exposure to noise and vibration risks in particular.

Analysis demonstrated that those workers who saw themselves on average as high/medium risk were more likely to have had a health condition and/or health screening whilst working on the Park and Village[2] than those workers who saw themselves in the low/no risk groups. This suggests that workers are able to provide a relatively accurate assessment of their likely exposure and that the Park/Village Health services were able to target those most in need of their help.

2.3.2 Perceived impact of work on health

Given these levels of exposure and access to protective equipment and procedures, workers were asked to state how much they felt work affected their health and how often they felt their health was at risk whilst working on the Park and Village. Appendix 6, Figures A6.1 and A6.2 provide a full breakdown of this result.

Forty-eight per cent of workers felt that work did affect their health at least sometimes; with 18 per cent feeling their health was at risk a lot or all the time. This result was unaffected by a worker's age or the length of time they had been working in construction. Fewer workers

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[1] *Workers' scores were summed across each of their responses to the potential job tasks listed in Table 2.1 (with 0 = never, 1= rarely, 2 = sometimes, 3 = often and 4 = almost always), then a mean score calculated. Those workers who scored less than 1 on average were labelled 'no exposure workers'; those who scored on average between 1 and 2 were called 'low exposure workers';, those between 2 and 3 were 'mid-level exposure workers'; and those who scored 3 or higher were labelled 'higher exposure workers.'*

[2] *The statistical significance was ascertained using a t-test. T-test results: had a health condition high/medium risk M = 0.29, SE = 0.030, Low/no risk M = 0.17, SE = 0.014, t(334.067)= -3.368, p<0.001; had health screening – high/medium risk M = 0.17, SE = 0.025, Low/no risk M = 0.10, SE = 0.012, t(326.964)= -2.426, p<0.05.*

felt that their health was actually at risk from the work they did, although 31 per cent felt that they were at risk at least sometimes. Older workers and those who had worked in the construction industry for a longer amount of time were significantly less likely[1] to feel that their health was at risk from their work. However, a higher proportion of older workers were in managerial positions on the site, meaning they have less exposure to hazards; although this may also reflect less awareness, or acceptance, of health hazards amongst older workers.

[1] *Statistical significance was ascertained using a chi square test. Chi square results for months in construction* $X^2 = 27.271$, $p<0.05$ *and chi square results for age* $X^2 = 31.328$, $p<0.01$

3 THE PARK/VILLAGE HEALTH STRATEGY AND SERVICE

The Park/Village Health service was developed by ODA as part of their stated commitment to holistic OH provision and worker well-being for the Olympic build. This chapter presents an overview of what the OH service set out to achieve and how these aspects of service provision were operationalised by Park/Village Health staff.

3.1 SERVICE AIMS

The specific aims for the OH provision on the Olympic build[1] were that the Park/Village Health team would provide a range of services and offer an integrated approach to prevention and risk management. The OH service specification states that the OH team advised ODA/DP on the development of its OH strategy and assisted members of the Park and Village supply chain to understand and meet the standards set by ODA for OH and occupational hygiene. The guidance included advice on the management of exposures to health risks (occupational hygiene), as well as the management of staff with identified vulnerabilities and/or health conditions. The advice should also have included assistance in characterising exposures to health risks, including undertaking measurement.

Park/Village Health's project brief outlines the three underlying priorities for provision. These are:

- ill-health prevention: limiting the impact of work on people's health
- clinical health intervention: limiting the impact of a person's health on their work
- health promotion: the use of the workplace environment to promote healthy behaviours.

In the service design these three elements linked together and health promotion was seen as a key tool in promoting workplace, as well as general, health behaviours. Joint campaigns, for example on dust and smoking cessation, linked all three elements of the service together.

An initial strategy document was circulated to members of the SHELT, made up of senior managers from Tier 1 contractors as well as representatives of ODA and DP, and their co-operation and endorsement secured. Each year the strategy was updated and progress against the previous year's objectives assessed and used to set the next year's strategy objectives and plan. The strategy linked the three main areas of Park/Village Health's work: workplace, worker and well-being interventions. It focused on the main OH risks facing workers in construction (exposures to dust, noise, vibration and manual handling) alongside emerging or topical issues (e.g. working in hot weather during the summer months). The strategies also included well-being initiatives on promoting healthy eating and sensible alcohol consumption, often linking these to OH and safety concerns.

Appendix 4 provides more detail on the main services that Park/Village Health provided and an overview of the vision of the process by which the service would work. It also offers an overview of the Park/Village Health strategic aims from their annual strategy documents.

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[1] *As set out in the ODA's HS&E Standard, Appendix 11, July 2008*

3.2 DETAILS OF THE TEAM

The Park/Village Health team included a range of professionals. OH nurses and physicians provided health services for workers, including pre-employment and safety-critical medical checks, health surveillance and on-site emergency services. Occupational hygienists, who are skilled in the recognition of OH hazards, then the evaluation and control of OH risks, provided strategies to avoid work-related ill-health from occurring. A physiotherapist skilled in ergonomic risk assessment was also added to the team in 2010 to provide on-site support to those suffering from musculoskeletal conditions.

The team worked from two units of operation: their main facility was on the Park where health checks and surveillance took place in a dedicated base, with another smaller facility on the Village.

3.3 THE 'HEALTH LIKE SAFETY' APPROACH

The Park/Village Health proposition used a key message/concept to underpin their approach to working with contractors: 'health like safety'. This approach, where possible, used existing approaches to safety management as the basis for health management. The 'health like safety' approach aimed to develop indicators for health which brought OH and ill-health prevention strategies specifically onto the agenda of contractors. It was hoped that this, in turn, would promote the visibility of OH, such that the levels of safety management achieved on the site could be mirrored for OH.

Putting the 'health like safety' approach into action, the Park/Village Health team also developed two OH measurement tools whilst working on the site, with the support of ODA. The rationale behind these tools was that by modelling them on existing approaches that seem familiar to contractors, and which integrate OH with existing health and safety management activities, contractors will be more willing and able to implement them. These tools are discussed in more detail in Chapter 5, as is their potential legacy.

3.4 IMPLEMENTING THE SERVICE

Park/Village Health services were available and free to all contractors and workers on the site. The service had a specific role as part of the overall approach to health and safety management on the site.

3.4.1 Working with the Assurance Team

The DP's Assurance Team worked with Park Health in a number of ways including:

- the use of quarterly risk profiling to create a forward look for key emerging risks to ensure that on each project there were adequate risk management/mitigation plans. Occupational hygiene input helped ensure that health as well as safety risks were evaluated. These profiles were then used to shape the next quarter's focus for assurance visits and explorations
- carrying out Assurance Team project visits in tandem with occupational hygienists, sometimes pre-briefed by the occupational hygienists because of issues that the latter had identified during their recent engagement with specific project teams and on site
- Assurance Team members using the Park Health hygiene team to support them with any concerns or questions. These could arise following a project review and/or site visit and

the Assurance Team would discuss these matters with the Park Health team, in order to clarify the issues and finalise the conclusions drawn and advice offered.

Thus, Park Health and CLM Assurance worked together proactively on risk profiling and interacted reactively as a result of their site engagement.

3.4.2 Working directly with contractors

In addition to running their services and working with the Assurance Team, the OH team was required to ensure that their services were well utilised, and that their use influenced attitudes and behaviours across the site. The Park/Village Health team characterise their work on the site in terms of four different stages.

Stage 1: Engagement

In the initial stages of their presence on site, Park Health activities focused on making contact with the contractors, understanding the main issues on the site and producing simple and easy-to-use OH solutions. This allowed them to establish a useful presence on the site and help contractors demonstrate their performance against key performance indicators (KPIs) set by ODA and DP. The prevention and clinical teams worked closely on engagement, often visiting together so that contractors became used to the fact that the approach to OH on the Park and Village was holistic (i.e. focused on the workplace, worker and well-being), and involved occupational hygienists as well as clinical staff. Each project was provided with a single point of contact with the OH service in the form of a named on site occupational hygienist. This occupational hygienist was responsible for visiting the sites they were assigned to, working with contractors to understand the potential health risks of the work schedule, and provide support in embedding health risk management in day to day work.

One of the initial outputs from these engagement sessions were OH risk registers for each project, outlining the different tasks and therefore risks at each phase of works (ground phase, build phase, fit-out phase and residual risks at handover). These risk registers enabled the team to focus their assistance with prevention on ongoing works looking at possible upcoming exposure issues and using the principles of prevention to eliminate or reduce these as well as allowing health surveillance to be tailored specifically to each project, with strategies being agreed by all concerned. The occupational hygienist would then visit the site on a regular basis and check progress against the tasks listed in the risk registers and discuss whether the contractors needed any further support to meet the required standards.

Park/Village Health also created a simple Red/Amber/Green mapping system for potential health exposures such as noise and contaminated land. This enabled contractors to either plan works to avoid exposures or properly control exposures which they were unable to avoid (see Example 3 in Appendix 7 for further details).

This initial stage was concerned with demonstrating to contractors the potential benefits of using the Park/Village Health services, and explaining to them how using the services could help them manage their project. This was felt to be a key stage in the success of the service as, without it, engagement levels of contractors with the provision and the ‘health like safety’ approach were likely to have been much lower. It gave contractors and workers the confidence and reassurance that they needed to work with Park/Village Health and fully utilise the services they offered.

Stage 2: Enabling

The second stage of work was to target the available resources to help others implement a 'health like safety' approach into their day-to-day activities. This mainly involved conducting risk assessment reviews and producing action plans for Tier 1 contractors, then encouraging them to implement the measures themselves. Tier 2 contractors were also targeted where access was possible through Tier 1.

In order to enable contractors to implement the ''health like safety'' approach, the prevention team needed to identify OH hazards from risk assessments and method statements. These hazards were then evaluated with the contractor using the principles of prevention and therefore actively seeking ways in which the risks could be eliminated or controlled at source before looking at monitoring or health surveillance. There were many examples of this proactive approach to OH management as provided in Appendix 7.

During this stage of their work Park/Village Health also established a presence at the regular SHELT and health and safety forum meetings. These fora allowed contractors to discuss emerging health and safety concerns and solutions. Park/Village Health brought OH issues onto the agenda at these meetings and allowed contractors to benchmark their OH management performance against others. This encouraged contractors to take the issues seriously, take action themselves and share good practice or learning with others.

Stages 3 and 4: Evidence and legacy

For ODA and the OH team it was important that the work on site had a broader legacy. The final stages of the plan for the service involved collecting evidence on progress made by contractors and information which could be used to inform the future development of OH management in construction. The Park/Village Health team also participated in a number of industry conferences (for health and safety as well as construction professionals), discussing the benefits of a combined clinical and occupational hygiene approach to encourage wider learning from their work.

In addition, the Park/Village Health team ran a series of master class sessions. These were mainly, but not exclusively, attended by personnel from the construction sector. Attendees saw the events as an opportunity to learn from any innovative or interesting OH approaches used by Park/Village Health which could be replicated within their own organisation. The master classes took place over half a day and involved participants being given a site tour, then a number of presentations and discussions with the Park/Village Health team. They covered a range of issues, such as the business case for good practice in OH management and taking a strategic approach to OH ill-health prevention in practice on the Park and Village.

It is worth noting in this context that the work of Park/Village Health was recognised externally through a number of awards. These include two in 2011:

- the Wilf Howe Award by the Faculty of Occupational Health in recognition of OH good practice
- the Astor Trophy awarded by the Royal Society for the Prevention of Accidents (ROSPA) for the organisation with the best-managed OH programme.

In addition, the team have developed OH measurement tools which have allowed the standardised collation of information across a number of different contractors and which could be used more widely following completion of the Olympic build. These are discussed in more detail in Chapter 5.

4 USE OF AND REACTIONS TO THE PARK/VILLAGE HEALTH SERVICE

Park/Village Health monitoring data is used in this chapter to provide an overview of the services provided on the site. The worker and manager surveys conducted during the research provide additional information on how different aspects of both the clinical and preventative services were used. Both sources also provide some assessment of worker health.

4.1 CLINICAL SERVICES

The data collected by the Park/Village Health clinical team provides an indication of the scale of work undertaken, with a total of 113,666 clinical interventions delivered. This includes over 63,000 pre-employment checks, over 14,000 safety-critical medicals as well as a range of other functions[1]. Appendix 6, Table A6.6 provides a more detailed overview of the services provided.

In the worker survey the different aspects of the Park/Village Health service were listed and individuals asked which of these they could recall using or having contact with. The responses of workers indicated that 33 per cent could not recall having any contact with the service, five per cent had used elements of the preventative service only, 45 per cent had only used the clinical services, and 17 per cent had used both aspects of the service.

A more detailed overview of the different clinical and preventative services used is provided in Figure 4.1. Only 25 per cent of workers were aware that they had experienced a pre-employment medical screen, even though this was obligatory for those working on the site. This was understandable, however, given that it forms part of wider induction and workers may have been unclear what the term meant in this context. A further 25 per cent of workers had used the medical treatment centre on a walk-in basis and a similar proportion had received some form of health briefing. A small proportion of workers recall an occupational hygienist conducting monitoring or equipment checks on their work site.

When all variables were controlled for using multi-variate analysis[2], the only significant factors predicting how many services an individual had used were that construction workers (rather than managers or those in support roles), and those who had worked for a longer period of time on the site, were likely to be more frequent users. There was also a statistically significant[3] link between higher uses of Park/Village Health by individual workers when they worked for contractors with higher engagement levels with the service (as assessed by Park/Village Health). This latter finding demonstrates the importance of management commitment to OH management in changing worker behaviour.

Interestingly, 45 per cent of workers stated that they normally had access to OH services through their employer and 80 per cent were registered with a GP off site. Access to employer OH support did not affect take-up of Park/Village Health services. However, those

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[1] *A cumulative picture has been put together using Park/Village Health monthly reports from August 2008 to May 2011 inclusively.*

[2] *Logistic regression was used to determine whether, when taking all the factors together, any emerged as significant in its own right. Only the factors mentioned did so.*

[3] *This was ascertained using a t-test. T-test results were: high engagement (mean = 1.87, SE = 0.9), t = -2.37, $p<0.01$*

workers already registered with a doctor were significantly[1] more likely to use the on-site services than those who were not registered. This indicates that there is a group of hard-to-reach workers who are particularly difficult to engage with regarding health issues and/or who opt out of contact with health professionals including Park/Village Health.

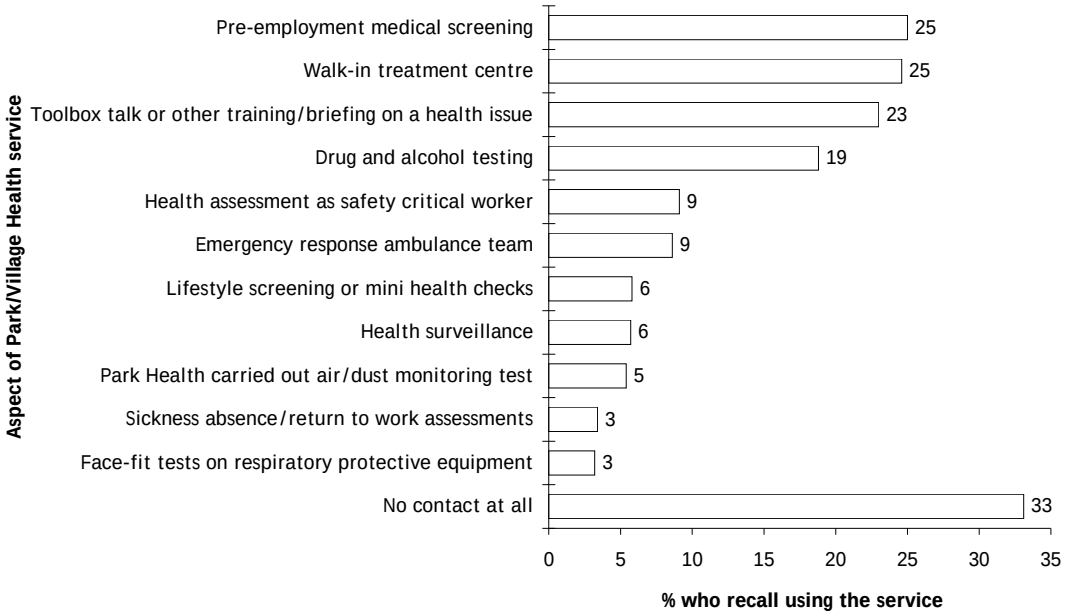

Figure 4.1 Range of Park/Village Health services used by workers

Figure is based on all responding workers. This is a multiple response question, with workers free to provide as many examples of their use of Park/Village Health as applied to them.

Source: IES/Employment Research Ltd Worker Survey 2010

4.2 MANAGERS ACCESS TO OH SUPPORT

The vast majority of managers surveyed (79 per cent) recalled receiving some form of help to manage OH issues whilst on the site. Amongst those managers that had received help, the single most common source of support was from Park/Village Health (76 per cent) followed by the DP (48 per cent) and a Tier 1 contractor (17 per cent).[2] A full breakdown of this result is provided in Appendix 6, as Table A6.7.

The manager survey asked which of the available Park/Village Health services they or their staff had used. The first question on this was asked without any prompting to see which of the services managers could recall best. Managers most commonly recalled having contact with the Park/Village Health team when they visited work sites. Site visits and site risk assessments were the two most commonly mentioned forms of contact (recalled by 36 and 35 per cent of managers respectively), closely followed by the provision of toolbox talks (mentioned by 26 per cent). Use of clinical services also featured strongly, most commonly the walk-in treatment centre (used by 20 per cent) and lifestyle screenings (used by 16 per cent).

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1 *Statistical significance ascertained using a chi square test: X(1) = 8.69, p = 0.01*

2 *However, a number of those responding would actually have been working for Tier 1 contractors, so that this response would not be applicable to them.*

All managers were then read out a list of 13 different Park/Village Health provisions/services and asked, in relation to each one, whether they had used it themselves, their workers had used it, or both. This additional question was used to prompt respondents into remembering any contact with the OH team that they might not necessarily connect with OH provision on the site. The results (presented in Figure 4.2) show a different pattern of responses from the first (free recall) question. Now the clinical services become more prominent, with the most common service the drugs and alcohol testing facilities on site and the walk-in treatment centre. Managers in the survey were statistically more likely[1] to have used more services if they had been on the Park and/or Village for longer and if they managed greater numbers of people on site.

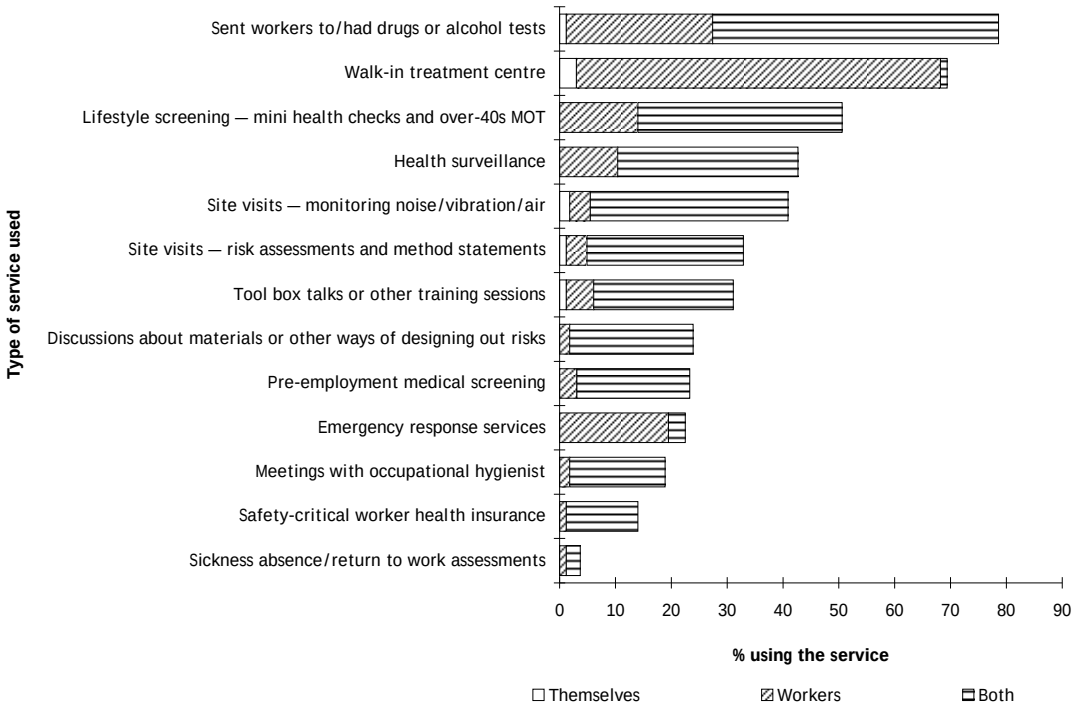

Figure 4.2 Park/Village Health services used

The table is based on the responses of all 164 respondents to the manager survey

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010

It is worth noting that activities such as air/noise monitoring and risk assessments/method statements require a meeting with an occupational hygienist, so some overlap between the different categories is likely. When answering this question contractors may also have confused lifestyle screening with health surveillance and safety-critical medicals.

There was therefore clearly a variety of levels of engagement with Park/Village Health amongst contractors on the site. This was observed by HSE inspectors visiting the site, who noted that some contractors had failed to engage with Park/Village Health, particularly in terms of ill-health prevention activities.

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[1] *Using a chi square test. The longer managers had been on the Park the more likely they were to have used more services; $X2(1)= 4.11$, $p<0.05$. The more people managed by managers the more likely they were to have used more services; $X2(2)=11.21$, $p<0.01$.*

'I just think it's a bit of a shame talking to my colleagues that some people don't seem to have had much involvement at all with Park/Village Health other than "we'll have them check their blood pressure" and "we'll have them check them for drugs" … and that's a shame because I think it's worked out very well on this particular project.' (HSE Inspector)

4.3 REACTIONS TO THE SERVICE

The Park/Village Health service was offered to all contractors on the site. Some were more engaged than others, but there was generally a positive reaction to the availability of this provision. This section provides management and worker views of the Park/Village Health services.

4.3.1 Managers' views of Park/Village Health

The manager survey asked a number of questions to determine how what was provided on the Park and Village compared to other sites. The results were very positive. A high proportion (71 per cent) felt that access to OH services was better for their workforce. A similarly high proportion (69 per cent) felt that the quality of the OH service was better than on other sites. A high proportion (86 per cent) also felt that the attention given to OH risks was better on this site than others. Managers were also very positive about the level of training available for them and their workers on this site (Appendix 6, Tables A6.8 and A6.9 provide further details on this result), and over 60 per cent felt that the amount, quality and usefulness of the training were much better than that normally provided.

In case studies, the general consensus was that Park/Village Health provided a 'first rate service' which was appreciated by all those interviewed. The facility was seen as excellent and supplied everyone on the Park with a range of facilities which they could use and which were easily accessible.

'I just think it's an excellent facility. And probably the one thing that stands the Park apart from other major projects is having that facility available to anybody on the Park. They're there when you need them and they're there if we had specifics, if we need to get toolbox talks done. I've said to all the contractors, use Park Health, you know.' (Construction Manager; Tier 1)

'Give [Park Health] it full marks. I think they have such a great team in Park Health and they're always looking for new ideas, new ways of doing things, trialling stuff out. They're always looking for the next best thing. I would say 100 per cent, it's all best practice.' (Health and Safety Manager; Tier 1)

'There's a whole bank of expertise [in Park Health]. And because the profile and because the involvement of every level of construction is so much more highlighted, it is very useful to have some of the expertise and experts over there you can consult.' (Project Manager; Tier 1)

The monitoring provided by occupational hygienists was seen by most of the people interviewed as one of the most innovative aspects of the Park/Village Health service. The prioritisation of health issues was also noted as something which went beyond what would typically be seen on a site, even a large one. This preventative aspect of health and safety was seen as something which began on other large-scale projects, such as the Channel Tunnel Rail Link and Heathrow Terminal 5, and has been developed on Park/Village Health to provide a very efficient OH service.

'I worked on the Channel Tunnel Rail Link for a number of years and they had a similar approach … I think it's because at the Channel Tunnel Rail Link they've learned lessons there, and also on Terminal 5 they learned more lessons and its pretty much the same team of people that you see on these major projects. Everyone seems to flow from one project to the

other and I think that is now culminating in a very efficient OH service we have on the Olympics. I have seen it get better and better from one major project to the next. It's a very effective OH service from a preventative angle.' (Health and Safety Manager; Tier 1)

4.3.2 Worker view of Park/Village Health

Workers were also asked how the OH provision compared to other projects they had worked on. Again the results were positive, with 78 per cent of workers believing that the provision they had on the Park and Village was a little or much better than on other sites, and 80 per cent that more attention was given to health risks on this site. A full overview of this result is provided in Appendix 6, Table A6.10.

In the case studies, the Park/Village Health staff were viewed by all the workers interviewed as approachable, friendly, enthusiastic people with expert knowledge in their field and with a genuine concern for the health and well-being of workers. The on-site treatment centre was perceived as a major achievement and the most visible benefit of Park/Village Health as it:

- enabled health and safety incidents to be handled swiftly and professionally
- encouraged workers to care for their own health
- alerted the health and safety teams to incidents and generally provided a beacon for OH messages on site.

5 PREVENTATIVE WORK

This chapter examines the work of the team's occupational hygienists. The scale of work conducted on the site was too extensive to provide a full overview here, but some examples are provided of the type of activities Park/Village Health have been engaged in. These examples have been collected from contractors involved in case studies for this research and from the Park/Village Health team.

As already described, Park/Village Health provided an integrated prevention and treatment service. The results of monitoring activities were therefore often translated into training delivered on sites where problems were identified and identification of possible health problems by the clinical team fed into monitoring work. The two different service elements, therefore, whilst covered in separate chapters (this one and Chapter 6), should actually be viewed as a single, integrated service.

5.1 HEALTHY BY DESIGN

One of the original aims of the health risk management service provided by the occupational hygienists[1] was to '*work with integrated project teams, meeting with designers and others to encourage a constructive dialogue and effective processes to minimise health risks during construction, use and maintenance*'.

Although the Park Health team had some interaction with designers, this mainly took place through quarterly construction design management and designers fora and was described as 'patchy' by key Park/Village Health staff. Following plans set out in the Park/Village Health 2010 strategy[2]. This is one of the mechanisms set up on the Park and Village to achieve the aims set out in ODA's HS&E standard and which identified how the OH service established on the site would implement and achieve its objectives for health risk management. The clinical team arrived on site as early as 2006, although the main work of the occupational hygienists did not start until mid-2008. From this point, occupational hygienists attended quarterly meetings with the CDMCs and design team to raise awareness of OH hazards at design phase.

By 2008 the construction work had already begun on site. Some design for the Olympic Build took place up to three years before the beginning of the on site works. The occupational hygienists needed to be involved much earlier in the process for them to have a real impact on the design phase as design decisions were taken much earlier. Members of the occupational hygiene team worked with Crossrail, for example, in 2009 during tunnel designs, with work on site beginning in earnest only in 2012.

The experience of the occupational hygienists suggests that both designers and CDMCs had been given very little information or training in health risk management. This meant that it could be difficult for CDMCs to fully engage with occupational hygienists on health risk management issues, as they did not see these issues as a priority. Whilst some progress was made, with the team invited to quarterly health and safety planning reviews on several projects, this did not always happen. Automatic involvement for occupational hygienists, which was the case for health and safety professionals in these meetings, was not achieved.

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[1] *As set out in ODA's Health, Safety and Environment Standard*

[2] *A summary of the main issues covered in the Park/Village Health strategy documents is provided in Appendix 4, Table A4.2.*

The occupational hygienists used the reviews they conducted with CDMCs as an opportunity to transfer knowledge on the impact and management of workplace health risks. The approach was to work with the CDMCs in the same manner with which they already approached method statements and other safety procedures but to simultaneously consider OH issues. Park/Village Health saw the process as a combination of education and engagement. However, the CDMC role is also a very complex one, with many different responsibilities, making it difficult to encourage these individuals to take on more work. Without a simultaneous push from clients and better OH training for CDMCs and designers, the Park/Village occupational hygienists felt that it would be difficult to change things in the industry more widely.

> *'CDMCs obviously have a lot of training on the CDM regulations, but not on occupational health, so they just don't get it, it doesn't become a natural part of what they do.'* (Park/Village Health Manager)

There were occasions when it was possible for the occupational hygienists to provide clear and successful advice on health risk management in design. However the hygiene team had often come into the process later and were only able to ensure that the health risks were designed out at this point. This was achieved by developing new and safer working processes, and by using different equipment and materials which reduced the risks to the workers' health (Example 2 in Appendix 7 provides an example of healthy by design in action). Ideally, the aim would be to design out health hazards at as early a stage of intervention as possible, effectively designing out risks before they even arrive on site. More could therefore have been achieved through the elimination of hazards and risks during the design phase and providing information about the remaining risks.

One example is that of Park Health working with a Tier 1 contractor to adjust the concrete pouring processes by increasing 'damping down' and opening up the work area.

> *'Rather than sticking a mask on the guy who's already hot and sweaty having to go through face fit tests … we sought a simple solution, just adjusting our work pattern, which was better.'* (Health and Safety Manager; Tier 1)

Some design managers also described how they had taken health and safety issues into account in their work on the Park and Village. They often discussed the importance of the role of the CDMC in designing out risks.

> *'We look at the materials that we're using. We look at things like glue, adhesives and we try to design out the nastiest things.'* (Design Manager; Tier 1)

There were mixed views amongst the case studies about how successful the process of designing out risks had been on the Park and Village. As Park/Village Health was set up after most of the initial projects had been designed, they were able to have little input into the early design stages of projects. Most of the organisations interviewed felt that the designers and architects had paid little attention to health issues involved in the construction and maintenance of buildings and that they could benefit from more training on these issues. A number of contractors stated that they have now decided to work with occupational hygienists from the very beginning of a project in future to make sure that health risks are managed through the design process.

> *'There's been many times we've come across sections of work where we feel that the design risk assessment has not been carried out … in terms of CDM and the designer stage and buildability of the project, the actual ability of the man on the ground to build it safely. I believe a lot of the risk could have been designed out of the project.'* (Health and Safety Manager; Tier 1)

'Designers are still not fully aware about designing risks out and I think that will take a while because they're not trained professionals to deal with eliminating all the risks without getting professional advice.' (Health and Safety Adviser; Tier 1)

The ability of the occupational hygienists to impact on the designing out of risks was therefore limited by their late arrival onto the site (during groundwork rather than the design stage) as well as limited understanding amongst, and interest from design teams. However, the benefit of using occupational hygienists when investigating problems in relation to design enabled a better understanding among designers of OH risk and the adjustment of some designs to accommodate this learning.

5.2 SITE VISITS AND MEASUREMENT

The most common activity undertaken by hygienists, as reported by managers during the case studies, was the monitoring of a variety of different health risks, although the levels of monitoring varied across the different projects. Most managers involved in the case studies commented that they had learned a lot by working with an occupational hygienist, and that they saw this as the most useful and innovative aspect of the Park/Village Health service. Some also felt that using hygienists would be something that they would do in future projects where possible.

'Park Health's site guys come round once a week and they will assist me in monitoring if something's not right in a particular area of the site. They will give me a short report so I can use it when I'm saying, "Look guys, this dust, the guy that's doing the operation, he's wearing the mask and the guy two meters away is not wearing a mask." I am able to show the guys the levels of dust they are taking in.' (Health and Safety Manager; Tier 1)

'We've tried to get the occupational hygienist on board before people start doing certain work so we've already got it monitored … before its going to become an issue. He's done a lot of sampling and testing and monitoring … every time someone mentions about something on the site that's happened, they'll come into me first and say can [name of occupational hygienist] *come in and do some monitoring so we've done it before they actually start work.'* (Health and Safety Adviser; Tier 1)

Following monitoring, the occupational hygienist provided reports for the organisations. These were described as informative and straightforward, giving practical advice which could be used to limit any potential health risks. A health and safety manager for a Tier 1 company stated that following a visit from the occupational hygienist he was provided with a *'very thorough report with a very clear action plan as to whether we need to put further controls in certain areas*'. The information provided in the monitoring reports was also felt to be suitable to share with workers and helpful in describing potential health hazards to them. Monitoring activities were felt to have the additional benefit of conveying an impression to workers that their employer had a genuine concern for their health.

The occupational hygienists mostly worked directly with a Tier 1 manager who was responsible for health and safety, with information passed onto sub-contractors through written reports or meetings. However, on occasion, they also worked directly with the sub-contractors to help them develop their approach to health management. The health and safety manager for one sub-contractor stated that although they *'had the skills within their team to successfully conduct a lot of the operations on the site, it was very useful to have Park Health involved in certain incidents which were more complex'*. The process of collecting data on various OH risks also helped to raise worker awareness of the risks presented by their job and therefore encouraged them to take reasonable precautions in their work.

The case studies provided a range of examples of specific monitoring activities across a full range of OH risks. Most contractors had undertaken monitoring of more than one health risk.

Site monitoring was often instigated due to intelligence from the clinical teams about cases where possible exposures had occurred. This demonstrates the fully integrated approach of preventative and clinical processes taken on the site.

5.3 HEALTH IMPACT INDEX

The Health Impact Index (HII) was a voluntary scheme run across the Park. Park Health's occupational hygienists conducted a site visit on participating projects once a week for two hours. It was developed to create a leading indicator in numerical form which could be reported on in a similar way to AFRs. The resulting data was called the Health Impact Frequency Rate (HIFR).

During the visit, occupational hygienists identified any work methods or practices that exposed workers to OH risks. The length of time spent on each project was an approximation of how long each contractor's health and safety department would be likely to spend identifying the same issues over a given week. The idea was to encourage managers and workers to better understand and identify exposures to health risks, and to consider the potential consequences of such exposures. The approach taken was to record health impacts in the same way as near misses where the potential consequence could be an accident. Thus, health issues could be given equal prominence to safety.

The regular site visits performed by Park Health for the recording of health impacts provided the occupational hygiene team and the Tier 1 contractors with indications of the emerging trends for OH issues on a weekly basis. Whilst Tier 1 management performed regular site visits, Park Health occupational hygienists were able to highlight exposures and then work with management to reduce them. Where particular trades or individuals were identified as being regularly affected, this could be directly addressed. Typically, observations of individual health exposures were validated by talking to the operative involved or their supervisor. On some occasions it was obvious to the Park Health team that the issue extended beyond the actions of a single individual.

The HII alone would not deal with the higher levels of controls recommended under Control of Substances Hazardous to Health (COSHH) guidelines[1]. These recommend that, ideally, risks should be eliminated. If this is not possible, then risks should be controlled by substitution with a substance or process less hazardous to health. PPE should be used only as a last resort when it is not possible to reduce the risk in other ways. The observations made by the occupational hygienists of health impacts, or exposures to health risks, therefore demonstrate failings in health risk management demonstrated at workforce level. The immediate resolution is therefore often the use of PPE to protect individuals from harm. Work with managers to promote better management of risks higher up the hierarchy of control is therefore also required to properly address health risks. Use of the HII tool alongside the Occupational Health Maturity Matrix (OHMM, discussed in Section 5.4) would provide a more comprehensive approach to managing OH risks.

5.3.1 Measuring health impacts

A health impact is an individual event which can cause any one occupational disease if the current working method is maintained. A single activity can generate any number of health impacts. For instance, if a carpenter was using a circular saw to cut timber, this could create:

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[1] *http://www.hse.gov.uk/coshh/ provides an overview of the guidelines and practical support in their implementation*

- exposure to excessive noise levels if no hearing protection is available
- exposure to excessive vibration if the tool is used for prolonged periods of time
- exposure to wood dust if the control measures to suppress or reduce airborne dusts are not present
- increased risk of manual handling strain if the tool is used whilst the operative is bent double, or the workbench is at an inconvenient height.

Similarly, a health impact would also be documented for each operative affected by the risk: if four other operatives were working around the carpenter without hearing protection, four individual health impacts would be recorded.

Occupational hygienists identified each health impact using knowledge and experience from previous site work and monitoring for each contractor within the scheme. The occupational hygienists judged likely impacts using information such as noise and vibration emission data from suppliers of tools. They also used results from previous exposure monitoring surveys to assess likely noise and vibration levels from each particular tool, as well as likely airborne concentrations of contaminants generated by certain processes. Whilst on site, the occupational hygienist informed the responsible parties of their findings and made recommendations regarding any additional control measures required. Often they were accompanied on the site visit by health and safety advisers who could implement the measures immediately.

The collection of data for HIFRs was solely based on observations from the field rather than a desk-based exercise. As a result, the data reflects failings at the final levels of the hierarchy of control as these were the visible elements out on site. Where controls had been put into place (such as substitution of materials or restriction on the time of exposure), these were not going to be visible to observers and therefore were not be picked up by the HII exercise. With every health impact there will be a number of different controls that will have failed; it will rarely be just one factor. Using this observational method, a judgement can only be made for any particular health impact on whether an individual doing a particular job at a particular time is being exposed to a significant OH risk. For example, an operative not wearing suitable gloves for pouring concrete will be categorised as a failure to wear suitable PPE. Whether that operative is actually following an incorrect COSHH assessment would not be picked up by the HII and neither would whether the failing lies in the fact that the concrete could have been pre-cast off site. The HIFR only addressed the immediate failing that caused the health impact, which invariably would be a failure of the last line of defence, PPE.

Some examples of the health impacts identified using the HII are presented below.

Examples of health impacts identified by Park Health

Skin exposures

One of the first recurrent issues that was picked up by the HII was the use, or non-use, of gloves on one project on the Park. Despite being a mandatory requirement of site PPE, operatives were frequently seen as having removed their gloves for particular tasks, using the wrong type of glove, or having chopped off the fingers of gloves for greater comfort and ease of use.

This was observed over several weeks, despite supervisors including the issue in their daily activity briefings. Park Health therefore performed a number of training sessions for different trades, with each session tailored to the specific difficulties facing each. Bricklayers, for example, were not wearing suitable gloves and were trained on the hazards of cement and mortar and why they had to wear a specific glove type to protect themselves. The briefings also identified that electrical fit-out workers needed more tactile gloves. Discussions were then held with supervisors and managers to help them decide on a type of glove which would provide workers with the dexterity they required.

It was clear in the following weeks that this training had a positive impact: HIFRs for glove use dropped, except for those trades new to site.

Noise exposures

On completion of the roof on one of the venues, new trades arrived on site to start on groundwork for the foundations of the main building. These trades, notably carpenters, brought with them a spike in HIFRs relating to noise exposures.

Discussion with the Tier 1 management and the operatives involved identified a lack of understanding of the hazard associated with even short-term exposures to high-pitched noise from wood cutting. After a couple of visits it was clear that speaking to operatives when exposure was observed was not having any discernible impact on the frequency of these HIFRs. Park Health therefore planned with the Tier 1 management to adopt a more forceful approach with the management of these contractors. It was deemed that compliance with the Noise at Work Regulations would be most effective when enforced by the contractor's management and supervisors. Hence Park Health performed a noise survey of the work being performed and provided a report outlining the management's obligations under the Noise at Work Regulations. This proved to be more effective, as the operatives now received the same message from Park Health, Tier 1 management and their own management. There was a distinct uptake in the use of hearing protection, although a few older workers simply ignored the message whenever they could.

Dust exposures

Following completion of the major concrete works for the plant room areas of a major venue, fit-out work commenced inside these concrete structures. This required drilling and working of concrete throughout the areas, which was reasonably well controlled, with operatives wearing respiratory protection. The most significant exposures were observed during the clean-up activities, when operatives were tasked with dry sweeping of corridors and pathways. This activity raised a significant amount of dust, and although most of the operatives were wearing respiratory protection, the levels produced could potentially be very harmful to their health.

Tier 1 management, when faced with this issue, asked Park Health to suggest different ways of managing it. A solution was found in discussion with the on-site hire companies, who hired in a range of suitably filtered vacuum cleaners to reduce the dust raised. To get over the potential increase in noise exposures that these would cause, a work programme was organised to perform cleaning at quiet periods of work, such as break times and after shifts. This saw a significant decrease in the numbers of HIFRs reported for the exposure to dust from dry sweeping.

5.3.2 Analysis of the data

Once the data had been gathered, it was input to a centralised resource system used by ODA, DP and all contractors on the Park. This system also documented near misses and reportable HS&E occurrences. A HIFR was calculated in a way which mirrored the AFR already used on the Park and Village[1]. In this way, workers and managers were encouraged to view and prioritise exposure to health hazards in the same way as they did safety near-misses. The HIFR was calculated for each contractor within the scheme on a monthly basis, to allow performance to be consistently monitored. The potential legacy of the HII is that it could be applied on other sites and within the industry as a whole to promote grater awareness of health risks. The production of information on health 'near-misses' would closely align with accident near-miss strategies on a site and would enable identification and action on OH trends.

As already stated, this alone will not be sufficient to ensure that risks are managed out by the introduction of safer policies, processes and materials. However, it does offer a useful way to highlight health issues that contractors and workers can identify on work sites. This approach is therefore most useful at highlighting the exposures that result when higher-level controls are not implemented.

At present the sample size is small and particular to the Park. However, analysis of the data provides an interesting opportunity to examine the links between AFR, injury Frequency Rate (IFR) and HIFR, and potentially between these levels and projected fatality rates due to ill-health. Park/Village Health analysis of their results is presented in Table 5.1. This table provides the top three issues identified, the top three causes of health impacts and the top three behaviours which result in the observations. This suggests that the three most common causes of health impacts are preventable by a positive health and safety culture. Also, whilst the procedures and risk assessments for tasks are usually available on the Park, the control measures to be used are not always implemented fully (i.e. lack of appropriate PPE, not damping down dust before sweeping). A thorough training regime, such as that used for safety but focused on OH, could be useful in reducing health impacts.

When recording the HIFR, it is important to note that each record could only have one health issue listed, but have multiple causes and behaviours related to it. For example, in the case of an individual wearing unsuitable gloves for concrete work, the HII might list:

- the health issue of 'skin exposure to harmful substance'
- caused by 'inadequate supervision' and 'lack of PPE'
- with the behaviours of 'non-compliance with OH procedures', 'non-compliance with COSHH procedures" and 'not wearing PPE'.

5.3.3 The HII in action

Managers of two of the projects participating as case study sites described how they had participated in the HII. They discussed how this had involved an occupational hygienist coming onto site for a number of days in order to establish an understanding of the OH hazards on the site at that time. The occupational hygienists would then provide the contractor with a report on the recommended way to manage these risks. Both contractors

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[1] *HIFR = number of health impacts x 100,000/total hours worked. Health impacts are examples of exposures to health risks, for example, where PPE is not being used correctly*

had embraced the initiative and viewed it as an opportunity to gain a different perspective on the hazards that were present.

Each of the participating contractors received immediate and ongoing feedback from the occupational hygienists working with them regarding the HII. Sub-contractors were all given copies of the report, which they were then able to take onto other projects.

The information collected during the HII trial was shared with HSE. The trends identified by the initial analysis were also used as the basis for Park/Village Health's messages within the monthly contractors' forum to help formulate follow-up work with different contractors. Where possible, links were made between the results and Park/Village Health's quarterly campaigns, and examples given to contractors not participating in the HII pilot. The summary table in Appendix 7 also highlights how the HII data was used in practice.

Table 5.1 Trends in the health impact incident data: top three health issues, causes and behaviours

Health impact	**Health issues**
Skin exposure to harmful substance	Causes: how and what type of gloves were used. Examples: operatives not wearing gloves or removing gloves whilst performing a task, primarily when operatives were using, or had the potential to be exposed to, chemicals. Operatives wearing unsuitable gloves for a task (e.g. cotton-backed gloves for mixing and applying concrete or mortar).
Exposure to excess noise	Causes: noise evaluation in the HIFR survey was not performed with a sound meter and was therefore largely subjective, with exposures recorded when the level was obviously above the prescribed limits. Examples: use of hearing protection was relatively good when compared to glove use due to greater awareness of noise risks, but noise affected the surrounding workforce, who were often unprotected. One noise source may therefore lead to multiple exposures and HIFRs being recorded.
Respiratory exposure to harmful substance	Causes: face-fit testing not widely conducted on site (at least initially), respiratory protection not stored correctly. Examples: observations of carpenters blowing away the dust from inside masks before wearing.
Health impact Causes	
Lack of appropriate PPE	The most visible failing identified by observation (and which therefore cannot take account of controls put in place at management level). Examples: individuals not wearing items of PPE, or wearing the wrong type, be it hearing protection, respiratory protective equipment (RPE) or gloves.
Inadequate Training	Inadequate training was recorded, where workers did not know how to behave in a way that protects their health. Examples: an individual not wearing the most suitable gloves because they did not know that the gloves they have are unsuitable. *Inadequate training is a more commonly recorded impact than inadequate supervision because workers would generally be given the benefit of the doubt (see below).*
Inadequate	Inadequate supervision was recorded where there was evidence that the

supervision	worker knew what constituted healthy behaviour but did not behave as required. Examples: carpenters cutting wood whilst wearing a mask on top of their helmet, or ear defenders around their neck; cementers who had suitable gloves in their pocket but did not wear them for comfort. Individuals not wearing hearing protection despite only having recently received a toolbox talk on the subject from Park Health.
Health impact	**Behaviours**
Non-compliance with OH procedures	This category of behaviour was so broad-reaching that it was selected for almost every health hit. It covers any OH exposure that should have been addressed by a procedure, method statement and/or risk assessment. This will ultimately relate to the vast majority of health impacts.
Not wearing PPE	This behaviour is the biggest cause of OH impacts observed, but is the second most commonly recorded. This is because there were circumstances where health impacts could not have been controlled by PPE, such as manual handling activities, but not using appropriate PPE is always considered to be non-compliance with OH procedures.
Non-compliance with COSHH procedures	Of the three most common health impacts (skin, noise and respiratory exposures), two are related to COSHH. Hence non-compliance with these procedures ranked highly.

Source: Park/Village Health team, April 2011

5.4 OCCUPATIONAL HEALTH MATURITY MATRIX

During SHELT meetings, the occupational hygiene team was alerted to existing work by ODA to produce a behavioural safety maturity matrix. The matrix highlights where an individual contractor believes they are currently on their behavioural safety journey. It was accompanied by an implementation action plan that listed the actions necessary to demonstrate improvement towards the goal of ensuring that the Park was the safest place contractors have worked. The Park/Village Health team developed a similar tool focused on OH rather than behavioural safety.

5.4.1 Developing a leading indicator of OH performance

The Park/Village Health team was commissioned by ODA to develop a benchmarking tool of the OH performance of Tier 1 contractors on both the Park and Village. The team adapted ODA's behavioural safety matrix to develop the Occupational Health Maturity Matrix (OHMM). The OHMM includes necessary leadership, supervisor, worker and subcontractor actions, and enables subcontractors to work towards a mature OH status.

A full copy of the OHMM is provided in Appendix 5. It covers the extent to which there is a demonstrated commitment to OH provision at the workplace, to the worker and to workplace well-being.

The purpose of the OHMM was to show, by a mixture of auditing and questioning both Tier 1 contractors and their sub-contractors, how far OH was integrated into the normal site health and safety and operational procedures. The system also shows how compliant contractors were with OH legal duties, systems and procedures. In order to make an assessment, the occupational hygienists measured each Tier 1 contractor and their supply chains against the OHMM and categorised them depending on how well they performed on a

number of measures related to the health of the worker, the appropriateness of workplace control and the focus on well-being. Following audits, implementation plans were supplied to all contractors to enable them to judge their own performance and make improvements where necessary. These plans also helped to focus Park/Village Health interventions.

The OHMM pilot demonstrated that there was room for improvement in OH risk management across both the Park and Village, but particularly on the Village. The Village Health occupational hygienists therefore devoted resource during 2011 to raise the profile of OH on the Village projects, many of which had had no engagement with Village Health up to that point. Contractors on the Village showed the greatest degree of improvement during this time. Park/Village Health identified a positive response from all contractors to the assessments and felt that they could see visible changes as contractors implemented the suggested changes. The results of the OHMM were also regularly discussed at SHELT meetings, where senior representatives of all Tier 1 contractors came together to discuss health and safety issues.

The potential legacy of the OHMM is that it provides the construction industry with a benchmarking tool that can be used to measure how well preventative mechanisms are being implemented and how mature an organisation is in its approach to OH. It also allows any improvements to be measured and rolled out across other projects, thus ensuring that the same approach to OH is used in a standard way throughout an organisation and is not dependent on site or location. In the longer term this would allow any improvements to be measured and rolled out across other projects.

5.4.2 OHMM in action

All contractors were assessed using the OHMM. Four displayed particularly good results in the OHMM assessment, and all of these had been closely engaged with Park/Village Health over the course of their projects on a regular and long-term basis. One was a smaller contractor who had very little in place in the way of health risk management. Their progress was, therefore, achieved in a relatively short period of time and they demonstrated management commitment to making improvements and to accessing the support of Park/Village Health occupational hygienists in helping them improve.

> *'The maturity matrix is a way of benchmarking and measuring integration of "health like safety" into the day-to-day activities with a view to them just doing it, creating habit- forming behaviour, you know, this is just the way we do things ... We managed it with asbestos, you know, we can manage it with other occupational diseases.'* (Park/Village Health Manager)

Park/Village Health analysis of the assessments revealed a number of issues where understanding or practice was in need of improvement.

- Training on OH and well-being issues were not prioritised in the same way as those for safety. There was a lack of regular training on OH risks and a lack of forward planning to ensure that common health risks were covered on a regular basis. Few contractors ran toolbox talks on well-being issues, but worker knowledge of what constitutes a healthy lifestyle was nevertheless generally good.
- There were links between discussion of OH risks at leadership level (e.g. SHELT meetings) and more proactive management of OH risks. Leadership involvement tended to lead to better forward planning for risk control measures and supervisors who were more knowledgeable about risks/control measures for health.
- Few Tier 1 contractors discussed whether sub-contractors were meeting legal obligations for health surveillance. In fact, sub-contractors had little understanding of these

responsibilities. Driven by risk assessments, appropriate health checks should be made at the instigation of a project and health risk controls (including health surveillance) checked in regular audits. This lack of understanding may have contributed to the low take-up of health surveillance on the Park and Village (i.e. contractors asking Park/Village Health to conduct their health surveillance).

- Well-being initiatives run by Park/Village Health were well attended by those who regularly accessed the main venue canteens, though some contractors who did not attend these had little knowledge of the initiatives and had not participated. Knowledge of, and participation in, well-being initiatives on the Village was more limited than on the Park.

Tier 1 contractors made significant improvements in the scores that they achieved on the OHMM between August 2010 and April 2011.

5.5 LESSONS LEARNED ABOUT WORKING WITH CONTRACTORS

As part of the preventative team's ongoing commitment to monitor their activities, they provided quarterly reports which highlight learning points. The reports for 2010 highlighted a number of issues, including the need:

- for contractors to be reminded to continually conduct health risk assessment and monitoring as work processes and the work environment changes (e.g. increased noise as structures become more enclosed)
- for health to be included in discussions at senior levels to ensure that inadequate risk assessments for hazardous activities are identified and adjusted, with health as a standing item at senior leadership meetings in the same way as safety
- to remind contractors to seek assistance from OH professionals in identifying safer substitutes for hazardous substances
- for contractors to plan ahead to undertake OH training or toolbox talks on a regular basis.

Overall, therefore, the preventative team have recognised the need to encourage contractors to take a more proactive and ongoing approach to risk assessment, monitoring and ill-health prevention work. Education and awareness-raising activities about OH remain necessary even amongst senior managers. This was particularly true with regard to effective health surveillance and the need to consider health issues at the design stage.

6 CLINICAL SERVICES

The clinical services provided by the Park/Village Health team are well integrated with those of the preventative team. However, this chapter primarily focuses on activities involving the identification and treatment of pre-existing disease, health surveillance and protecting individual's health, the rapid and effective treatment of illness and injury whilst on the Park and Village, training on OH issues and health promotion. Some activities covered in this chapter, such as training, involve occupational hygienists as well as the clinical team.

6.1 PRE-EMPLOYMENT MEDICAL SCREENING

Park/Village Health conducted pre-employment medical screenings on employees, specifically plant operators and those on high-risk tasks such as machine drivers, when they arrived for ODA induction. In the case studies most managers found this to be a useful service. Copies of the fitness-to-work certificates were kept on the employee's file throughout their employment at the Park.

One Tier 1 health and safety manager particularly liked the fact that Park/Village Health contacted him six months following the pre-employment screening to re-assess the same employees. This meant that he could concentrate on other aspects of his job in the knowledge that Park/Village Health would deal with employees who needed a medical screening. A Tier 2 contractor's health and safety manager explained that the company used Park/Village Health for pre-employment medical screening for their night-work and confined-space employees. He found that having Park/Village Health on site with the necessary skills to conduct the assessments had helped to speed up the whole process.

> *'We have used them and found them very helpful. Normally they're something you have to book through a doctor and you send your guys away for and there's a real sort of laborious process of getting to the point you want to be. With this being on the Park, it speeds the whole system up and makes it a lot more fluid'*. (Health and Safety Manager – Sub-contractor)

6.2 BRIEFINGS PROVIDED ON OH ISSUES

The Park/Village Health team have consistently provided toolbox talks and other briefings for those working on the site on a range of OH and well-being issues. Contractors also provide their own briefings for staff.

6.2.1 Park/Village Health briefings

Park/Village Health (both clinical staff and the occupational hygienists) provided briefings on a wide range of issues. In addition to responding to the needs of individual contractors, the topics covered were shaped by factors such as:

- the aspects of the overall strategy for the service that were a priority for that time period (e.g. different OH risks are a focus for site-wide campaigns at different points)
- the monitoring work of the occupational hygienists (e.g. their work on the OHMM, results on hand arm vibration (HAV) monitoring, skin monitoring and silicosis)
- the changing risk profile of individual projects (e.g. toolbox talks about HAV delivered to a structures, bridges and highways project prior to an increase in the use of power tools on that project) or the environment (e.g. cold-weather training in colder months)

- emerging issues from the clinical services (e.g. the provision of drug and alcohol awareness training to 65 workers on a major venue due to recent concerns about false positives).

In total 3,675 briefings were delivered, covering more than 20 different topics, across 26 contractors (both Tier 1 and sub-contractors). The five most commonly covered topics were:

- drug and alcohol awareness (with 662 people attending)
- asbestosis (541 people attending)
- silicosis (474 people attending)
- occupational dermatitis (280 people attending)
- manual handling (204 people attending).

Appendix 6, Table A6.11 provides further details on the content and scale of briefings delivered.

In the survey of managers and supervisors, 25 per cent stated that either themselves or their staff had received some form of on-site briefing from Park/Village Health on OH issues. Only a small proportion recalled having received a briefing on any of the main priority risk areas (i.e. stress, manual handling, HAV, dust exposure and hazardous substances), but given the scope of the training provided by Park/Village Health this was perhaps not surprising. Manager ratings of the briefings received for quantity, quality and usefulness of the training were all high. The vast majority of workers surveyed (82 per cent) had received a briefing on an OH issue whilst working on the site. These included both Park/Village Health-delivered briefings and those provided by their employer or the Tier 1 contractor for the projects they had worked on.

The case studies highlighted many examples of briefings and training offered by Park/Village Health on both occupational (e.g. asbestos, manual handling, dermatitis, noise, dust, skin monitoring) and general health issues (e.g. prostate cancer, muscle joint awareness, sexually transmitted infections). Some employers arranged for talks to be given once a month by Park/Village Health whilst others only used them when a specific health issue became apparent or when a work activity was about to start. Reactions to the briefings were very positive, with the talks seen as innovative, informative, engaging and interesting for workers. Contractors appreciated the focus on the health rather than safety of the workforce.

> *'They're pushing a lot of health and occupational health. I think that health is the new safety. Everyone is pretty much up to speed now with the safety side of things. We've still got to do a lot more but there is far more general awareness about safety than there is about health and I think that's the bonus and benefit of working on major projects like the Olympics.'* (Health and Safety Manager; Tier 1)

The talks were felt to be accessible to workers, allowing them to fully engage with the issues. As a result, worker knowledge and awareness of health issues were felt to have improved. This in turn helped workers to feel more comfortable and confident in addressing and raising health issues around the site when they encountered potential health hazards.

Physiotherapists from Park/Village Health were also used to deliver talks on training for manual handling and on musculoskeletal conditions which can occur in jobs such as scaffolding and steel fixing. Again, workers found the training useful and appreciated the fact that the sessions were delivered by knowledgeable professionals.

6.2.2 Targeting of OH briefings

Workers recalled receiving briefings on a broad range of topics. The most common (cited by 64 per cent of workers) concerned safe manual handling. This was a positive result, given that the most common cause of occupationally related illness amongst those working on the site was some form of musculoskeletal disorder (MSD), and that manual handling was the most common type of exposure to OH risk. Around 50 per cent of workers recalled having some kind of briefing on the use of hearing protection, the sources of and/or the risk factors for HAV, keeping skin clean and/or the causes of dermatitis. For ease of analysis, the different briefings were divided into those related to specific health conditions to determine the proportion of workers that had received briefings on each. This demonstrated that a relatively high proportion of workers had access to briefings about each of the different health conditions on site. At a whole-site level, therefore, workers were briefed on all the main OH risks they were likely to face.

Whilst the purpose of briefings was to provide access to information that would help all workers, it was also interesting to determine whether there has been any targeting of workers with briefings relevant to their particular jobs. Analysis of the worker survey data identified that those workers with higher (self-identified) exposure levels to particular health risk factors were more likely to have received briefings on related topics than those with lower exposure levels. This indicates that there was effective targeting of workers on the site with briefings that were most relevant for them given the nature of the work. An overview of the analysis results is presented in Appendix 6, Table A6.12.

A lower proportion of workers received briefings on dust hazards than on any other OH issue. However, the survey does demonstrate that those workers who identified themselves at greater risk of exposure to dust and airborne particles were more likely to have received a briefing on this issue. This indicates that briefings on dust were more targeted than for the other health risks.

6.3 WELL-BEING INITIATIVES

Health promotion plans were outlined each year by Park/Village Health as part of the overall strategy for OH provision on the site and were often linked with the work of the preventative team on specific health risks. Examples of the work undertaken include:

- smoking cessation clinics on the Park and Village
- a Park ‘strong man’ contest across all venues to raise awareness of upper limb disorders
- a ‘mole patrol’ and a site surgery focusing on men’s health delivered to one Tier 1 contractor area
- diabetic site surgeries with Hackney Diabetic Team with diabetic drop-in clinics
- a mental health week, undertaken with the approval of the SHELT meetings on four major venues by Park/Village Health and Alcoholics Anonymous, SANE and Hestia (both mental health charities) and the Samaritans: around 20 individuals with problems came forward and were able to access appropriate support and treatment, with 80 workers attending workshops offered by the charities
- ‘body mapping’, trialled during a musculoskeletal awareness campaign in November 2010 across three major venues, and accompanying drop-in clinic.

The ‘body mapping involved approaching the operatives in the communal areas on site and questioning them on any musculoskeletal injuries they either currently suffered from or had

suffered from in the past. It attempted to get an informed view of the most common areas of the body affected in the construction industry in order to target future health promotional activities. A total of 162 operatives were approached. The results of the analysis are provided in Appendix 6, Figure A6.3.

Running alongside the body mapping programme was a drop-in clinic, where the site physiotherapist was available for advice and education of any injuries that the operatives were suffering from. During this period the physiotherapist was approached by a total of 99 operatives. The distributions of the types of complaints identified are provided in Appendix 6, Table A6.13.

The case study interviews identified high levels of awareness of a number of health promotion activities. These activities were generally achieved through Park/Village Health displaying posters around the Park and Village, placing leaflets in canteens and also proactively engaging employees during site visits. The use of competitions to engage workers with health issues was seen as a particularly valuable approach. One construction manager described how there were '*queues outside the door to attend'* a sexual health clinic.

Workers appreciated that promotions were brought to them on their work sites. This meant that workers were more likely to have contact with activities and engage with them than if they had to take time out of their day to go along to a centralised health facility. Workers were clear that a poster campaign alone would not have provoked the same response as did this combined with the proactive approach of the Park/Village Health staff.

> *'In the summer they also did mole patrol and working in the heat … Instead of getting guys to come in and listen to them, we took the nurses out on site who spoke to the guys about moles and the changes to your moles … and the guys thought that was fantastic. Nobody goes out on site and talks to them.'* (Health and Safety Adviser; Tier 1)

In addition to this, Park/Village Health also worked with Tier 1 contractors to help them promote and deliver their own health promotion activities. The topics covered included nutrition, stress tests, diabetes clinics, prostate cancer awareness, help to stop smoking and morning fitness sessions.

Park/Village Health worked with a range of organisations to set up sports teams to bring an element of competitiveness to health promotion. It was stated that the emphasis was on *'voluntary, light-hearted and interactive approaches which engaged staff interest'*. Park/Village Health also trained some employees from large construction companies to carry out health checks and promotions with their own workforce. This knowledge could therefore potentially be retained within the industry and used on other projects after the Olympic build.

There was a concerted effort to ensure that as much health promotion work as possible could be integrated in some way with wider concerns about OH and safety, even when they focused primarily on general health issues. This is further illustrated in Example 4 (in Appendix 7), which describes the health promotion activities undertaken on the site as part of 'Big Breakfast' week.

6.4 DRUG AND ALCOHOL TESTING

All contractors involved in the case studies had used the Park/Village Health drug and alcohol testing facility. Most tested around 10 per cent of their workforce, but one contractor conducted its own drug and alcohol testing and only used Park/Village Health for re-assessment if the result was positive. One organisation welcomed the tests conducted by Park/Village Health and had recently decided to increase their sampling to 20 per cent of their workforce; they were looking to keep this in place for future projects. Another

organisation stated that they had a couple of workers fail the drug and alcohol tests and in response asked Park/Village Health to deliver a training session on drug and alcohol awareness. The health and safety adviser stated that it was *'fantastic'* and put the *'issues at the forefront of everyone's mind'*. Since the training she had noted a difference in workers' awareness of drug and alcohol issues.

6.5 WALK-IN TREATMENT CENTRE

Park/Village Health provided a free walk-in treatment service for all employees on the Park, regardless of whether the injury occurred on the Park or outside of it. The primary aim of the service was to deal with minor injuries and ensure that, where required, workers were referred for further treatment.

6.5.1 A comprehensive health centre

All of those interviewed in the case studies stated that they had either first-hand experience of this aspect of the health service or had known a colleague who had used it. Everyone interviewed described the service as excellent, with short waiting times and friendly, approachable staff. The services offered on the site were seen as good practice and much better than those usually found on other sites, where there may only be a first aid box, an OH nurse available or other limited assistance.

> *'Any injury our first aiders deem is not severe enough for A&E, but a little bit out of their first aid capabilities, we use Park Health to plug that gap. It's the stopgap where a guy would normally go and see his GP possibly the next day. On this site we've got the facility to say "well, why don't you go down there right now", which is really beneficial.'* (Health and Safety Manager; Tier 1)

The enhanced service was seen as particularly useful for workers who did not have access to a GP – fairly common amongst the workers on the Park and Village; 20 per cent of workers surveyed were not registered with a GP. Workers highlighted the short treatment times associated with on-site facilities, which allowed them to get back to work more quickly than would off-site provision. Workers also felt that they were more likely to use the services because of their accessibility. Ordinarily, workers might not have used the GP for minor ailments as this would have meant taking a day off work without pay. They were more likely to use the on-site health centre, particularly if they were aware of other workers who had attended the facility.

> *'That's the reason why they neglect their health: because it means that they have to take a day off work. They don't get paid for it, so literally to go and see a doctor for ten minutes is going to cost them £100.'* (General Foreman; Tier 1)

> *'There's none of this faffing about losing a day's work and all the rest of it and possibly not even getting in because you're a transient worker.'* (Worker; Tier 1)

The treatment centre was seen as a 'one-stop shop' for advice about a range of issues. This meant that, if a worker attended the centre, they could access range of health professionals, such as physiotherapists and occupational hygienists, or use other services such as a mini health check or blood tests, without having to travel elsewhere. Park/Village Health professionals actively promoted these benefits to workers, which in turn made workers feel that their welfare was a priority. They were also happy to use services, due to the convenience of having everything located under one roof. The services were provided free of charge this encouraged people to use them. The general consensus was that the walk-in treatment centre offered by Park/Village Health was an excellent facility and was much

appreciated for the range of services available and the ease by which these could be accessed.

> *'I mean, the whole thing took half an hour, if that. So it was very quick. But also, what I was particularly impressed with was the follow-up… it took 20 minutes/half an hour and she told me what the results were then and there. So it was sort of a complete bit of healthcare really.'* (Worker; Tier 1)

The communication between the clinical team and contractors was also felt to be comprehensive. Follow-ups would take place with patients and employers were kept up to date on emerging issues and any work adjustments or rehabilitation required. Park/Village Health was also able to pick up on and communicate back to employers instances where employees had come to visit them but had not reported the accident. The clinical team was felt to respond well to requests for additional information from contractors whilst maintaining the confidentiality of their patients. In this way organisations were alerted to OH incidents and could keep their reports accurate and up to date.

> *'Sometimes the guys will go off and we've got no problem with them going down to Park Health as soon as they need to, but for our purposes and the contractors we've got to record it and sometimes you don't find out, if they go to their own GP. You've got no idea that they've been treated or dealt with, whereas at least with Park Health we get notification and we can deal with it afterwards*.' (Construction Manager; Tier 1)

6.5.2 Results of health checks

Park/Village Health monitoring data from the health checks provided an overview of the general health of the workforce. The Park/Village Health team did not have access to the results of health checks in an electronic form, making analysis of their general health checks difficult. However, they conducted an analysis of a limited number of test results and also held the results of random testing carried out by the Hackney Diabetic Team. These results (presented in full in Appendix 6, Table A6.14) demonstrate that over 40 per cent of workers on the site were overweight, with 28 per cent classified as obese; 29 per cent had some form of hypertension, although less than one per cent had severe hypertension; and 15 per cent had abnormal blood pressure, although again less than one per cent had severe problems. Thus, the health checks identified a relatively large number of health problems and provided workers with information on how to change their lifestyles to reduce future problems.

6.6 EMERGENCY RESPONSE SERVICES

Fortunately only a very few of the people in the case studies interviewed had experience of working with the emergency response services which Park/Village Health offered, and these were mainly when more serious injuries occurred on their site, such as a suspected heart attack, a stroke and a person with multiple fractures. The protocol ensured that Park/Village Health was made aware of any incident when they were called on their emergency line. An on-site ambulance was used to drive to the scene of any incident. All the people in the case studies commented that the response time of Park/Village Health was excellent and the health professionals at the clinic responded immediately to the call on the emergency line. Park/Village Health was felt to deal with the incidents effectively.

> *'Park Health were great with the ambulance and the paramedic and they did the stabilising basically and got him off to the local hospital'* (Health and Safety Manager; Tier 1)

Other case studies stated that managers had worked in conjunction with Park/Village Health emergency response services in order to simulate an emergency situation. This had the mutual benefits of allowing workers on the project sites to understand what needs to occur

when an emergency takes place and also provided good practice examples for the Park/Village Health emergency response team. These exercises helped both Park/Village Health and the project site to improve on emergency situation training, so they were better prepared when called upon for real.

> *'I have phoned a number of times to arrange emergency drills on site where we would initiate with a person falling off the scaffold, getting injured, not moving or maybe there's a burn on site, someone has a broken leg perhaps or there's a man in the water-everything that we could think would be a possibility on our site.'* (Health and Safety Manager; Tier 1)

6.7 OCCUPATIONAL HEALTH CONDITIONS EXPERIENCED

As a footnote to the clinical services provided on the Park and Village, information was available from the worker survey which provides an overview of the work-related ill-health they have experienced. As any OH conditions are likely to be the result of exposure to OH hazards in previous as well as current work, the survey explored the experiences of workers prior to, and whilst working on, the Park and Village. The analysis also explored the extent to which the type of work individuals were involved in was related to the nature of the OH issues they experienced.

6.7.1 Incidence of work related ill-health amongst the workforce

The worker survey explored any OH problems that workers were experiencing. The results are provided in Table 6.1. Before coming to work on the Park and Village:

- 25 per cent of workers had experienced a musculoskeletal condition
- 14 per cent had experienced dermatitis or some other skin condition
- 11 per cent had suffered the effects of work-related stress
- 7 per cent had some hearing problems
- 5 per cent had a problem with their breathing
- 4 per cent experienced some symptoms associated with HAV.

The most common conditions workers experienced whilst on the Park and Village were work-related stress and musculoskeletal problems (11 per cent of workers stating they had these conditions whilst working on the site), but only a small proportion had sought help from Park/Village Health with these conditions, particularly in the case of work-related stress. This may suggest that people worry more about seeking help with mental conditions than they do with physical. Supervisors/managers may also require training to recognise mental health conditions amongst their workforce so that they can advise individuals to seek help when symptoms emerge.

Table 6.1 OH conditions workers have experienced

Health condition	Had condition on site (%)	Had condition before (%)	Had condition checked by Park/Village Health (%)	Never had condition (%)
Work-related stress	11.2	10.6	2.9	76.2
Musculoskeletal	10.9	25.2	5.4	61.4
Dermatitis/skin condition	4.7	13.5	3.7	79.8
Hearing	2.9	7.2	6.0	84.6
Breathing	3.4	5.2	3.0	89.0
HAV	3.2	3.7	3.9	89.5

Source: IES/Employment Research Ltd Worker Survey 2010

6.7.2 Relationships between health conditions and work risk factors

Those workers who identified themselves as subject to higher exposure levels for a particular health hazard were compared with those who considered themselves as subject to lower exposure workers on whether they had experienced a health condition associated with that particular hazard.[1] (For example, exposure levels to manual handling were compared with the incidence of MSDs). This analysis determined whether there were any discernible relationships between the health conditions workers had experienced and the nature of the work they conducted on the Park and Village.

Workers with higher self-rated exposure levels to HAV, musculoskeletal, hearing and dust risks were all more likely to have experienced symptoms of related health conditions whilst working on the site than were workers who considered themselves to have lower exposure levels to these risks. In addition, those who had experienced HAV, musculoskeletal and hearing problems in the past were also more likely to have higher exposure levels to related health risks on the Park and Village. Whilst these results suggest a relationship between exposure to health risks and the experience of associated health conditions, workers with pre-existing and current health conditions might also be attuned to the risks they face whilst working on the site, affecting their responses.

Park/Village Health has been particularly good at identifying those at risk from certain OH conditions: there was a significant relationship between worker exposures to health risks associated with HAV, hearing and dermatitis, and these individuals receiving a health check on these conditions whilst on the site. The same relationship was not observed for musculoskeletal conditions or dust exposure.

Dermatitis has a less clear relationship between exposure and incidence: workers with both lower and higher exposure levels to skin irritants are equally likely to have developed a related health condition. Whilst individuals with higher exposure levels to wet cement or similar products were significantly more likely to receive checks from Park/Village Health, this was not the case for high-risk employees working with hazardous chemicals and biological agents or abrasive substances, both of which can cause dermatitis.

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[1] *Statistical significance ascertained using chi square tests: HAV = X(1) = 11.73, p = 0.001; MSD = X(1) = 13.03, p = 0.001; noise = X(1) = 10.55, p = 0.001; dust = X(1) = 11.00, p = 0.001*

These assessments are not based on monitoring data for different exposure levels, but on workers' own assessments based on the type of work they do. Appendix 6, Table A6.15 provides further details of the results.

6.7.3 Limitations of the data on health conditions

The research team were not provided with records of the outcomes of statutory health surveillance. Park/Village Health records were not available in a suitable format for analysis, as most were not held in electronic form. The outcomes of statutory health surveillance were provided to the employer's normal OH provider and HR department for them to record and follow up as necessary. However, data was not analysed at the level of the whole Park and Village. As statutory health surveillance takes place, on average, once every two years, it was also extremely rare for the Park/Village Health team to see operatives for health surveillance on more than one occasion. In addition, other OH providers operated for some companies working on site and a complete picture could not be developed without access to this data. Securing access was beyond the scope of this study.

It is not possible, however, to use the number of cases of ill-health observed on the site as an indicator of the success of its preventative programme. The difficulties involved in this stem from a number of factors:

- The construction workforce is not static, with large turnover of workers. Operatives working on the Olympic Park were only present for a maximum of six to 12 months and in some cases worked on site for just a few weeks.
- Any data on health surveillance would only be useful in identifying the general problems in the industry as a whole, as problems identified would have, for the most part, been chronic (and therefore caused prior to working on the Park).
- Most cases of occupational ill-health have a latency of five to 10 years and therefore any ill-health effects from exposures during the work undertaken on the Olympic site would not be observed for some considerable time.
- In order to assess any acute effects a system of entry and exit medicals would be required. This was not implemented on the Park and Village as it would have been difficult to justify the resources involved.

It is more appropriate to consider how well the prevention service limited exposure to hazards. Certain exposures (noise, vibration, substances) will be unlikely to cause ill-health if either eliminated or reduced to within acceptable (legally defined) limits. In cases where the prevention team were able to either eliminate the use of certain substances (e.g. the use of lead-based paints at the Aquatics Centre) or reduce exposures (e.g. to noise or welding fumes on the Village site), the likelihood of ill-health occurring will have been lessened. Health surveillance would not pick up the effects of these reduced exposures for some time following the point at which individuals were exposed on the Park/Village. Operatives may also have been exposed during their previous work on other sites. Thus, even with better data on health surveillance, the conclusions which could be drawn at this point in time about exposures on the Park and Village would be limited.

The ill-health prevention team therefore focused on proactively reducing the possible causes of ill-health rather than reacting to ill-health which had already occurred. One available measure is the ill-health frequency rate which was used by Park Health to assess the numbers of cases of reportable ill-health against the number of hours worked (similar to AFR). However, only those cases of reportable ill-health which were known about by the medical team could be included. The number of such cases was very low, which rendered the rate

almost incalculable. A decision was taken to stop calculating this rate in November 2009; at this point the rate was the rate was 0.04.[1] Recording stopped because

- not all reportable ill-health cases were being captured, as some were reported via the ODA's central recording system (Enable) with some recorded only by the contractors own OH provider
- most of the cases seen were chronic (having occurred before exposures on site) and there were very few acute cases which could be tied to exposures seen on site.

[1] *Based on RIDDOR-reportable occupational illnesses diagnosed. This was calculated a: the number of cases of reportable ill-health x 100,000/total hours worked.*

7 SERVICE IMPACT

It is difficult to draw firm conclusions about the impact of Park/Village Health interventions on the practice of contractors and workers. There are many other factors at play, such as the influence of ODA and DP, and contractors' own initiatives to improve OH practice. The full range of learning legacy research projects explore these factors in more detail and should be referred to as further context to this report.[1] In some ways, also, it is not necessary or helpful to attempt to distinguish between these different influences, which all represent a commitment to good health and safety management on the Park and Village. This chapter therefore presents and discusses the available data on the **likely** impact of the OH provision on the site, and more widely that of working on this unique construction project. The data is from contractors, workers and the Park/Village Health team, and focuses on their assessment of how things improved or changed during their time on the Park and/or Village.

7.1 DEFINITION OF OH, WORKPLACE HEALTH AND HEALTH SURVEILLANCE

Before moving on to discuss how the service affected the attitudes and behaviours of managers and workers, some important definitions are provided to assist the reader.

Occupational health is the process of dealing with health problems in the work environment. This covers health problems workers bring to the workplace as well as health issues caused or aggravated by work.

Workplace health is the process of preventing workers from becoming ill as a result of their job, by controlling risks to their health through task adaptation or worker adaptation. This is a specific part of OH.

Health surveillance is a statutory system of ongoing health checks required when workers are exposed to hazardous substances or activities that may cause them harm. It helps employers to check for early signs of work-related ill-health in these employees.

7.2 IDENTIFICATION OF OH RISKS

Part of the rationale for the provision of OH services on the preventative side was to raise awareness of OH risks. In order to gauge the extent to which managers were able to identify possible risks, they were asked *'What do you think are the main OH risks to workers posed by the work they are asked to do on the Park and/or Village?'* This was then supplemented by the instructions *'We are most interested in health risks, so try to think beyond the traditional safety risks that tend to cause accidents'*.

In total, just 40 managers (24 per cent of the sample) stated one of the six key OH risks targeted by Park/Village Health (i.e. dermatitis, HAV, MSD, noise-induced hearing loss, respiratory disease and stress) when asked in this way. As 76 per cent of respondents did not provide even one OH risk, it was not surprising that only 11 people provided more than one health risk in response to this question (even though they were asked to name up to five different safety risks).

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1 A full range of learning legacy report summaries is available on the ODA's website at: www.london2012.com/learninglegacy

The most commonly mentioned health risk was respiratory disease (14 per cent), with the remaining target risks each mentioned by fewer than 10 per cent of the sample. A relatively large proportion (34 per cent) provided examples of traditional safety risks, unable to think of a health risk in answer to this question. There was a statistically significant difference in the responses of managers depending on their level of use of Park/Village Health services, with heavier users significantly more likely to be able to name one of the six target risks.

Having discussed this result with the Park/Village Health team, there was some concern that it did not accurately reflect the levels of health risk awareness amongst managers on the site. The use of the term 'occupational health' rather than 'health risk' was considered potentially difficult for contractors to interpret. In their discussions with contractors on this issue, the Park/Village Health team avoided using terms like this, or health surveillance, as they did not feel that contractors fully understood what they meant.

> *'The language we use is so important. We use the words "long-term" because [when] they think health risk they think cutting my finger, cutting my hands, tripping over and hurting my leg, getting something in my eye, straining my back. So we say to them, "What are the things that you do at work that can affect you long-term, can affect your health?" And then they start to think of things like hand arm vibration, or breathing in the dust that we're exposed to.'* (Park/Village Health Manager)

It is, therefore, possible that the way in which the question was interpreted by contractors was different from that intended. Future research could therefore usefully trial different ways of asking this question, including using the words 'long-term' health to help contractors understand what was meant by OH risks.

Other evidence from the case studies and from Park/Village Health records clearly highlight the steps taken by the team to educate management about health risks and help them introduce high-level controls.

7.3 CHANGES TO MANAGEMENT SYSTEMS

The general consensus amongst representatives of the large Tier 1 contractors participating in case studies was that, although they saw Park/Village Health as an excellent service, there was little potential for it to significantly alter the general health and safety management systems they had in place. They already considered themselves to have the right systems to ensure they successfully complied with legislative requirements. The standards required on the Park and Village were therefore seen by this group as no different to those on other major projects.

> *'I don't think we've changed anything; we're just more comfortable and more confident in the way that some of the work activities are carried out. With the expert advice we've had (from Park Health) you've got the degree of understanding that you're doing the right thing.'* (Construction Manager/Health and Safety Manager; Tier 1)

A number of managers, however, were able to identify that having access to Park/Village Health gave them a different perspective on managing health risks. It also offered access to expert advice on their health and safety systems and policies. Park/Village Health were also able to offer suggestions for potential improvements.

> *'As a result of working with Park Health we're more aware of the questions to ask when the information comes in and how we review it and we know who to ask and when to ask for advice.'* (Health and Safety Manager; Tier 1)

> *'Park Health are always assessing how we do things, what we do and what our current control measures are and then advising us where we should and could do better. Also there's*

a lot of lessons which I've learned from Park Health from a systems point of view that I've fed back to the company. It's all about sharing lessons learned.' (Health and Safety Manager; Tier 1)

The strategy of Park/Village Health was to encourage contractors to see health risk management as part of their day-to-day activities, and something which was simple to integrate with existing safety management. The response of contractors was therefore entirely consistent with the approach taken by Park/Village Health to encourage contractors to integrate OH into what they were already doing rather than see it as something unique or additional.

The case studies did provide a number of specific examples of contractors who had used the advice and support of Park/Village Health to implement some kind of change to the way that they managed OH at a strategic level. Park/Village Health were able, therefore, to highlight some important areas for organisations to consider and provided advice on how these could be incorporated into policies. They also reinforced positive health and safety systems which organisations had already established.

7.4 IMPROVING OH MANAGEMENT

Despite the general view that Park/Village Health had not fundamentally changed their approach to the management of health and safety, changes to the management of OH risks were more commonly reported. The Park/Village Health team were also able to highlight examples where they felt the greatest changes had been made.

Thirty six per cent of the managers surveyed felt that they, or their employer, had in fact made changes to the management of OH risks (a total of 59 managers). When this was broken down by the number of Park/Village Health services they had used, there was a statistically significant difference in the extent to which managers felt they had made changes whilst working on the Park and/or Village: the heavier a manager's use of OH services, the more likely they were to feel they had made a change.

For those managers who did believe that their own, or their company's, management of OH risks had changed, a follow-up question asked what type of changes had been made. The most common changes were to policies designed to protect workers, followed by better OH risk assessments, greater awareness of OH risks and better OH training provided to staff. The full results are presented in Table A6.16, although as can be seen in this table the numbers involved are small.

7.4.1 Health surveillance and monitoring

It is important to note the differences between health surveillance and exposure monitoring and interactions between these activities. This was something which was not always clearly understood by contractors.

Health surveillance is the collective term for a wide range of procedures where the following factors apply:

- work damages health in a particular way
- there is a valid way to detect a related disease or condition
- it is likely that damage to health will occur under the particular work conditions
- it is of benefit to the employee.

Health surveillance must not be confused with general medicals (such as fitness for work, safety critical, return to work), health checks (body mass index, cholesterol) or health promotion (healthy eating, increased physical activity, smoking cessation etc). It is a monitoring technique used to systematically check for early signs of work-related ill-health in employees exposed to certain health risks. It also provides a valuable opportunity for feedback from employees and a chance to reinforce health and safety messages. Results should either reassure that controls are effective or indicate, before irreversible harm is done, that enhanced control is necessary. The purpose of health surveillance is therefore twofold:

- to gather information on the state of health of employees for the early detection of work-related ill-health so that appropriate action can then be taken to rectify the situation and prevent further harm
- to indicate failures in controls or unsuitable working practices requiring prompt review.

Health surveillance is required where there is considerable reliance on controls to prevent employee exposure to significant risk of harm[1]. The decision to undertake health surveillance is made as part of risk assessment. Through this, hazards are identified, variable risk is categorised and proportionate controls are introduced. As part of this process, decisions need to be made regarding actions to ensure controls remain effective. One of these is health surveillance.

Health surveillance is therefore not a substitute for managing exposure to health risks at work and is only of value if appropriate action is taken in response to the results. Where it shows that a worker's health is being affected by their work, steps must be taken, such as preventing or reducing further exposure, reviewing risk assessments and improving control measures. Checks that the action taken has worked should also be made.

Where an OH service provides only the support of a nurse, individual workers experiencing health problems will be cared for, but there is then a gap. The role of the occupational hygienist, when notified by the nurse of problems picked up during health surveillance, is to create a new control regime so that other similarly exposed workers can be protected. The results of health surveillance should be made available for those undertaking risk assessments for similar tasks and activities; otherwise the situation will arise again. Understanding this distinction, and the separate but interlinked roles of OH nurses and occupational hygienists, is at the heart of providing a good OH service. Having access to just this type of provision from Park/Village Health was something which a number of contractors were keen to take forward onto future projects.

One Tier 1 contractor, as a result of working with Park/Village Health, decided to use a Registered General Nurse (RGN) on their sites in the future who was also OH-trained and able to spend time working on site looking at OH issues. The same company also developed OH monitoring questions in their pre-qualification questionnaires for sub-contractors. All sub-contractors now have to demonstrate how they complete health surveillance and how the results are managed. It is hoped that this will embed the good practice established by Park/Village Health into sub-contractors' procedures after the Olympic build has finished.

> *'She [the nurse] would spend days on various projects going around looking specifically at occupational health and HAVs, dermatitis, that type of thing you know. So there will be a*

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[1] *For health risks that might give rise to musculoskeletal disorders, such as lower back pain or work-related upper limb disorders and stress-related disease, there is no specific requirement for health surveillance, mainly because valid ways to detect ill-health have yet to be discovered and/or the link between work and the ill-health condition is uncertain. In these cases methods such as encouraging symptom reporting and checking sickness record should be considered.*

benefit from here to the company in her particular role and I would like to think that other major contractors and the other major players on this project would do something similar.' (Health and Safety Manager; Tier 1)

A sub-contractor had brought in their own OH services to carry out health surveillance following their contact with Park/Village Health during monitoring. Another sub-contractor stated that, as a result of working with Park/Village Health, they have altered the way in which they report near misses, as well as realised the need to continually update method statements from different perspectives as work is completed on a project. These are both new management practices which they felt they would take forward into future projects.

'The welding monitoring that they did was quite intense. The guys had their blood taken, they had different levels of checking beforehand and afterwards … It prompted us [the sub-contractor] to get our own health surveillance.' (Supervisor, sub-contractor)

'We know exactly where the masks are now, exactly about the hearing and how long they have got to be exposed. So that was a good thing.' (Foreman, sub-contractor)

Another area where Park/Village Health was felt to have made a significant impact was on the introduction of health monitoring activities, and establishing that these can be incorporated into existing health and safety systems. A number of contractors stated how useful health monitoring had been. One sub-contractor stated that, as a result of working with Park/Village Health, they were now more informed on the monitoring processes and this was something which would help them in the future with specific operations.

'What's interesting is that Park Health provide the monitoring service … which we may not have considered before: monitoring the health of the workers.' (Senior Engineer; Tier 1)

Encouraging contractors, and the construction industry, to implement a full and effective OH service will require a change in perceptions and the education of senior managers. It is important, however, that they recognise their legal requirements to implement effective health surveillance, with appropriate feedback loops into risk assessment, and the importance of introducing and maintaining preventative measures on workplace health.

7.4.2 OH in designing out risks

One of Park/Village Health's aims was to improve the extent to which OH considerations form a part of the design process. In discussions with designers it was clear that a number were now more likely to include OH as a consideration when designing various aspects of projects. This was due to their work with Park/Village Health and the park-wide philosophy of excellence in health and safety However, it was felt that designers and CDMCs would benefit from more training to raise their awareness of OH and encourage such professionals to consider these issues as part of their day-to-day work.

'I think the one thing I would like to see is that designers have access to that, or there is training on health issues, because they're a way behind on … risk management or risk assessment and design … I don't know, have you ever heard of a designer taking on health issues?' (Construction Manager; Tier 1)

'Normally we just think about the risks to the constructors, the actual people building it in terms of physically trying the components, hazardous materials, that sort of thing, and then the users in terms of safe operation and that sort of thing. On the Park it's proven much more of a philosophy and it sort of cuts across more than just, you know, "Is there a hole you're going to fall into". It's more "Could this be done better", "Could this cut the cost in terms of [the environment]". It cuts across everything really, so in that respect it's been quite different, certainly in my past experience.' (Design Manager; Tier 1)

The attention that Park/Village Health has given to the process of designing out risks was also felt to have influenced the behaviour of contractors, particularly when identifying healthier processes and materials. The health and safety adviser for one Tier 1 contractor stated that, as a result of working with Park/Village Health, their organisation would now seek advice on certain hazardous materials or products before they are used. If another material can be identified that is safer to use, this would be implemented early in the design of the project. The manager felt that Park/Village Health had highlighted the importance of working with designers on OH risks during the initial stages of the project, and this approach would be something which the company could use in the future.

> *'I think [the organisation is] going to take into account all of the occupational health stuff with the designers beforehand to make sure they've eliminated as much as possible prior to work starting.'* (Health and Safety Adviser; Tier 1)

This aspect was commented upon by another manager, who stated that they had worked with Park/Village Health to take into account the design processes when constructing the infrastructure for the site. Park/Village Health advised and worked with the contractor to proactively think about the safest and healthiest way to carry out the work.

> *'[Park Health] came up with various systems and initiatives, all of which are workable. Yes, they are a little bit more costly; not fantastically more, but a little more. Most importantly though, by doing it that way nobody's gonna get injured and there's no electric services disrupted or no gas mains touched.*' (Health and Safety Manager; Tier 1)

One reason why Park/Village Health found this area more difficult to have influence on was that the team was established after most of the initial projects on the Park had already been designed. This meant that they were able to have only limited influence in the process. In the longer term, early involvement of OH professionals in the design process can save both time and money, if health and safety issues can be highlighted at the very beginning of the construction process to prevent subsequent delays once work begins.

> *'I think they probably started up at the same time or slightly after we did and I think there's probably opportunity now for them to get involved in some of the projects, the design stage of some of the projects that are kicking off in terms of the specification and things. There's still a few projects that haven't completed their design process yet and that's an opportunity we probably didn't take as fully as we could have done on the basketball arena.'* (Design Manager; Tier 1)

7.4.3 Changes to managerial behaviour

All managers were asked in the manager survey how likely they felt it was that, having been involved in this project, they would act differently as a manager in the future. Seventy-three per cent said that they definitely (40 per cent) or probably (33 per cent) would behave differently. There was a significant relationship between the level of use of Park/Village Health services and the extent to which managers believed that they would do things differently: employers using more services were more likely to believe that they would change.

These changes to manager awareness and behaviour were reflected in case study interviews. A number of managers highlighted how they were trying to build a more positive health culture. Working on the Park and/or Village had been useful for managers in understanding the importance of engaging workers in health and safety and listening to their comments on various issues. This encouraged workers to speak out when they encountered health and safety risks or poor procedures, as they knew their opinions would be listened to and potentially acted on.

'We have a healthy reporting culture in our team of site labourers and we can see that by the sheer number of quality near misses… They've been really good and it's all because we create opportunities, engage. Not just communicate but engage with the workforce and listen, but then act upon what they're telling us and make sure we give feedback. That hasn't just been from Park Health. We have realised [the benefits] through our behavioural safety programme and cultural development on the step change programme … We have learned.' (Health and Safety Manager; Tier 1)

One employer stated that they had promoted a culture where it was better to ask the wrong question than not to ask at all. These changes in attitudes can be witnessed in the number of health and safety initiatives that various companies have set up and promoted around the Park, often with the aid of Park/Village Health. These all encourage a more proactive health and safety culture which looks to engage workers in decision-making.

Employers have now begun to realise the importance of a proactive OH service and the need to place more emphasis on it within their organisations. One contractor stated that Park/Village Health have been invited to project leadership team meetings so that OH issues could be placed at the forefront of the agenda. This had been well received by the senior managers and so is likely to be continued in future projects.

'I say occupational health is always seen as reactive and I think now they've changed it to be proactive so they think about those kind of conditions on the occupational side. But also it's now mentioned in meetings whereas before on other projects it wasn't really mentioned.' (Health and Safety Adviser; Tier 1)

Despite these apparent successes there was still a feeling, amongst a few interviewees, that some employers were merely paying 'lip service' to health and safety. Others felt that there was still a culture present which looked to blame someone for an accident that occurred, rather that looking at ways in which it could have been prevented in the first place. However, overall, there were mostly positive views amongst managers about what had been achieved.

7.5 CHANGES AMONGST THE WORKFORCE

Another area where Park/Village Health was felt to have had an influence was on the behaviour and attitudes of workers in relation to their health: both managers and workers identified changes.

7.5.1 Changes to worker awareness of OH risks

The worker survey asked whether workers felt that their awareness of OH risks had improved since they started working on the Park and/or Village. The majority (86 per cent) of respondents did feel that their awareness had improved either a little (43 per cent) or a lot (43 per cent).

Less experienced workers (those with less than four years of work experience in the construction industry), were significantly more likely to feel that their awareness had improved.[1] Additionally, the longer individuals had been working on the Park and/or Village, the more likely they were to feel that their awareness had changed.[2] Multi-variate

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[1] *Statistical significance ascertained using a chi square test. Chi square results X^2 (4) = 9.550, p<0.05.*

[2] *Statistical significance ascertained using a chi square test. Chi square results X^2 (4) = 16.869, p<0.01.*

analysis[1] revealed that length of time working on the site was the only factor which significantly explained some of the variance in whether a worker improved their awareness of OH issues, with those on the site for longer more likely to report improvements. These survey results are therefore evidence of a developing culture of health awareness across the whole site, particularly where the workforce was more stable.

Another result showed that workers with a more positive view of the OH provision on the site (both access to OH services[2] and the attention given to health risks on the Park and Village[3]) were also significantly more likely to have improved their awareness of OH risks. These differences were quite marked and suggest that there was a significant minority of workers who did not engage with OH messages on the site. However, where workers did engage, results could be seen in terms of their improved awareness.

7.5.2 Changes to worker behaviour

The worker survey revealed that the majority of workers (78 per cent) felt that, since working on the Park and/or Village, they had made changes to the way they worked in order to better look after their health, although 49 per cent had changed their behaviour only 'a little' rather than a lot. Analysis showed that the only significant differences within the sample were that those working on site for longer were significantly more likely to have made changes.[4] This was in line with the views of some managers from the case studies who commented that, over time, workers were more likely to take on board OH messages and improve their behaviour.

> *'The longer we keep the guys, the longer we can impress on them what we want. Obviously we will start building a culture.'* (Health and Safety Manager; Tier 1)

As with the changes suggested in relation to OH awareness, those workers who felt that better attention was given to OH risks on the Park and Village than on other projects they had been employed on were also significantly more likely to state that they had made changes to the way in which they worked to pay more attention to their health and safety.[5] So too were those workers who felt that their access to OH services on the Park and Village was better than on other sites.[6] Clearly, therefore, the more engaged the workforce with the OH messages and services provided, the more likely they were to change their behaviour. These survey results are therefore further evidence of the importance of a proactive and

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1 *A logistic regression was conducted. This used the following variables: age, time in the construction industry, length of time on the Park, job role, whether respondent was a supervisor or not, personal engagement with Park Health, project engagement with Park Health, principal contractor or subcontractor.*

2 *A t-test was performed to establish this. The results were: better access to OH, mean = 0.8260, standard error = 0.01271; same/worse access to OH, mean = 0.6242, standard error = 0.03782, t(202.641)= -5.058, p<0.001.*

3 *A t-test was performed to establish this. The results were: high/med risk, mean = 0.8869, standard error = 0.01071; low/no risk, mean = 0.7055, standard error = 0.03785, t(168.985) = -4.610, p<0.001.*

4 *Statistical significance ascertained using a chi square test. Chi square results X^2 (4) = 11.354, p<0.05.*

5 *A t-test was performed to establish this. The results were: better attention to OH risks, mean = 0.8143, standard error = 0.01309; similar/worse attention to OH risks, mean = 0.5933, standard error = 0.04024, t(181.880) = -5.221, p<0.001.*

6 *A t-test was performed to establish this. The results were: better access to OH, mean = 0.8260, standard error = 0.01271; same/worse access, mean = 0.6242, standard error = 0.03782, t(202.641)= -5.058, p<0.001.*

visible OH culture (of which a preventative OH service can be an important part) that workers can directly relate to.

7.5.3 Managers' view of changes to worker behaviour

The manager survey asked managers for their view on changes to worker behaviour, and 64 individuals (or 39 per cent of the sample) felt that they had observed changes. There was a significant relationship between managers and whether they felt that their workers' behaviour had changed and the extent to which they had used Park/Village Health services. The more services that a manager/their workers had used, the more likely they were to feel that there had been an observable behaviour change amongst workers.

The majority of managers (77 per cent) who had observed changes felt that their workers were now more aware of OH risks, and 38 per cent believed that workers now took OH risks more seriously; one in five felt that workers now made better use of PPE. Very few managers mentioned better use of specific procedures designed to protect workers from common health risks. (A full breakdown of the type of changes that managers had observed is provided in Appendix 6, Table A6.17.) Managers are likely to observe changes amongst their workforce with regards to PPE, as this is a highly visible change. Higher-level controls are unlikely to be observed at workforce level.

7.5.4 Attitudes towards OH management

During the case study work, managers working on projects across the site felt that their workers had been very receptive to the health and safety messages that were promoted around the Park and Village and reinforced by Park/Village Health. Although in some instances it could take some time for workers to accept the new health and safety procedures imposed on them, over time the majority of workers realised the benefits and were happy to comply. Some managers and supervisors, however, felt that it was harder in the beginning to alter the views and attitudes of sub-contractors towards health and safety, due to a sometimes poor existing culture amongst organisations.

> *'When we first started here, we had agency guys who weren't used to this culture of working and they'd think nothing of just throwing up a ladder against something and running up it and things like that, you know, which is not allowed. So it was a hard struggle to stop people that weren't used to the culture … it was hard work to get them to comply with what we wanted.'* (Foreman; Tier 1)

Managers on some case study sites commented that promoting greater knowledge and awareness of OH issues had engaged workers more with health and safety in general. There were examples where operatives had anxieties around working with potentially harmful substances that they were not accustomed to. Providing them with the appropriate knowledge on how to work safely with these substances helped to relieve these fears and give them the confidence to raise issues with management if the processes being used potentially posed health risks.

> *'I think I would say 98 per cent of all the guys are very receptive to it and we certainly had feedback about "We shouldn't be doing this" or "Can I do this" or "Do I need this mask or that mask" or "Am I OK to dig in here". So again you're in a position where [with] a bit more information they tend to ask for clarification or guidance. Also you … get the situation as well where, if they're supplied with, let's say, a 50p mask instead of a £2 mask if their company won't supply it, they'll come and talk to us and then we can attack them from another direction. So, you know, a little knowledge helps the guys to realise this.'* (Health and Safety Manager; Tier 1)

A number of contractors commented that by educating workers on health and safety issues on the site, they had become more aware of their working environment and the reasons behind requirements such as wearing appropriate PPE. This helped to overcome problems that they had experienced in the past with workers when encouraging them to comply with on-site safety standards. Similarly, the site was seen as the neatest that most managers and workers had worked on, and workers were on board with keeping a '*tidy ship'* and the reasons why this was important.

> *'They pay more attention to the excavations, making sure they're stepped and tidy. They seem to have become a lot neater working … It takes a few weeks to get them into it but once they start doing it they keep doing it.'* (Project Manager; Tier 1)

As worker attitudes and behaviours towards health and safety began to change and they became more engaged with the topic, managers commented that they were willing to pass on positive OH messages to other workers on sites that they felt were not as conscious about health and safety. This helped to spread the health and safety culture to sites and workers which were not fully engaging with the ethos.

> *'I know that some of the sub-contractors have spoken to their teams on other sites where it's not so safety-driven and they've taken that outside of the business: "We're doing this here, I think you need to be doing the same elsewhere."'* (Health and Safety Adviser; Tier 1)

Despite these positive impacts of good OH management on the Park and Village, there was, perhaps inevitably, some examples of 'message overload' amongst workers. Some felt that whilst the regime was undoubtedly set with their best interests at heart, the (as they saw it) strict and unwavering rules could feel restrictive at times; others felt that it took the 'fun' out of their job. A number of workers raised a specific example of being required to wear safety goggles even in rainy weather. They found this difficult, as the goggles steamed up and prevented them from seeing well. Despite bringing up this issue with their employers, no flexibility had been demonstrated and they couldn't understand this, given that not being able to see was a risk factor. However, most workers were positive about what was being achieved on site in relation to their health and safety, despite any inconvenience they might feel. It is worth noting that asking all workers to wear goggles and gloves is a relatively new step for a major site; workers are far more used to expectations about other aspects of PPE (e.g. high-visibility clothing and hard hats). This may account for some of the difficulties experienced as both workers and managers adapted to these new requirements. It is also worth noting as a general point that the industry needs to move away from a 'one size fits all' policy with regard to protective equipment.

> *'It's strict, yes. Sometimes there's no margin for common sense. There's a set rule and they can't see any way round that. But yes, it's very strict.'* (Worker – Sub-contractor)

> *'It can be very restrictive sometimes and very over the top, but you can understand that they are looking out for you.'* (Worker; Tier 1)

7.5.5 Protecting workers from risk

The main aim of the preventative side of Park/Village Health provisions was to protect workers from risks to their health whilst working on the Park and Village. In the analysis of the worker survey data, it was possible to explore whether this was achieved.[1] The results show that access to a range of preventative measures was more available to higher-risk workers.

The results show that, in the majority of cases, those workers who were high risk for a particular health condition were more likely to receive preventative measures to combat related health conditions than were those workers who were considered low risk for the same condition. Where the analysis produces results that are statistically insignificant when comparing high-risk workers and low-risk workers, this tended to be where the preventative measures would not specifically only apply to those workers who were at high risk for that particular condition (e.g. help stopping smoking, washing facilities and checks on noise levels are likely to apply to all workers). Thus, preventative health measures have been effectively targeted on the Park and Village.

Appendix 6, Table A6.18 provides full details of the significant associations between a worker being at risk of exposure to a particular health condition and them having access to relevant preventative measures.

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1 Those workers who were considered either high- or medium-risk workers for certain health conditions (skin conditions, HAV, MSD, noise and dust) were analysed using a series of t-tests to see if they felt they had better access to the preventative measures for controlling the OH risk when compared to those workers who were at low or no risk for the particular health condition. The full statistical data for this analysis can be found in Appendix 6.

8 COST–BENEFIT ANALYSIS OF THE PARK/VILLAGE HEALTH SERVICE

Cost–benefit analysis (CBA) is a standard framework for evaluating interventions.[1] Its purpose is to quantify the value of the benefits of a programme in order to assess whether these benefits outweigh the economic cost of the programme and, hence, whether the programme provides value for money. Here we have attempted to estimate some of the economic benefits from the OH programme implemented. As discussed in this chapter, such an exercise is difficult and requires assumptions be made.

8.1 DATA SOURCES

The main data sources for the CBA of Park/Village Health were:

- ODA records of the costs involved in running the Park/Village Health clinical services to the end of July 2011
- the time spent by workers in the clinical facilities receiving treatments, and health surveillance from the clinical team working on site as recorded by Park/Village Health to the end of July 2011
- the estimated time taken to offer the same clinical treatments and health surveillance off site
- the calculations used in conducting a similar CBA of the OH service offered on a comparable recent major construction project in the UK
- data provided by ODA on the estimated hourly wage and production costs (an estimate of the value-adding benefit) of work on the Park and Village.

8.2 LIMITATIONS OF THE DATA

The benefits estimation is limited to a fairly narrow view of the potential impact of the Park/Village Health service for a number of reasons:

- The calculations take no account of the potential benefits accrued through the work of the occupational hygienists which, as discussed throughout this report, was a major element of the work on site. The costs of providing the occupational hygiene support on site have not been included in the calculation, but the time spent by the clinical team liaising with occupational hygienists and sharing results is included.
- There is no estimation of the potential health benefits evidenced through reduced absence rates on site. Absence recording within construction is notoriously poor, and it was beyond the scope of this research to compile the absence records of all contractors working on the site.
- The benefits are limited to time saved through treatments and other clinical interventions. No account is taken of the potential longer-term health and well-being impacts of these treatments, for example through the identification and control of health conditions. The assumptions used are also that individuals attend for treatments alone, when in fact

[1] *The HM Treasury Green Book*

supervisory staff or another colleague often accompany them, for example assisting them to reach the medical attention required.

- It is difficult to quantify the benefits of improved health and safety measures in monetary terms. On this site this would have required in-depth work with individual contractors, which was beyond the scope of the research. However, it is likely that better health and safety management practice, implemented as a result of their time on the Park/Village (and reinforced by the work of the Park/Village Health occupational hygienists), will benefit contractors (e.g. through reduced absence, administration), individuals (who will enjoy better health and spend less time off sick) and society at large (due to savings made in NHS costs, insurance and social security payments).

The time-saved data is reliant on having accurate estimates of off-site treatment times. There is likely to be a degree of error in the estimates used, as some off-site treatments may take more or less time than has been set out in the calculations. Similarly, the calculations on treatment times assume that each treatment is a one-off event whereas actually more than one treatment or assessment could occur during a single off-site visit (e.g. audiometry and lung function could be tested by the same clinician during one trip off site). The time-saved data therefore is not precise, but is based on the best available estimates which were also used in making the same calculations for the OH service used to support the construction of Heathrow's Terminal 5 (T5).

8.3 CONTRACTOR VIEW ON COSTS

This research did not set out to measure the costs incurred by individual contractors in making changes to their working practices in line with the requirements placed on them by ODA whilst working on the site. However, during the case studies, some contractors did discuss this issue.

Whilst all the organisations interviewed understood and accepted the importance of health and safety, some admitted that there had been costs associated with the significantly higher emphasis placed on health and safety on this project. However, as one site manager stated '*if it helps to save someone's life, then it is worth it'*.

Some examples of additional costs were:

- the purchase of newer, more expensive PPE
- the provision of more health and safety training
- slower procedures introduced over faster, more hazardous alternatives
- the use of safer materials identified as part of the design process which could cost more.

There were mixed views, however, about how great a cost was involved.

> *'Working in terms of looking at the whole health and safety delivery of the project, yes of course, quite often doing it safely was doing it more expensively. So there were aspects when we said we are going to do it more safely and that will incur costs, but that wasn't really ever the driving issue in terms of making the decision on whether something was going to be done safely or less safely.'* (Construction Manager; Tier 1)

> *'A lot more. A serious amount. If something needs to be done, like courses, you're told to do it. You're on the course, you could lose your workforce for five to six hours. The machines can be standing waiting and you don't get any time added on for it, so you have to work twice as hard for the rest of the day to try and get it back. That's the one serious disadvantage of [focus on health and safety].*' (Project Manager; Tier 1)

In general, however, organisations tended to agree that, in the long term, the services offered by Park/Village Health would result in time and cost savings for their organisation. It was felt that, as Park/Village Health responded quickly to any tasks which they were asked to carry out (such as monitoring) and produced easily comprehensible reports free of charge, their input resulted in savings.

> *'If we do need a specific monitoring out on site, you're talking about a couple of days to get somebody to come in and then you have to pay for it. I emailed Park Health yesterday or maybe this morning and he's already replied saying he is coming in tomorrow, whereas you'd have to wait for that in the outside world, wouldn't you? For me that is very quick and can be done as and when really.'* (Health and Safety Adviser; Tier 1)

In addition to this, Park/Village Health also offered valuable free health and safety awareness training which saved contractors money and allowed them to respond quickly to emerging issues on the site.

> *'It's been good because the occupational nurses are right there. If we do need someone to come and do an awareness briefing or talk or give advice, then a person will come in a few days. If we had to go through our own OH provider, then it could be weeks or months before we see them and that's costing us money. And given how fast the programme moves on in this job, we may miss that opportunity … Time and money has been saved.'* (Health and Safety Manager; Tier 1)

8.4 GENERAL CBA METHODOLOGY

Conducting a robust CBA requires all relevant costs and benefits to be taken into account. This can be achieved through the following three stages:

- defining the counterfactual, i.e. identifying the outcome that would have prevailed had the programme not been implemented
- identifying all relevant costs and benefits
- measuring these costs and benefits and estimating net benefits (i.e. benefits minus costs).

In this case we have operated with limitations at all three stages and a number of assumptions have been made to allow the analysis to proceed.

8.4.1 Defining the counterfactual

It is necessary to define the counterfactual to identify the added value of any programme. In this case the relevant counterfactual is what outcome would have occurred if Park/Village Health had not been implemented. Once a counterfactual has been identified, it is then possible to compare it with what is observed in relation to the provision of the Park/Village Health service.

In order to define the counterfactual, an estimate has been made of the amount of time it would have taken to offer the same services off site that were offered on site through Park/Village Health. The time taken to offer services off site is assumed to be longer due to the travel time involved.

Ideally, similar information on counterfactual costs would be available, i.e. how much would have been spent on providing the off-site services (e.g. through NHS provision or the services of other OH providers). That would help us understand whether the Park/Village Health costs are 'additional' (over and above what is typically spent by contractors/individuals/government). This would require a detailed analysis of the costs of

different types of provision and a complex estimation of the types of treatments typically taken up by those working on major construction sites or bought for them by their managers. This was beyond the scope of the current research project.

8.4.2 Identifying the relevant costs and benefits

It is important to identify and take into account all the costs and benefits associated with Park/Village Health.

Costs

The costs of providing the Park/Village Health service fell mainly on ODA (although the specifications issued by the ODA stated that such a service would be provided, and it may be that bidding contractors reduced their own cost estimates according to the investment in on-site health services they may otherwise have contracted). They arose because ODA paid for the OH facilities and staff on the Park and Village. In addition, employers will have incurred costs because contractors working on the site needed to invest in ensuring that their health and safety procedures met ODA standards. As stated, these costs have not been estimated by this research.

The costs to ODA of providing Park/Village Health included:

- the costs of all clinical staff involved in running the two healthcare facilities
- the costs of setting up and equipping the two healthcare facilities
- the costs involved in analysing drug and alcohol tests
- ODA contract management
- the provision of an on-site emergency response vehicle
- annual IT costs
- the costs of occupational hygienist time and equipment.

As the benefits of the service have been calculated solely on basis of reduced treatment times due to the certain aspects of the clinical service, the costs of occupational hygienists and their equipment have been excluded from the calculations.

The costs of providing the elements for which the benefits have been calculated have not been separated out from the costs of providing additional service elements. Thus the calculations focus on the benefits of only certain aspects of the clinical service (i.e. those which employers are legally obliged to offer) whilst using the costs of this **and** other additional features (e.g. health checks, well-being initiatives).

Benefits

The main **measurable** benefits of Park/Village Health are the reduced treatment times involved in providing an on-site healthcare facility when compared to the time taken to treat off site.

This calculation assumes that, in the absence of Park/Village Health, all the treatments offered by the Park/Village Health services would have happened off site. The focus of the core cost benefit is therefore on the treatment service and health surveillance conducted by the OH team. These aspects of provision are those which we believe it is most likely employers would offer to meet their legal obligations. In this way, we have attempted to

make the model more scalable to other sites where the wider range of good practice may not be implemented.

8.4.3 Measuring the costs and benefits

After all costs and benefits are identified, they need to be expressed in the same units, preferably in monetary terms, to allow the net benefits of the programme to be calculated.

Costs

The costs of provision are straight forward to measure and were all expressed in monetary terms. ODA data describes how much was spent in the provision of the services. The total amount spent on Park/Village Health was £6.3 million. Of this, £1.1 million was allocated to the occupational hygiene team and has not been included in the calculations for the reasons discussed. The costs used in this analysis therefore relate solely the provision of the clinical services, which was £5.2 million.

It was not possible to allocate these costs to different aspects of the service as the clinical staff worked on a range of tasks on any given day, and some services would be combined with others. So, for example, they may be offering treatments alongside health checks or health surveillance. The costs of the whole clinical service are therefore used in all calculations, even though not all services are included in the benefits.

Benefits

The basis for calculating the benefits of the service is the actual time logged, by systems within the Park and Village healthcare centres, of the time workers spent in the centres receiving support from the clinical team. This includes waiting and treatment times and represents an accurate record. These times have then been compared with the estimated time taken to offer the same treatment, or other service, off site. A full overview of the recorded on-site treatment times and estimates of how long it would take (including travel and treatment) to offer these same services off site are provided as Appendix 8.

The Park/Village Health services were extensive, and the cost benefit presented here focuses on two main areas of provision, namely:

1. The time saved by offering treatments on site which would have otherwise been offered by a GP or hospital: this aspect of the service was calculated to have saved 67,940 hours compared to the time taken for operatives to travel off site and receive the same treatments. (Treatments are those service elements provided for injuries or health conditions which have been identified due to on-site incidents or detection by OH staff.)

2. The time saved by offering health surveillance on site rather than off site: offering these tests in an on-site location is estimated to have saved 67,572 hours.

These categories therefore constitute aspects of the service that contractors would be legally obliged to provide for their workers in some form. The basis of the estimates of off-site treatment times is work conducted on the construction of Heathrow Terminal 5 (T5), which also conducted a CBA of its own OH service. This forms the basis of the hours saved used in the cost–benefit assessment. The number of hours spent in relation to injuries is bound to vary with the size of the workplace and how hazardous the environment is. It is therefore difficult to directly compare different sites. The data used here therefore illustrates how things can differ by site, and provides only a basic comparator.

In addition, the OH team provided a range of other services as described throughout this report (e.g. fitness to work tests, health checks and drug and alcohol testing). These also saved time, compared to receiving the same services off site, but some represent elements of good practice that go beyond current legislative requirements. These savings have therefore been treated separately from those associated with treatments. A further 379,813 hours are estimated to have been saved compared to offering the same checks and services off site. Estimates of the time saved for these additional services have been specifically constructed for this research. These additional hours saved have not been included in the main cost benefit estimates.

The benefits of the programme are therefore expressed in non-monetary terms (e.g. a reduced number of hours spent by workers receiving clinical interventions) and a monetary value has to be placed on this. We have produced two separate estimates of the costs or value of a man hour on the site. The first of these is the average hourly wages cost of workers on the site, as spent by employers (i.e. employer hourly wage payments made by employers rather than the hourly wage received by workers). A second way of looking at hourly costs is to consider the hourly production costs/benefits of the site. This takes a broader view of the costs of a man hour lost to medical treatment, as it focuses on the cost of completing the work, the value-added benefit of the worker's availability to carry out that work and how this breaks down by the average hours worked.

In summary, we have conducted two calculations which quantify the benefits of Park/Village Health differently, and which produce very different estimates of benefits:

- Converting hours saved into hourly wages saved. We have used a £35 per hour rate for this calculation as suggested by the ODA..
- Converting hours saved into hourly production costs saved, that is the benefit of having the worker present for the hour otherwise lost and the average value of the production achieved in that hour by ODA[1], with a range for this of between £60 and £80 per hour. In our calculations we have used the central £70 an hour estimate.

8.5 COST–BENEFIT ANALYSIS

In this final section, the estimates of the benefits of offering Park/Village Health clinical services and the costs of providing the service are used to calculate the net benefits of Park/Village Health clinical services. These are limited to certain aspects of the services provided (as described earlier), namely the time saved by offering treatments and statutory health surveillance on rather than off site.

The net benefits of the treatment service are negative and are likely to lie somewhere between £400,000 and £2.8 million net loss. When the health surveillance is factored in, the results remain negative when hourly wage costs are used, but result in a net benefit of £4.8 million using production costs.

These figures take no account of the additional benefits of the other services offered by the clinical team within this budget. The costs of the health checks, ambulance service, drug and alcohol testing and all the other clinical inputs – a total of 17,734 hours contact time with workers on the site – are all included in the costs, whereas the monetary benefits of the

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[1] *The calculation for lost productivity is based on an internal study undertaken by the ODA's Delivery Partner which identified that, on average, a worker produces £100,000 per year of value in built assets. The range provided for value/productivity per man hour on this basis was £60 to £80. We have taken the central estimate of £70 per hour for use in our calculations*

estimated 380,000 hours saved by offering other clinical services on site are not. Operating the treatment and health surveillance service can therefore be seen as (almost or completely) paying for all these other services as well. Section 8.5.3 provides a discussion of the potential benefits of the whole service.

8.5.1 Benefits of the treatment service and health surveillance

Taking the estimated benefits of all services provided by the clinical team,[1] we can provide two estimates of the monetary benefits of providing the service. Both the costs and the benefits involved are associated with the two years of service delivery. The costs include all those associated with running the clinical services for this period (including set-up, ongoing and one-off costs), and the benefits apply only to this two-year period also.

The first takes the hourly wage estimates (of £35 per hour) and suggests that the net benefits of providing the service are:

Calculation 1: CBA analysis of savings from all clinical services using average hourly wage estimates

CBA	Treatment service only	Statutory health surveillance only	Both treatment and surveillance
Costs £	5.2 million	5.2 million	5.2 million
Benefits of treatment service £	2.4 million	2.4 million	4.8 million
Net benefits of treatment service £	-2.8 million	-2.8 million	-0.4 million

Source: IES analysis of Park/Village Health data

The second uses the estimate of £70 per hour production costs and value of an average hour's work for the site and sees net benefits of:

Calculation 2: CBA analysis of savings from all clinical services using average hourly production cost estimates

CBA	Treatment service only	Statutory health surveillance only	Both treatment and surveillance
Costs £	5.2 million	5.2 million	5.2 million
Benefits of treatment service £	4.8 million	4.7 million	9.5 million
Net benefits of treatment service £	- 0.4 million	-0.5 million	4.3 million

Source: IES analysis of Park/Village Health data

Using wage data alone is likely to underestimate the potential costs to an employer. Even when people are not at work (e.g. off sick), timescales must be met and employers have to

[1] *Excluding off-site referrals*

make up production costs and keep running to meet deadlines. Construction employers are likely to need some additional resources to help cover any missing workers, and these additional staff require training, induction and equipment. Where the tasks are highly skilled (e.g. some aspects of the Olympic build), these costs are likely to be higher as it is less likely that individuals can easily be covered by other workers. However, contractors may also build in additional costs to cover such issues in their quotes to clients. Using production costs is therefore likely to overestimate the benefits. Ultimately, however, workers are employed on site not to cover their wage costs but to carry out value-adding, productive work, and estimating the hourly value of this is an appropriate approach to a CBA.

The actual benefits of the programme are therefore likely to lie somewhere between the estimate based on wage costs and that based on production costs.

In order to make this calculation more meaningful for different employers, for every pound invested by the ODA in the OH service, they experienced a return of 92p on reduced wages, and £1.82 in reduced production costs from the treatment and health surveillance elements alone.[1]

8.5.2 Sensitivity analysis

It is also good practice to examine how sensitive the results of the CBA are to changes in assumptions/underlying estimates. While some elements of the analysis can be measured directly (e.g. costs of the Park/Village Health clinical services), other elements involve estimations (i.e. off-site treatment times and hourly wage and production costs) or assumptions (i.e. that all treatments and health assessments would have taken place in the absence of the Park/Village Health facility). It is therefore necessary to assess how the results would change with changes to these parameters.

Changes to the monetary value of hours saved

The main areas where the estimates could be different are:

- the number of hours saved (for the treatment service and statutory health surveillance)
- the monetary value attached to these hours saved, resulting in revised estimates.

If there was a +/- 10 per cent change in the hours saved or the hourly wage/production cost estimate used, this would provide a range between a net loss of £1.0 million and a net benefit of £5.2 million.

8.5.3 Benefits of the whole service

Although not included in the main cost–benefit analysis, further exploratory work was conducted to estimate the potential economic benefits of the whole Park/Village Health service (i.e. including service elements such as well-being programmes, general health checks, an ambulance service etc as well as the legally required elements of the treatment service and health surveillance – see Chapter 6 for a full description of these services). This demonstrated that the net benefits for ODA of being able to offer all the services they did on, rather than off site, was considerable. Based on wage costs the net benefits were around

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[1] *Using the simple formula: Return on Investment = amount of financial gain/ total investment amount. This formula is useful when calculating an uncomplicated figure for investments over the short term (here we are looking at benefits only over the course of the build and not beyond)*

£12.8 million and based on production costs £30.9 million (Appendix 9 provides the calculations used to arrive at these estimates).

Clearly these estimates are based on the broad assumption that, in the absence of Park/Village Health, ODA would not be able to offer any of these services on site. They also assume that, in the absence of Park/Village Health, all the services would still have been provided, which is by no means guaranteed. They are therefore likely to overestimate the benefits.

Adjusting for this, further calculations were made of different levels of service use. These revealed that service use (or service use on as opposed to off site) would have to be only a third of that actually measured for the service to break even on wage costs. This level of usage/service provision would still have resulted in substantial economic benefits (of around £5m) if production costs were used.

ODA were committed to providing workers with a comprehensive OH facility, and one that would create a positive OH culture and promote improved health behaviours both now and in the future. This demonstrates that, for this client, in these circumstances, there were substantial economic benefits of having this facility on site.

A simple return on investment calculation for these figures show that (if we assume all services would have been provided off-site in the same way that they were on site) for every one pound invested by the ODA the return was £3.46 in reduced wages and £5.96 in reduced production costs. Even if the ODA were less likely to offer the same services using off-site provision, the returns remain relatively high. Assuming that only a third of the services would have been offered off-site as were actually provided on-site, an investment of one pound still results in a return of £1.02 on wages and £2.02 on production costs.

8.6 COMPARISON WITH OTHER CBA DATA

The only available comparator for this work was the CBA conducted on T5. This focused solely on the benefits accruing from clinical treatments. The calculations took no account of the range of other services offered (e.g. statutory health surveillance). The number of hours spent providing such treatments on the Park and Village was much less than that provided on T5. This reflects the very low accident and occupational ill-health rate for the site. It also only used an estimate of hourly wages, rather than considering the full production costs. The two services were also very different, with the Park/Village Health teams offering a broader range of other clinical services.

Making a direct comparison of the two sites, which as discussed has its limitations, reveals that the net benefits of offering a treatment service alone on the Park/Village were less than on T5. The net benefit in terms of time saved by the treatment service on T5 was estimated to be £269,000. The same calculation made for the Park/Village treatment service suggests a net benefit of -£2.8 million.

These results demonstrate the importance of calculating what types of clinical services are required for each site. For some clients or high-profile projects, a state-of the-art facility will have advantages, whereas on others a more restricted facility may be all that is required.

8.7 DISCUSSION OF RESULTS

The cost benefit calculations made here have a number of limitations, as discussed earlier, and are based on a number of broad assumptions. These include:

- a restricted view of benefits, only the hours saved by using on rather than off-site treatments can be included. Thus any longer term benefits to the employer, individual or economy of reduced ill-health due to early intervention are not included
- the costs and benefits of the occupational hygiene team's work has not been included
- cost estimates are for the whole of the clinical service, whilst benefits are calculated only for those service elements that employers are legally obliged to provide. The actual benefits to the ODA in this case, who were committed to offering a comprehensive OH service, of having the services they wanted available from an in-house team will be much higher than discussed here
- the counterfactual position is based on the assumption that all treatments and health surveillance activity would have taken place in the absence of the Park/Village Health service and/or that it would have taken place off-site
- assumptions about the wage levels and production costs involved, which are averages only and subject to inaccuracies

If all the costs and benefits were fully moneterised, the estimates presented here would be very different.

Whilst the treatment service alone results in a net loss, this element of the service constituted only 13 per cent of the total contact time with workers by the clinical staff. It does, however, cover the costs of up to 92 per cent of the service provided (when production costs are used). When the benefits of statutory health surveillance are also included, these two elements of the service more than pay for themselves and all the other services offered and in fact have significant additional economic benefits when production costs are used), when compared to what it would cost to rely solely on off-site provision.

There are clearly deficiencies in this analysis, due to a lack of available data. We would recommend that further research work takes place across other construction sites which attempts to rectify this. Further research will require better data recording amongst both OH providers and contractors and that this data is shared. On the Olympic build it would have been useful to estimate the benefits of the work of the occupational hygiene team. Additional research would be also useful on smaller projects to investigate the scalability of these benefits.

What our analysis does demonstrate is that there can be economic benefits to running an on site clinical OH service on a major construction project, and this has already been demonstrated by work on T5. In deciding what level of OH provision is appropriate for them, contractors and clients of other projects clearly need to consider at what point the service would break even. Also, whether by providing such a service, the costs of additional facilities which combat broader workplace health issues can be offset. This will depend on a range of factors including the size of the workforce. In this case, the benefits of the treatment service and health surveillance were sufficient to cover (or help cover, depending on whether wage or production costs are used in the calculations) the costs of a large amount of additional, good practice, OH activity.

9 LIKELY LEGACY

This chapter examines the potential OH legacy which could be attained by Park/Village Health and the Olympic build. It draws on the views of contractors working on the site, HSE inspectors who had visited the site, individuals attending the master classes and external stakeholders with an interest in OH, particularly within the construction industry. The aim was to explore areas where changes have been occurring within the construction industry and to place the work done on the Park and Village within this broader context.

9.1 SETTING A STANDARD OF EXCELLENCE

The consensus amongst stakeholders was that the facilities offered by Park/Village Health were impressive and superior to those offered even on other large construction sites. One master class participant commented that, for the construction industry, Park/Village Health offered '*absolutely best practice and probably beyond that*'. Another major construction company also stated that they viewed Park/Village Health as the *'blueprint of excellence'* for OH in the construction industry.

A number of different aspects of the facilities were highlighted by stakeholders as contributing to these high standards.

9.1.1 Having on-site facilities

The ability to offer on-site services was seen as valuable, and links were made between having the ability to treat and test workers on site and potential time and resource savings for both contractors and the workforce. One HSE inspector emphasised the importance of having an on-site physician as part of the service. One interviewee commented that '*by dealing with casualties on site, this would divert the need for the London Ambulance Service and prevent the worker from having to go off site to the A&E department where it will take a considerably longer time to be treated*'. Similarly, offering drug and alcohol services on site was seen as valuable, tackling an issue that the construction industry was only '*beginning to get to grips with*'. The master class attendees generally hoped that the provisions of Park/Village Health would be recognised by the industry, seen as good practice and incorporated into future major projects such as Crossrail.

9.1.2 A more proactive and preventative approach

One of the main differences seen between the OH service provided by Park/Village Health and others in construction was that it was client-sponsored, with the aim of encouraging contractors to implement good practice in OH management. The vision for the service was therefore that it would take a proactive approach to engaging with contractors. The inclusion of occupational hygienists in the core Park/Village Health team was specifically implemented with the aim of managing OH through prevention.

The outreach and engagement work conducted by Park/Village Health throughout their time on site met a number of different aims. The work conducted in compiling the Health Impact Index, for example, was a useful way to provide workers with information, arguably as useful as taking a course. Similarly, the well-being work allowed the Park/Village Health team to chat to workers about OH issues whilst they waited to participate in 'fun' activities. Having a holistic approach to health on site, where the worker, workplace and well-being were all prioritised, allowed the team a great deal of flexibility in how they went about their

work and gave them a greater presence on site than if they had undertaken any one activity in isolation.

A number of stakeholders expressed the view that the presence of Park Health around the site, actively engaging with the workforce, represented a valuable approach and one which was different from normal industry practice, where professionals tended to be at the end of a phone. Master class attendees were also positive about the fact that Park/Village Health actively took its services out around the site so that OH staff were visible to workers.

> *'A proactive occupational health service is the main lesson to take from this site as it helped to get the hearts and the minds of the workers, to work and act safely in and out of work.'* (Master class attendee)

Another important difference identified between the approach on the Park and Village and other building projects was the preventative element of the services provided by the occupational hygienists. A number of master class participants commented that they were pleased (some surprised) that Park/Village Health were focusing on the preventative aspects of OH and employing occupational hygienists to go out into the field, undertake OH risk assessments, conduct monitoring and provide advice and briefings for managers, designers and workers. By engaging the workforce in this manner, one interviewee claimed that it would '*help to improve the workers' lives without impacting on their productivity*'. A number of the stakeholders also appreciated the fact that Park Health worked with employees to help them get back into work and reduce the long-term sickness absence levels in order to keep them within the construction industry.

9.1.3 An accessible and welcoming service

In a number of case study interviews, managers expressed some surprise that Park/Village Health had been so successful in engaging with workers and attributed this to accessibility and speed of access to facilities. One master class participant commented on this issue that '*the men care about themselves more than we realise; once you provide the facility, they want it*'. In particular, the central locality of Park/Village Health and its modern, clean appearance was felt to make it both appealing and easily accessible for workers. It was suggested that such facilities would help to encourage workers normally unwilling to see a medical professional to come forward for treatment.

Worker reluctance to use OH services was seen by some master class attendees as one of the main barriers to the successful implementation of OH initiatives, although more workers are beginning to realise the importance of safeguarding their health. A number of the master class attendees interviewed commented on some of the innovative ways in which Park/Village Health had tried to engage the workforce fully with their services (e.g. visiting workers in site canteens at lunchtime) and on their ability to talk informally to workers about their health. One master class participant stated that workers would find it easier to approach a person and discuss health issues if they were '*out on site wearing high vis, hard hat and boots rather than in a medical building with a white coat and a stethoscope*'. Similarly, the well-being activities undertaken on site were a successful way to engage workers, with the result that they felt more comfortable and familiar using Park/Village Health services for workplace health issues. The Park Health team in fact felt that this aspect of their work had been crucial and this was picked up by a number of stakeholders.

> *'I think it's that [Park Health] was available to all men, all women who worked on the site, irrespective of how long they worked for. I think it was their approach to the programme of making these men feel they were important, that health mattered; they were going to help them stay in work, not to say that "because you've got X you can't do this". Because these*

men are usually on daily rates, so they're not going to go to any health provision that's going to take them out of work.' (National Director for Health and Work)

Managers interviewed in the case studies remarked on how genuinely enthusiastic, approachable and knowledgeable the Park/Village Health staff were and how this in turn encouraged workers to contribute to conversations and feel like they were having a say in how health and safety was managed on the site.

9.2 CHANGING ATTITUDES TOWARDS OH

Stakeholders and case study participants identified changed managerial and worker attitudes – another area where the work conducted on OH on the Park and Village could potentially impact in the future.

9.2.1 Managerial attitudes

A number of people interviewed during the case studies, as well as HSE inspectors, believed that the positive messages about OH that had been fostered on the Park and Village would be passed on throughout the industry. This was due to the major contractors working on the Olympic build being likely to take forward higher OH standards to future projects and in their work with sub-contractors. Case study interviews showed that most contractors had positively engaged with Park/Village Health and as a result of this, and sharing good practice with others working on the site, had already increased their focus on OH at a company level.

HSE inspectors who had visited the site were also positive about the way that contractors were getting involved in OH management. Employer attitudes were being changed, in their opinion, because the positive changes that had taken place on the site (whether due to Park/Village Health, DP or ODA interventions) made economic sense. This was evident from a number of larger companies who were keen to promote their new OH initiatives such as 'Beyond Zero' and 'Always Safely'. These aim to raise the standard of health and safety by looking at the preventative aspects of OH and engaging the workforce in these initiatives.

'I think that the smaller contractors come on to big sites and they see standards that could be improved with a little bit more thought or a little bit more money. And I think the important thing is when you get people involved, like they have here, you get people involved in making decisions and in using new techniques and new tools… I see the behavioural changes occurring when people actually see what's in it for them, that there is a benefit to them rather than just you should do this because somebody might get hurt. That usually doesn't work.' (HSE Inspector)

'I think it really is about getting people involved in thinking about why they're doing things and how they could be doing them better – in a non-confrontational way, and just letting them see the benefits of that… In my experience that's what's really changed people's minds.' (HSE Inspector)

It was also encouraging that interviews with master class participants and external stakeholders highlighted that they were already trying to improve OH performance within their own companies. Attending the master class or receiving input from the Olympic project in other ways helped them to generate ideas on how to implement improvements. Stakeholders also tended to agree that employer attitudes towards OH were improving and that helping them to realise that good health management would enable them to stay ahead of their rivals in a competitive industry was an important factor in this. However, strong and influential champions at senior levels who promote messages about the importance of good OH management from within organisations were felt to be necessary to effect real changes at a company or industry level.

A stakeholder from a large union expressed the view that contractors would be unlikely to change their attitudes towards OH or to integrate health management into day-to-day work without some form of assurance process. Whilst ODA and DP provided this on the Olympic site, his view was that some other mechanism (e.g. independent specialist health and safety representatives on each site who are protected in their role by law and independent worker councils) would be necessary on future projects.

9.2.2 Worker attitudes

A number of stakeholders felt that, in general, construction workers tend not to place a great emphasis on their health. The often nomadic nature of workers, who often move around from site to site around different areas of the country, or even between different countries, means that registering with GPs can be difficult, as can securing access to any kind of consistent healthcare. A service such as Park Health, which was available to all workers and attempted to empower and educate rather than lecture to them, was therefore helpful in changing worker attitudes and helping them to see the benefit of often relatively small lifestyle changes. In turn, these changes can also be linked to workers extending their working lives, with resulting economic benefits.

A representative from a large union felt that it was particularly important to educate workers in the current economic climate as '*the status of the construction industry is not what it used to be and many of the workers do not hold themselves in high esteem or view themselves as a qualified professional*'. His view was that only if workers were encouraged to respect themselves professionally would they begin to raise their expectations about their own health and well-being and expect a certain standard of facilities on the sites that they work on. There was felt to be a sense of pride about working on the Park which was fostered by ODA (e.g. Olympic badges given out as rewards and bird's-eye view pictures of the Park which the workers have built) and that this added to the culture of caring and respect fostered on the site. Comments were also made by contractors that they believed that their workers were likely to take away good practice with them to other jobs.

A number of construction stakeholders highlighted the importance of having senior leadership buy-in when trying to engage workers in health and safety initiatives. Their view was that when workers finally believed that the senior leaders cared about their health and safety they were more likely to come forward with issues.

> *'The behavioural safety workshops, the three hour workshops that we did with everybody working on the stadium, have been a great way of actually getting these people to believe that safety was first on this project, and that you didn't walk by anything. If you actually stopped and acted on a particular incident, that's where we got the buy-in, we really did get the buy-in from them. They knew and they believed – and I would say a good 95 per cent of them working on the stadium believed – that we did care and that we would act on any concern they'd got.'* (Health and Safety Manager – large construction company)

> *'I think the workforce do appreciate it where you offer good facilities. And if you can convince them that you care about their health and their well-being I think that is appreciated.'* (Group Health and Safety Director – large construction company)

A number of stakeholders raised the importance of early training and education within the industry. If a new generation of workers can be taught the importance of health awareness at college, and gain experience of this in action when working on large projects such as the Park, this should help to ensure the future workforce are better equipped to contribute to good OH management.

9.3 USING OH DURING THE DESIGN ASPECTS OF A PROJECT

One of the original aims for the Olympic build was that risks would be tackled at design stage. However, finding a way to influence this has been particularly challenging for Park/Village Health. Their view, and that of a number of contractors interviewed, was that designers and CDMCs tend not to have received adequate training on OH issues and are therefore unable or unwilling to consider such issues as a part of their work. A number of case study interviewees remarked on how the initial design of their project showed little consideration for how the workers would be able to construct it in a safe manner.

> *'I don't know whether at this particular stage in this industry the designers are fully aware about designing risks out, and I think that will take still a while because they're not trained professionals to deal with eliminating all the risks without getting professional advice.'* (Construction Manager)

One HSE inspector, whilst positive about the potential effects of the Olympic build on the construction industry in general, had concerns about how much had really been achieved in changing attitudes at the design stage.

> *'During their on site works one of the contractors identified a number of individual health risks that they were then able to effectively manage by tapping into the on site occupational health resource. … Hopefully they'll take that specific knowledge away with them and think to ask the question on the next job; but as to whether this input will lead to future early identification and designing out of the health hazards from the very start – I'm not so sure.'* (HSE Inspector)

Although Park/Village Health were able to offer some support to companies, it was felt that they needed to have been involved at a much earlier stage of the design process to make sure that health and safety was taken into account. One health and safety adviser stated that this was something her organisation was looking to take forward on future projects, to ensure that they work with designers from the beginning. The Park/Village Health team have been working with Crossrail in an attempt to achieve this on that project; Example 5 in Appendix 7 provides more details.

Another part of the design process that does not always take into account the health and safety aspect was that of the raw materials used on a project. Some case study participants highlighted the fact that the HS&E impact of raw materials used in construction processes is not always adequately considered. Park/Village Health was felt to have been more successful at educating contractors and designers about the use of different raw materials on the project, suggesting alternative materials which have a less detrimental impact to the health of the workers and the environment. It was hoped that the good practices established by them on the Olympic build could be taken forward into the wider construction industry.

From interviews conducted with the master class attendees it was clear that the Olympic build has helped to reinforce trends within the construction industry for improved OH management, and in some cases improve them.

> *'Development of Terminal 5 was seen as a centre of excellence at the time; now the Olympic site has surpassed that.'* (Master class attendee)

> *'It is inevitable that the good experience here will spread throughout the industry, led by those who worked on the Olympic project … If nothing else, the workers are going to expect it on their next jobs. And if the contractors see that it pays dividends then it might become standard practice.'* (Master class attendee)

9.4 POTENTIAL BARRIERS TO CHANGE

Whilst there were a lot of positive views about how the industry was changing, interviewees were also able to identify some of the barriers they felt could stand in the way of progress and establishing a solid legacy from the Olympic build.

9.4.1 Achieving sustained attitude and behaviour change

In order to fully embed OH management in the day-to-day work of contractors and their workforce, it was important that worker and manager attitudes towards OH change. The view from a number of those interviewed was that worker attitudes towards, and interest in, health and safety needs to be maintained with constant pressure. Whilst on the Park, the health and safety messages are very clear and prominent, whereas on other projects this is not always the case. It was therefore important for employers to engage workers and help them to maintain this interest. However, the extent to which this happens elsewhere in the industry is uncertain. Workers also felt that for the health and safety messages to be continued, it was important to have the full support of the managers working on the project. If they do not engage with the messages, it is likely that the legacy will not continue.

> *'There has started to become a culture, but people come on to site and I think at first it is like they are unsure about it and then after a few weeks or a month or whatever everyone starts getting accustomed to the whole health side of things. It is slowly becoming culture, especially on the Park, but yeah I mean it depends if it carries on after they go on to jobs off the Park. You know because while you are here and it is in your face, it's easy to keep it going but as soon as you go off it that is when it is going to be hard to maintain.'* (Worker)

> *'It depends on the managers and whether they want to take that attitude with them. You know if your manager is that way inclined and he is telling you "this is how it is and its best that you do this", then that's no problem, but if your manager leaves here and thinks "I haven't got to do that any more", then the guys are going to revert back to before they came to the Park.'* (Worker)

A number of the stakeholders interviewed also felt that more work needed to be done within the construction industry to educate employers on the health and well-being of their workers. Many companies understand the need to keep their workers safe and will successfully tackle these issues; however, they find it more difficult to understand the OH aspects and how to protect their operatives from these issues. OH risks are also often less visible than safety risks. However, there was a view that achieving change in attitudes towards health risks was possible, particularly if it could be linked to the improvements already underway on safety culture.

> *'I think there's still an awful lot of work to be done in the construction industry to get them to understand that looking after the health and well-being of their men is not just a safety issue, but it is an issue about productivity and quality of product. And I think the men at the top of the big ones will say "we look after our staff". What they mean is "we look after the staff in the office". What they don't mean is "we look after, if you like, the more difficult end of this".'* (National Director for Health and Work)

> *'There's no reason why the legacy of what goes on at the Olympic site cannot be shared on your typical major building project – whether it's building a new hospital, some major road works or whatever. There is no reason why what we've achieved on improving the safety culture on those major projects cannot be extrapolated to securing better health improvements as well.'* (HSE Inspector)

9.4.2 Economic pressures

In the current economic climate cost was seen to be a major factor in preventing contractors from providing high standards of OH facilities on every large project. ODA as the client sponsored the OH provision on site, but this will not be the case for all large projects. It is therefore important to educate future clients on the benefits of good OH management so that they consider funding provisions themselves, either fully or partially, and/or ask contractors to consider in their tender how they will offer their workers good OH provision. A number of case study interviews also suggested that it can be clients that place contractors under economic pressure and that the clients have no interest in OH issues. Developing a strong business case to take to these clients was felt to be necessary; if this could be achieved from the Olympic build, it would be a real benefit. The view was that good practice does not always have to cost more.

> *'Some of our members have got significant-sized clients that have said, "We very much like the work that you do for us but we can't afford your health and safety". And they've lost out on work based on that from significant clients.'* (Representative of UK construction organisation)

> *'There's still too many employers out there who just see [health and safety] as a burden. They see health and safety as something they do because they have to, rather than realising that this is really positive. They can help their profit margins and productivity because they've got a happier, healthy workforce, a very healthy reporting culture – but they don't see that. The industry's got too many of those people.'* (Health and Safety Manager; Tier 1)

> *'There's not necessarily an overall cost involved . If you're designing out the production of the dust in the first place you're reducing the need for labourers to run around cleaning up the dust. If you can impart an understanding that there are not just moral but also financial incentives from improving health, then people are more likely to buy into it.'* (HSE Inspector 2)

There was a feeling that some employers will do what they feel is needed to get work, by providing documents and policies that suggest excellence in health and safety, without having any actual commitment to these values. Instead, it is economic pressures that drive their behaviour. As such, companies may not really believe in the business case for improving health and safety, but do accept that it is important to at least appear to be taking it seriously in order to win work.

> *'All decisions are driven by how much it's costing and there is not even one clue at this stage when it's finally decided what about health and safety … The health and safety is something in the early stages to present something – "We're doing this, we have this, so much hours, blah blah blah" – but at the end this is just paperwork for someone else.'* (Health and Safety Manager; sub-contractor)

> *'Unfortunately I still come across too many employers who just do not care about it. It's all about the absolute bottom line … get in there to do the job as cheaply and as quickly as possible. I still see too much of that. It's sad because they don't realise what they're missing out on. It doesn't have to cost a lot of money to set in place best practice. It's about being smart. But there's too many employers out there who just don't see that. I think that is the biggest barrier.'* (Health and Safety Manager; Tier 1)

Another issue for some companies was a lack of management commitment to making improvements in this area, due to concerns about, and availability of, time and resources, particularly on smaller projects. Again, there is a need for better cost–benefit information to help convince contractors that there are benefits of good OH management and that the costs do not have to be prohibitive.

'Some employers can see added value in long-term investment to improve health management, whereas others look at the immediate costs. Some employers see a cost with no immediate benefit so will not pay, the more aware ones will see that they will reap benefits in the future, but this is not common.' (Master class attendee)

For some companies the issue is not whether or not there are available resources to invest in OH, but how best to invest what is available in order to get the best returns. If the industry can become an intelligent buyer of OH services, purchasing a service which is appropriate for their needs, then it is easier to change things in the longer term. There needs to be some acknowledgement that buying a standard service, such as relying solely on an on-site nurse, is not the most appropriate strategy. What the Olympic project has demonstrated is that other aspects of OH services can be just as important in achieving high standards. If future clients adopt an approach where they create on-site standards and ensure that contractors comply with these, then contractors are more likely to seek out professional support that will actually help them achieve these standards. All of this can be achievable for less than the cost of traditional clinics.

9.4.3 Passing on lessons learned on the Park and Village

Another concern amongst stakeholders was that the Olympic build would be seen as somehow different from other major projects, and that this has the potential to limit the extent to which lessons learned would be taken up by the industry in a broader way. A number of stakeholders commented that they had worked on other large-scale projects, such as Terminal 5, Wembley and the Channel Tunnel; although good work around OH and health awareness was conducted on these sites, very little was recorded or reported to the wider construction industry, meaning that a lot of the good practice was lost. The learning legacy research programme is planning a wide dissemination of learning about health and safety management on the Park and Village.

'It's okay having this flagship project here, the Olympic, and having all these initiatives and good ideas of how to improve the life and standards of safety for everybody working in construction. It's pointless if it's not gonna be publicised and taken back out into the wider world of construction.' (Health and Safety Manager; Tier 1)

'A company will have a variety of managers and some will be good at health and safety and some won't be. If you are a sub-contractor on a site where the principal contractor is less interested in health and safety, then there is a chance that some of the impetus will be lost. I hope that these companies will sell their health and safety performance at the Olympics as part of their portfolio of skills and this may help them to roll out these practices onto other sites.' (HSE Inspector)

Some of the external stakeholders felt that although previous large projects will have set the standard of OH for future projects, there is a danger that individuals see the approaches used as only relevant for the largest projects. It is therefore important to illustrate how these standards can be scaled down for smaller projects and highlight lower-cost alternatives to achieve the same goals.

'The difficulty I think when we're talking to some of these individuals is that they see it in very much a different league. So what they see is almost a premiership football equivalent of those projects that have got the money, they've got the resources to actually do that, and don't equate that to the environment that they're operating in and struggle to actually take certain elements of that on board ... Yes it is a best-in-class service, but look at … the operation model … on the smaller projects – the bread and butter for the industry. If a model could be put together of how that would look and how that could be integrated into local NHS services, etc, that may actually give it significantly more credibility moving forward, because the perception is most often, "well, it's easy to do it on a big project".' (HS&E Practitioner)

A number of key differences between large and smaller projects were highlighted. Workers on smaller projects do not spend as much time on any one site, so that any OH team will find it harder to influence workers. Also, as there are more limited numbers of workers available, any time off to attend training or medicals is more noticeable. However, it was suggested that the lessons learned from the Olympic build could be used as a roadmap to demonstrate to employers how they can tackle OH. This map should offer suggestions about how to scale down the provision, but still achieve positive results. Such suggestions could include how to secure funding and agree who pays for what, how frequently people on site have to be released from work, how to access remote support through telephone or internet and how to engage with OH at design stage.

An additional issue was contractors needing, but not knowing where to get, the right kind of OH advice, particularly that which goes beyond well-being, healthy-living support and first aid for workers to focus on health risk management. Also, contractors often did not realise that their responsibilities go beyond health monitoring and require them to act on the results.

> *'There is a real danger that people miss the point when tackling health risks. Health risks should be approached in the same way as you deal with safety risks by looking to design out the health hazards in your workplace. Part of the answer is knowing where to go for good, competent, relevant advice in occupational health together with a co-ordinated approach to the health monitoring where residual risks remain.'* (HSE Inspector 2)

The fact that smaller contractors can be resistant to messages about OH issues and need to be encouraged with specific tailored messaging that resonates with them was also felt to limit progress. Smaller employers will see little relevance of what has happened on a large project like the Olympic build unless the messages are specifically tailored for their needs. However, the master class participants felt that the standards achieved for OH management on the Park and Village should become common practice on larger projects. There was recognition, however, that for this to occur funds need to be found, which will only happen if a robust business case can be used to justify the costs.

> *'The majority of the industry is not a big site like the Olympics or any of the big projects that we see; much of it is actually small business work that happens down your own road or round the corner. I think in terms of talking about OH provision it needs to be fit for purpose but also recognise that the average small business will not set OH provision in the same way you will do on a major building project.'* (HSE Inspector)

> *'If statistics from the Park are broadcast and people are made aware of what has been carried out, then this may help small and medium-sized projects to understand and apply some of the principles and so help to bring about wider-scale improvements within the sector.'* (Master class attendee)

Another issue was that contractors and workers often lacked any real understanding of what OH really means. One interviewee described OH as '*a bit of a dark art*' which people do not understand, find complicated and therefore avoid. There was a view, amongst both the master class attendees and HSE inspectors, that it was important that learning from the Olympic build is used to further educate and guide the construction industry. By publicising any results or data from the project, it will help to reach out to the wider industry. It was suggested that these efforts should link with industry bodies such as Constructing Better Health, Constructing Excellence and the UK Contractor Group. The sharing of good practice information between organisations was also seen as a way to encourage further change in employer and employee attitudes. This was carried out on the Park through SHELT meetings and other informal discussions and also through the master class meetings, but such co-operation is likely to be more difficult to encourage in future projects, as contractors generally work in a more competitive environment.

'If a company feels they want to dip their nib in the water and get a provider on board, if you've never done that before that might be quite daunting and they might be unaware of the qualifications they should look for in the people they're appointing and what they'll be able to do for them.' (Master class attendee)

There were also suggestions for OH providers. Some stakeholders felt that there was too much inconsistency and complexity in what OH services were available, and that breaking OH down into standard packages would make it easier for contractors to understand what was involved in providing good OH management and to make decisions about what was appropriate for them.

'So everybody knows what's in a type one package, everybody knows what's in a type two package. This would make it significantly easier and modular so that you can then bolt elements of other packages on to customise what you're actually after. If you look at the provision that's actually out there at the moment, even the terminology changes dramatically.' (HS&E Practitioner)

9.5 HSE CONTRIBUTION TO LEGACY

HSE was very interested in the legacy from the 2012 Games. As stated on their website over the course of the build (to 2011)

'For HSE, this means getting lasting benefits from the construction phase: promoting good practice; embedding this in to the culture of other projects – both large and small – and sharing and learning how to manage risks more effectively.'

HSE developed a specific strategy for working with ODA and a number of specific projects were selected for interventions. These interventions were front-end loaded at the design stage to focus on the identification and elimination of risks or to ensure that an acceptable level of risk reduction was achieved before the start of main construction work.

HSE inspectors conducted initial site visits to check basic site arrangements, then targeted higher risk work activities. Tier 1 contractors were then invited to give presentations on key risks and proposed control measures. HSE's site inspections then tested actual working practices against the systems of work agreed at the design stage. For certain specified projects intervention plans were prepared along with a targeted inspection regime. If early inspections provided confidence about the adequacy of management arrangements then HSE adopted a risk-based approach to further interventions. If not, HSE challenged senior management teams to improve their performance or face enforcement action.

HSE has a dedicated section on their website http://www.hse.gov.uk/aboutus/london-2012-games/index.htm which provides an overview of their work on the Park and Athletes Village and includes some case studies of good practice. HSE is committed to capturing and taking forward the health and safety learning legacy from the London 2012 Games and is a partner with ODA in the Learning Legacy Research Program.

One master class interviewee commented that the amount of data produced by the OH programme on the Park and Village was '*going to be huge and not one size will fit all*'. The interviewee felt that it was important that the information was presented in an easily accessible manner. HSE was seen as important in promoting the information from the Park and producing guidance to encourage employers and employees to adopt a more positive attitude towards health and safety and OH.

Additionally, client commitment to OH management was felt to be an important driver of contractor behaviour, so that public-sector commissioning could be another way to encourage contractors to embed OH within their day-to-day operations.

'I really think it needs to be from a higher level, the big clients, the big government projects they need to continue, they need to sort of pick up the baton and introduce all of the same structures and actually continue to drill this down from the top into the procurement, into the actual delivery. If we just expect the contractors to pick it up and run with it, they'll only do it in so far as the client demands it. ' (Design Manager; Tier 1)

It was felt by a number of external stakeholders interviewed that the main area which HSE need to work on is that of the sub-contractors. Whilst it was felt that the major construction companies have now improved their OH management and are introducing the correct methods to tackle OH issues, the smaller companies are still finding this very difficult. HSE could therefore have a role in developing an OH model that can be transferred and integrated into the overall system of a smaller sub-contractor.

'In my opinion HSE need to target the smaller, medium-size enterprises and leave the big guys alone. The big guys have got it about right. Yes, they need policing, they need the enforcement aspect of it, but all the major contractors have got it about right. In my opinion HSE have got to educate the smaller and medium enterprise within construction and civils.' (External stakeholder; Health and Safety Manager for a large construction company)

It was suggested that one way HSE could do this would be by examining how other industries tackle health and safety issues and trying to explore how this could apply to the construction industry and how it could be scaled to fit within a smaller company or on a smaller project.

'I personally always find it very interesting to see how other industries tackle risk issues. So if I look to think who are the leaders in health and safety and I'd look at Petrochem's and the major hazard industries, I think there's a lot that could be learned by best practice exemplars. So it is what "good" looks like and painting that picture in quite a vivid way.' (External stakeholder; Group Health and Safety Director for large construction company)

A number of the stakeholders also highlighted the important role that public-sector contracting could play by declining tenders for major construction projects where OH is not considered.

10 CONCLUSIONS AND RECOMMENDATIONS

This final chapter of the report presents the conclusions of the research, based on the evidence presented in the preceding chapters and in relation to each of the original evaluation objectives. It also goes on to draw out the implications of the research for different groups working in and with the construction industry.

10.1 CONCLUSIONS

10.1.1 Research aim 1: Did the OH intervention model and practice on site represent best practice?

The work of Park/Village Health is definitely seen as representing good practice. It is viewed as taking forward and improving the provisions offered on other major construction projects in the past. The service has also received a number of awards from external bodies, reflecting wide recognition of its achievements. The view of a range of stakeholders is that the work on the Park and Village has set a new standard for what a comprehensive OH provision can look like. This applies not only within the construction industry but also in a wider sense.

There was also a very positive response to the work of Park/Village Health from managers and workers on the site. Standards of health and safety management were generally seen as better than or as good as other sites, with the welfare facilities generally viewed as better.

The Park/Village Health service involved a number of elements which should be encouraged in the future. First and foremost the provision focused on both preventative and clinical interventions and did so using an integrated team comprised of professionals from a number of disciplines. The preventative element of the service also attempted to integrate health management into the day-to-day work of contractors by operating a 'health like safety' approach. This allowed contractors to use tools based on existing safety management approaches, with which they were familiar, and apply them to OH issues. This was seen as a very effective approach. Finally, the OH team encouraged co-operation and communication between contractors about OH issues. They managed, with the support of ODA and DP, to successfully raise the profile and understanding of OH issues amongst contractors on the site.

Park/Village Health are therefore very much seen as operating good practice. Judging whether the model, and execution of it, constitutes 'best' practice is more difficult as there is little comparative data available. What the 'best' OH service should provide is also subjective, to some extent, and depends very much on providing something which is context-appropriate. However, there is certainly agreement that the OH service on the Park and Village was one of the best that has been implemented on any major construction project in the UK to date.

10.1.2 Research aim 2: Was the model consistent with cost–benefit evidence from similar interventions elsewhere?

When discussing the legacy of the Olympic build, the view of a wide range of individuals was that developing a business case for OH provisions in construction, and more widely, was necessary to help promote improvements. This requires some form of cost–benefit assessment be conducted on the data available from the Olympic build, and from other sites. However, assessing the full benefits of any OH intervention is notoriously difficult. Partly because of this, and because of commercial concerns about sharing cost data, finding

appropriate comparative data is difficult, and robust cost–benefit assessments almost non-existent. This research has been reliant on data shared about the OH provided during the building of Heathrow's Terminal 5 as its benchmark.

Immediate benefits, such as time saved through the treatment of workers on site rather than them having to travel off site for treatment elsewhere, are generally the focus of any cost–benefit assessments of OH services, due to additional difficulties in collecting data about the benefits of preventative work. There are a number of problems with relying on this data alone to assess the benefits of OH. Firstly, this method is likely to underestimate the potential benefits whilst counting the full costs of providing the service. It also focuses solely on clinical inputs whereas the focus of work on site has been about prevention. The focus of this type of benefits assessment is also very narrow: it does not include any estimates of improved productivity associated with maintaining staff on site through improved health (and not having to cover for those who seek treatment), or through improved work practices achieved through better training and more awareness amongst the workforce.

In this research, a cost–benefit assessment of the clinical aspect of provision was conducted. This suggested that the net benefits accrued from the time saved on the Park and Village by providing a treatment service and health surveillance on site rather than off site were somewhere between a net loss of £0.4 million and a net benefit of £4.3 million, depending on whether wage or production cost estimates are used (the latter being significantly higher). These service elements therefore cover (almost, or with significant economic returns) the costs of all the other services provided by the clinical team. The analysis was not able to consider the returns on the work of the occupational hygiene team, and this would be a useful future research priority. So too would investigating what level of OH service pays for itself on smaller sites. Comparisons with T5 demonstrate that the savings of the treatment service alone on the Olympic Park and Athletes' Village were less. However, the two services were different in approach, making this comparison of only limited use.

This research provides a range of examples of low-cost OH management interventions that contractors can introduce for themselves and evidence from survey and interview data that contractors on the site had begun to recognise these benefits. These involve adapting existing practices to incorporate health issues as well as safety, raising the profile of OH amongst the workforce, linking monitoring and risk assessment to ongoing work plans and making better design decisions. All of these interventions minimise delays and can lead to the implementation of more streamlined and less intensive work practices. The relative costs of occupational hygienists, when compared to the overall costs of the service, are also relatively small (less than 20 per cent of the total spend on OH), but this component was seen as highly valuable by contractors and a useful support in decision-making and planning.

10.1.3 Research aim 3: Did the interventions made through the OH programme impact on the attitudes, behaviours and exposure to health risks of people on site?

The research provided evidence from surveys and interviews that the work of Park/Village Health had some impact on the attitudes and behaviours of those working on the site. There is also evidence from the survey that Park/Village Health were able to effectively target interventions at those who most needed them, particularly for the OH briefings they offered.

The OH team took a very proactive approach to engaging both contractors and workers. Levels of OH awareness and behaviour change were greatest amongst workers and managers who were most engaged with Park/Village Health. This demonstrates the positive effects from the inputs of OH professionals that can be realised when there is a commitment to OH

within a company and when managers and workers have access to appropriate support. The team also developed new ways to engage workers, using competitions and having an active presence on work sites. These steps were at the heart of their successes in changing the attitudes and improving the OH awareness of workers.

Whilst Park/Village Health provided support to the majority of contractors on the site, there were some workers and contractors who did not engage with the OH service. Given that the service was offered for free and is seen as setting new standards for the industry, the fact that some contractors failed to engage is disappointing and demonstrates that there is still some way to go before OH is accepted as an important issue by everyone in the industry, and therefore before real attitude change is likely.

The culture that developed on site for contractors to share their experiences with each other has been a good way to maximise learning and promote good practice. The regular meetings involving contractors across the site have also offered Park/Village Health a vehicle for promoting OH messages and encouraging contractors to take the issues seriously. This type of approach should be encouraged in future projects but will require client backing and sponsorship to really work. Ensuring that attitudes and behaviours are changed on shorter-term projects or where there is a more transient workforce also remains a challenge.

One key lesson from this project is that it is useful to bring in the advice of OH professionals right from the start so that they can assist in planning and early decision-making, particularly design decisions. Another is that ODA's willingness to fund good OH provisions on the site, and to ensure that all contractors were required to meet certain standards in relation to OH management, was particularly important. This not only ensured that the expectations on site were high, and that OH received a high profile, but also that contractors were more willing to engage with Park/Village Health and with OH issues more generally.

10.1.4 Research aim 4: Did the OH interventions impact on future behaviours of key stakeholders?

One of the potential risks identified by stakeholders in relation to Park/Village Health was that the model would be dismissed as lacking relevance in the wider world. The challenge in maximising legacy is that the Olympic build is seen as somehow different from other major projects, or of no consequence to smaller sites. Whilst the scale of OH provision or the exact model will not be replicable on all future projects, there are elements that could be transferred across the industry and/or appropriately scaled for more modest budgets. Creating a culture of health and taking the issues seriously at all levels does not necessarily have to incur prohibitive costs and can be done regardless of the size of the project if the contractor and/or client are willing.

There is evidence from the case study interviews and surveys that the lessons learned by individuals and contractors working on the site will be carried forward into their own futures. Managers gained a lot from working with occupational hygienists; most claim that they will do things differently in the future, and take away their learning from this project to others. Similarly, most workers received some kind of OH briefing whilst on site and have noted the greater focus on their health that was present on the site when compared with others they have worked on. How well placed workers will be in the future to demand similar standards is not clear, but their awareness about OH certainly seemed to improve, particularly if they had worked on the Park and/or Village for a longer period. Senior management commitment to good OH management, independent of or in tandem with, a similar level of commitment amongst clients is likely to be most influential in ensuring a greater emphasis on OH in the industry in future.

The Park/Village Health team have been equally proactive off the site as they have been on it. They put in place a series of master classes to ensure that anyone interested in what was being done on the site could learn from their experiences. They also actively participated in a range of industry and OH conferences. In this way the team have also attempted to spread the word about good OH practice beyond the confines of the Olympic Park. It is important that this work continues. Hopefully the learning legacy research outputs (of which this report is one) will help to continue this work.

10.2 RECOMMENDATIONS

Given that the research involved a wide range of different groups and that the implications for these groups differ, this section is broken down into recommendations for a number of different groups.

10.2.1 Occupational health professionals

- Using a multidisciplinary team, involving both clinical staff and occupational hygienists, was instrumental to the success of the Park/Village Health service. In particular the feedback loops between occupational hygienists (who measure and monitor exposures that lead to harm) and nursing staff (who check controls are effective) should become the norm in operating a truly preventative OH service.
- Having an on-site physiotherapist was seen as particularly helpful in reducing treatment times for workers and fits well with what is known about the prevalence of MSDs in construction.
- There are definite benefits from taking a proactive approach and engaging directly with contractors and the workforce. The OH professionals were seen 'out and about' in high-visibility clothing in real work situations. This improved workers' awareness of the service and helped them to identify and engage with the OH team.
- There are ways in which the benefits of OH can be 'sold' to workers and managers, and some element of 'selling' can be necessary to encourage participation. For workers particularly, using fun and innovative introductions to health topics (e.g. the use of competitions) worked well.
- Well-being issues were a useful way to begin dialogue with workers about health issues, as these were of more immediate interest to them. With good planning and a joined-up strategy, however, it was possible in most cases to directly link such well-being topics with OH issues.
- OH terminology can be difficult to understand, as can OH processes and issues. Survey results and the experience of Park/Village Health suggest that understanding of what constitutes an OH rather than a safety risk was poor, even amongst managers on the site. So, too, was awareness of the requirements of health surveillance (including the role of the feedback from clinical staff during health surveillance to occupational hygienists who then acted on it) and how this differs from general health checks. There is therefore a need for the OH industry to simplify its proposition so that contractors, particularly smaller ones, can understand how OH provisions are relevant to them.
- Working directly with sub-contractors allowed Park Health to make improvements with some of the less well developed companies, in OH terms, on the site. Wherever possible, therefore, OH professionals should encourage main contractors to allow them access to the full supply chain of those working on a site. This could help to drive up industry standards. This type of access was achieved here because the Park/Village Health team

were seen as a client/management tool for meeting health and safety performance targets. Establishing such a relationship with the client and key contractors is therefore important and should happen as early as possible in the life of a project.

- Building a business case for OH requires that better data is kept and shared by OH professionals about how what they do benefits the businesses that buy their services.

10.2.2 Clients and policy-makers

- Public-sector contracting could prioritise OH issues to help promote a change in the way the industry views the issue. A good initial step, for example, would be ensuring that all major projects require tenderers to present their OH provisions and/or OH management practices and that this is assessed as part of the contracting process. These requirements could then gradually be pushed down the supply chain.
- The best way to prevent harm is to design out health risks before they reach the work site. However, there is still more to be done in educating designers, CDMCs and architects about their role in OH and the benefits of making healthy design decisions.
- ODA set out to offer a safe and healthy working environment to all involved in the Olympic build. Offering a comprehensive OH service was seen as a key part of achieving this. Their investment in OH did have benefits. These can be expressed most clearly in terms of saving contractors, and workers, time and money by treating workers on site. There were also examples of the OH team suggesting quicker and more efficient procedures, which were good for worker health and good for business. Achieving results in health and safety is also good for business more generally by safeguarding company reputations.
- Clients of major projects should carefully consider how best to offer OH facilities, and such facilities should not be limited to clinical provisions. Whilst there are legal duties to protect the health of the workforce, clients often do not appreciate the additional benefits of adopting a preventative approach. Working with OH professionals, including occupational hygienists at an early stage will help to work out what scale and type of provision is appropriate for each project and identify the likely benefits for that project.
- Younger workers are particularly receptive to health messages. Including OH in all construction skills training is therefore important in shaping the industry of the future.

In addition, it is important to note that, with or without the commitment of clients, principal contractors too have responsibilities. They must ensure that the site they manage is a workplace which does not cause harm. The responsibilities of principal contractors therefore extend beyond their direct employees to sub-contractors and everyone working on their sites.

10.2.3 Employers

- Park/Village Health were able to successfully demonstrate to contractors on the Park and Village that a ‘health like safety’ approach allowed them to implement good OH management using their existing safety management procedures. Thus risk assessments for health can be done in a similar manner to those for safety. Similarly, good risk planning with regular updates, as should be standard on major projects for safety issues, can equally be achieved for health issues. The role of the safety professional on work sites is now accepted, and having access to professional OH support is no different to this.

- Having the support of OH professionals in designing work, monitoring the risks of work to health and dealing with the results of any exposures has a number of benefits. It helps to reduce the amount of time workers take off sick; it helps to keep skilled workers at work and working well for longer and will increasingly offer a competitive edge when bidding for new work. The scale and type of provision that employers can offer will depend on a range of factors, but having good knowledge and awareness of OH issues amongst the workforce and implementing effective OH management procedures should be possible for all contractors, regardless of size or available resources.
- If changes in worker behaviour are to be effectively promoted, it is important that senior managers are seen to take OH issues seriously. Supervisors also have a key role to play, so it is also important to ensure that they have the appropriate knowledge and commitment to OH issues.
- The availability of good welfare and health facilities was well received by the workforce and resulted in improved worker commitment to the site. Offering such facilities will help to make work sites attractive and encourages workers to see the companies offering them as employers of choice. These issues will be particularly important when the labour market tightens.
- There is clear evidence from the cost benefit calculations conducted that providing an on-site OH service can make sound economic sense, as the net benefit of doing so, in terms of reduced production costs, on the Park/Village is estimated to be over £4 million.

10.2.4 Designers

- OH inputs into the design stage were generally seen as valuable, but to fully engage CDMCs and designers with the OH agenda, and give them the skills necessary to consider workplace health when making decisions, training is likely to be required.
- It is important to factor in OH from the start of the design process. Doing so can reduce on-site delays and exposures and lead to a quicker, more effective build process.
- It is not necessary for designers to be experts in OH; they can easily work with OH professionals, and health and safety experts, to ensure that they provide designs which safeguard workers. This in time will lead to improved awareness amongst designers, enabling them to do more themselves.
- Better training about OH issues should form a part of the training offered to new designers, architects and CDMCs and be offered to existing professionals as part of their continuing professional development.

10.2.5 Workers

- All workers have the right to a healthy workplace. As construction professionals, workers should expect to be treated with respect, have decent welfare facilities and healthy working conditions.
- Working healthily does not always mean working slowly or in a more costly way. Improved OH can lead to better, more efficient working practices.
- Employers are not always fully aware of the day-to-day implications of work on health: it is therefore important for workers to speak out about health issues in the same way as safety.

- It is important that workers not only think about the health risks of their own work, but also how they can affect the health of others working around them. Even if an individual has the right PPE, for example, others around them may not. Workers should be prepared to help other workers see and deal with potential health risks. Different groups of workers will need different information about OH risks and should be educated about the risks that affect them in their own role. Workers could then share this knowledge amongst themselves.
- Engineering and procedural controls should be the focus of preventative OH, and PPE represents the last resort under COSHH regulations. For workers, however, PPE is an important way to protect themselves when higher-level controls are not possible or not in place. It is therefore important that PPE is appropriate for the job in hand. PPE must be right for: the individual – it should fit and not stop them working; for the job in hand – it should be specialist gear when necessary and not always standardised; and for the job as it changes – the PPE that was appropriate last week may not be right now, and this will depend on the actual job being undertaken. It is important that supervisors and workers are provided with the skills necessary to be able to identify what they need, or at least feel able to highlight issues with poor PPE and ask for improvements. Clearly higher-level controls should be adopted to reduce the need for PPE, through the removal of hazards, wherever possible, but workers will often not be in a position to influence this themselves.
- When OH services are provided there is still more to be done to encourage workers to take full advantage of them. It is important that workers are helped to see the benefits of accessing health provisions. Such benefits can be expressed in terms of helping individuals to keep working, keep working for longer and to lead healthier lives. Using OH services is nothing to be afraid or ashamed of and should be viewed as a legitimate part of life for those working in high-risk occupations.

APPENDIX 1: METHODS USED IN THE RESEARCH

A wide range of data has been collected to allow this research to provide an in-depth overview of progress made by the OH team on the Park and Village construction sites. This appendix provides a breakdown of the different techniques used to collect this data, and the sources of information involved.

MAPPING THE AVAILABLE OH PROVISION

IES met with Park/Village Health (the OH team of clinical staff and occupational hygienists on site) on numerous occasions to discuss their work. These meetings explored both the clinical and preventative aspects of the service and included interviews with a number of front line staff (i.e. with OH nurses and occupational hygienists) as well as key managers.

In addition, the research team worked with the Park/Village Health team to identify and access aspects of their management information (i.e. information that they routinely collect which demonstrated what actions they had taken on site, with whom and how many users) that could be useful for the evaluation. This report also provides an analysis of the data provided by Park/Village Health.

The key sources of information from Park/Village Health used in this analysis are:

- their own experiences shared during interviews and meetings with IES
- regular reports of their activities
- their 2009 and 2010 strategy documents
- records of the training sessions conducted on site
- yearly reports from each of the occupational hygienists regarding their work with contractors
- case study materials provided by the preventative team.

TELEPHONE SURVEY OF MANAGERS

In order to gauge the views of a large number of management-level staff working on the site for different contractors, the evaluation included a telephone survey of managers. The sampling frame for the survey was made up of contacts provided by contractors across the site. No central source of information about on-site management level staffing was available so the evaluation team was dependent on the responses of individual project managers, which were variable. Fifteen contractors provided contact details.

Each project manager was approached by IES and encouraged by ODA to provide contact details for the managers working for them and their main sub-contractors. It is therefore not possible to determine whether or not the sample provided is representative of managers working on the site as a whole, although a cross-section of managers was interviewed. It is best instead to view the survey results as indicative of the views of managerial staff working on the site at the time when the survey was conducted. The views of both principal and sub-contractors are represented.

The survey was undertaken between Monday 8 March and Friday 19 March 2010. A total of 164 interviews were achieved, including 15 as part of the piloting process undertaken during the first week of the fieldwork. These interviews are included in the final dataset as only

minor adjustments were made to the interview schedule. Most managers could not be interviewed between 9am and 4pm due to the nature of the work and being on site. This meant that most of the interviewing was conducted between 7and 9am and after 3pm (and sometimes in the evenings if requested by interviewees).

The original sample consisted of 396 records; of these 25 had incorrect numbers, three were duplicate leads and eight were not applicable as the manager had left the company/was abroad etc., leaving a workable sample of 360. The response rate for the survey was therefore 46 per cent. However, the survey aimed to reach 150 interviews (across a range of contractors) and then stop. This means that approximately 50 per cent of non-participants could be considered still 'live' in that they had been contacted fewer than five times (meaning that the response rate presented is likely to be a conservative estimate).

WRITTEN SURVEY OF WORKERS

A survey of workers was conducted on the Park between March and June 2010 and on the Village in September 2010. Workers were recruited from eight different site canteens and asked to complete a short written questionnaire. The interviewing/questionnaire completion was conducted between approximately 9.30am and 2pm each day, with all workers using each canteen being offered the opportunity to complete the form. An estimated 80 per cent of workers present in the canteens on the days in question took part in the survey, although a precise response rate is not possible to calculate. Workers were selected entirely at random as they used the canteen. Researchers moved around the canteen and explained the survey and what was required of each participant who wished to contribute. As forms were completed, researchers handed out £2 lottery scratch cards as a 'thank you' for participating.

In some cases workers were helped to complete the form if their eyesight or English was weak. This was not offered as a matter of course, only if an individual requested it.

A total of 1,183 forms were completed, including 50 from an initial piloting exercise. These responses can be included, as only very minor changes were necessary to the questionnaire following the pilot.

CASE STUDY WORK WITH CONTRACTORS

Eight contractors on the site were selected for inclusion in the research as case studies. This involved a researcher spending a day visiting each project and conducting interviews with a number of project staff. Contractors were asked to provide access to the following:

- a representative from the senior management team, commonly the main project manager
- the health and safety manager/adviser
- one or more supervisors
- four or five people from the workforce
- a representative of a sub-contractor working on the project
- a member of the design team that they had worked with on the early stages of the project.

In practice not all contractors were able to provide access to all these different individuals and the participants for each case study did vary, although generally most of the above have been included. Designers were particularly difficult to access, as some contractors had little contact with the design teams in the later stages of the build and were therefore unable to locate a suitable contact for the research team. All interviews were taped (with participant

permission) and were transcribed to allow full content analysis to take place. A union representative was involved in one of the case studies.

INTERVIEWS WITH A RANGE OF STAKEHOLDERS

Telephone interviews were also carried out with other stakeholders. These included:

- individuals attending master class sessions on the site (provided by Park/Village Health to offer an overview of the OH programme and the principles behind it), whose contact details were provided by Park/Village Health
- HSE inspectors who had been involved in HSE's programme of inspection activities on the Park and Village
- contractors who had worked on the site but who had since ceased operations
- consultation with a wider range of stakeholders, including OH experts, policy-makers and representatives of other employers (in construction and other industries), and representatives of construction trade unions.

APPENDIX 2: CHARACTERISTICS OF SURVEY PARTICIPANTS

WORKER SURVEY SAMPLE DETAILS

There were a total of 1,183 worker respondents to the questionnaire survey. The mean age of the respondent was 35.47 years old, with a minimum age of 17 years old and a maximum age of 69 years old. For analysis purposes the age categories presented in Table A2.1 were used in the body of the report.

Table A2.1 Age of worker

Age	Frequency	%
17–24	146	12.3
25–34	465	39.3
35-49	400	33.8
50+	172	14.5
Total (N)	1,183	100

Source: IES/Employment Research Ltd Worker Survey 2010

The length of time that the respondent workers had been employed within the construction industry was converted into months to facilitate analysis. The mean average months was 146.97 (12.25 years) and the minimum and maximum were 0 and 660 (55 years) months respectively. The categories used in Table A2.2 were used for analysis in the main report.

Table A2.2 Length of time working in construction (months)

	Frequency	%
<47 months	249	21.6
48–95 months	272	23.6
96–143 months	199	17.3
144–191 months	109	9.5
192+ months	323	28.0
Base (N)	1,152	100
Missing (N)	31	
Total (N)	1,183	

Source: IES/Employment Research Ltd Worker Survey 2010

The mean average months which a worker had been working on the Olympic site was 11.10 months, with a minimum of 0 months and a maximum of 57 months (see Table A2.3).

Table A2.3 Length of time working on the Park or Village (months)

	Frequency	%
<5 months	445	39.0
6–11 months	266	23.3
12–17 months	146	12.8
18–23 months	104	9.1
24+ months	180	15.8
Base (N)	1,141	100
Missing (N)	42	
Total (N)	1,183	

Source: IES/Employment Research Ltd Worker Survey 2010

A range of trades were represented in the sample (Table A2.4). Some respondents provided more than one main trade (which is why the total number of responses is more than the 1,183 respondents).

Table A2.4 Main trades of the worker respondents

Job Role	N	%
Management	215	18.6
Groundworker	92	7.9
Carpenter/joiner	83	7.2
Steelworker	76	6.6
Plant operator	75	6.5
Electrician	71	6.1
Plumber	71	6.1
Office/administrator	41	3.5
Engineer	36	3.1
General operative	35	3.0
Roofer	34	2.9
Banksman	32	2.8
Cladding	33	2.8
Canteen	30	2.6
Slinger	29	2.5
Scaffolder	29	2.5
Heating/venting services	29	2.5
Painter	18	1.6
Crane driver	16	1.4
Bricklayer	4	0.3
Plasterer	3	0.3
Other construction	114	9.8
Other non-construction	79	6.8
Total (N)	1,245	107.4

Source: IES/Employment Research Ltd Worker Survey 2010

The job trades were categorised into construction, non-construction and management in order to facilitate analysis. The breakdown of these is presented in Table A2.5. As this shows, the bulk of respondents were working in construction.

Table A2.5 Main trades of the worker respondents

Job Role	Frequency	%
Construction	794	68.5
Non-construction	150	12.9
Management	215	18.6
Base (N)	1,159	100
Missing (N)	24	
Total (N)	1,183	

Source: IES/Employment Research Ltd Worker Survey 2010

Respondents were also asked to state whether they were a supervisor, foreman or someone who supervises the work of others (Table A2.6). Analysis (chi square test at $p<0.001$) also demonstrates that managers and older workers are more likely to have supervisory responsibilities. Older workers are also more commonly in managerial positions than are younger workers (Table A2.7).

Table A2.6 Are you a supervisor, foreman or someone who supervises the work of others?

Response	Frequency	%
Yes	302	28.0
No	776	72.0
Base (N)	1,078	100
Missing (N)	105	
Total (N)	1,183	

Source: IES/Employment Research Ltd Worker Survey 2010

Table A2.7 Breakdown of level of worker by age

Age	Construction (%)	Non-construction (%)	Management (%)	Total (N)
17–24	77.9	16.6	5.5	145
25–34	69.2	13.0	17.8	461
35–49	66.4	12.5	21.1	393
50+	63.1	10.6	26.3	160
Total	68.5	12.9	18.6	1159

Source: IES/Employment Research Ltd Worker Survey 2010

Due to the sampling methods used in constructing the survey (i.e. use of project-based canteens), some construction projects are represented by more workers in the survey than others (Table A2.8). However, a wide range of different projects are represented within the sample. To facilitate analysis, projects were grouped according to the type of construction activity involved (Table A2.9). Projects which did not fit well into the main types of construction project (e.g. logistics) were placed in an 'other' category. The data shows that

19 per cent of respondents had worked on more than one project at the Park. The mean average projects worked on at the Park was 1.61.

Table A2.8 Individual projects worked on

Project	N	%
Village	325	28.9
Velopark	205	18.2
Aquatics	193	17.2
Basketball	97	8.6
Enabling works South Park	94	8.4
Enabling works North Park	79	7.0
South Loop Road	69	6.1
Landscaping North Park	65	5.8
Wetland Bridge	60	5.3
Rail Bridge/Stadium Bridge	56	5.0
Stadium	53	4.7
Logistics	45	4.0
Utilities: Networks	35	3.1
IBC/MPC (media centre)	35	3.1
Landscaping South Park	31	2.8
North Loop Road	31	2.8
Handball	31	2.8
Energy Centre	29	2.6
Eton Manor	28	2.5
Greenway	27	2.4
Carpenters Lock Bridge	27	2.4
Utilities: Deep Sewer	22	2.0
Waterpolo	19	1.7
Primary Substation	17	1.5
Other	133	11.8
Total	1,806	160.7

Note: This was a multiple-response question, with workers free to list all projects that they had worked on; hence the number of responses is greater than the number of respondents.

Source: IES/Employment Research Ltd Worker Survey 2010

Table A2.9 Types of projects worked on

	Project Frequencies	
Projects	**N**	**%**
Venues	524	46.7
Village	325	29.0
Structures, bridges and highways	164	14.6
Enabling	127	11.3
Landscaping	90	8.0
Non-construction	52	4.6
Utilities	41	3.7
Park-wide	28	2.5
Other	24	2.1
Total	1,375	122.7

Note: This was a multiple-response question with workers free to list all projects that they had worked on; hence the number of responses is greater than the number of respondents.

Source: IES/Employment Research Ltd Worker Survey 2010

As would be expected, given the nature of construction work, the majority of workers were employed by sub-contractors rather than Tier 1 contractors (Table A2.10). Analysis showed that those workers employed by Tier 1 contractors were more likely to have worked on the Park for longer than those employed by sub-contractors (chi square results, $p<0.001$).

Table A2.10 Whether employer is principal or sub-contractor

Employer	**Frequency**	**%**
Principal contractor	327	31
Sub-contractor	642	60.9
Don't know	85	8.1
Total	1,054	100
Missing	129	
Total	1,183	

Source: IES/Employment Research Ltd Worker Survey 2010

MANAGER SURVEY SAMPLE DETAILS

The survey involved individuals working in a range of managerial positions (Table A2.11). They were also asked their age, the length of time that had been working in construction (Table A2.12). In table A2.11 nine respondents were female.

Table A2.11 Respondent's position/job title

Job Title	%
Commercial/Works/Contracts/Plant Manager	15.9
Project Manager	14
Supervisor/Foreman	12.2
Senior/Site Manager/Agent/Assistant	9.1
Construction Manager	7.9
Design Professional	7.3
Health and Safety Officer/Manager	6.1
Director	4.9
Operations Manager	3.7
Security Manager/Agent	3
Site Engineer/Project Engineer	2.4
Owner/Proprietor	1.8
Principal or Top Management	1.8
Surveyor/QS/Project Surveyor	1.2
Other	8.5
No. of responses on which %s are based (N)	*164*

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010

Table A2.12 Length of time working in construction

Characteristic		%
Length of time working in construction	0–10 years	29.3
	11–25 years	39.6
	more than 26 years	30.5
	Not working in construction	0.6
No. of responses on which %s are based (N)		*164*
Age	Under 25	3.1
	26– 40	24.5
	Over 40	72.3
No. of responses on which %s are based (N)		*159*
Missing (N)		*5*
Total (N)		*164*

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010

Fifty-four per cent of the sample directly manages more than ten people on site, although 10 per cent do not have direct management responsibility for any staff on the site (Table A2.13). Most managers work for contractors that have a relatively large presence on site, with 63 per cent of the sample having more than 50 workers from their company on the site).

Table A2.13 Staff management responsibilities

Staff management responsibilities		%
Number of workers they manage	0 people	10.4
	1–5 people	14.1
	6–10 people	16.0
	11–25 people	18.4
	26–50 people	21.5
	51–249 people	14.1
	250 or more	5.5
No. of responses on which %s are based (N)		*163*
Missing (N)		*1*
Total (N)		*164*
No. of workers their employer has on site	0–10	12.9
	11–24	12.3
	25–49	11.0
	50–99	13.5
	100–249	28.2
	250 or more	22.1
No. of responses on which %s are based (N)		*163*
Missing (N)		*1*
Total (N)		*164*

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010

The majority of managers (69 per cent) had been working on the site in some capacity for between more than six months and around a half for more than a year (Table A2.14).

Table A2.14 Length of time managers have spent working on the Park and/or Village

Length of time spent on Park and/or Village	%
0–6 months	13.6
7 months to 1 year	38.9
1–2 years	30.9
2 or more years	16.7
No. of responses on which %s are based (N)	*162*
Missing (N)	*2*
Total (N)	*164*

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010

Managers had worked across the Park and Village (Table A2.15), but the sampling was restricted to managers working with contractors who were prepared to supply contact details to the research team (i.e. 15 contractors).

Table A2.15 Projects which mangers participating in the survey have worked on

Project worked on	**%**
Enabling works North Park	6.1
Enabling works South Park	6.7
Landscaping North Park	1.8
Landscaping South Park	1.8
Greenway	4.9
North Loop Road	6.1
South Loop Road	6.1
Rail bridge/Stadium bridge	3.7
Wetland bridge	1.8
Carpenters Lock bridge	2.4
Utilities: Deep sewer	15.2
Utilities: Networks	15.9
Energy centre	14.0
Primary substation	6.7
Logistics	11.6
Stadium	3.0
Velopark	5.5
Handball	6.7
Aquatics	1.2
Basketball	6.1
IBC/MPC (Media centre)	2.4
Waterpolo	0.6
Eton Manor	1.2
Village	6.1
Other venue	37.2
Other venues/projects (coded)	4.3
No. of responses on which %s are based (N)	*164*

Note: This was a multiple-response question, with managers free to list as many projects as applied to them. As a result the percentages sum to more than 100.

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010

Whilst most managers (55 per cent) had worked on only one of the projects running on the site, around 25 per cent had worked on two projects, and some as many as five. The average number of projects that managers had worked on was 1.8.

APPENDIX 3: CHARACTERISTICS OF CASE STUDY PARTICIPANTS

Table A3 Characteristics of case study participants

Job title	Level of organisation	Years in industry
Health and Safety Manager	Tier 1	2 years with organisation
Health and Safety Adviser	Tier 1	7 years
Scaffolder 1	Tier 1	16 months with organisation
Scaffolder 2	Tier 1	8 months with organisation.
Scaffolder 3	Tier 1	12 months with organisation
Scaffolder 4	Tier 1	18 months with organisation
Health and Safety Manager	Tier 1	Health and safety role for 10 years
Design Team	Tier 1	Design role for 5 years
Design Manager	Tier 1	17 years
Deputy Project Manager	Tier 1	27 years
Senior Engineer	Tier 1	20 years
Foreman	Tier 1	'Many'
Worker – Health and Safety Files Co-ordinator	Tier 1	32 years
Health and Safety Manager	Tier 1	3.5 years with organisation
Engineer Manager	Tier 1	10 years
Worker	Tier 1	9 years
Health and Safety Adviser	Tier 1	1 year with organisation
Project Manager	Tier 1	
Construction Manager	Tier 1	10 years
Site Manager	Tier 1	31 years
Worker – Handyperson	Tier 1	
Health and Safety Adviser	Tier 1	
Construction Manager	Tier 1	2.5 years with organisation
Design Manager	Tier 1	
Design Manager	Tier 1	15 years
Construction Manager	Tier 1	15 years
Health and Safety Manager	Tier 1	10 years
Health and Safety Manager	Tier 1	10 years
Worker/Union Representative	Tier 1	25 years
Supervisor	Sub-contractor	35 years
Machine Operator (worker)	Sub-contractor	18 months on Olympic site
Pipe Fitter (worker)	Sub-contractor	14 months on Olympic site
Dumper Driver (worker)	Sub-contractor	10 months on Olympic site
Groundworker	Sub-contractor	2 years on Olympic site
Site manager	Sub-contractor	15 years
Supervisor	Sub-contractor	30 years

Job title	Level of organisation	Years in industry
Supervisor	Sub-contractor	
Pipe Fitter (worker)	Sub-contractor	6 years
Site Manager	Sub-contractor	26 years
Project Manager	Sub-contractor	13 years
Plasterboard Fixer (worker)	Sub-contractor	20 years
Plasterboard Fixer (worker)	Sub-contractor	13 years
General Foreman	Sub-contractor	2 years on Olympic site
Labourer and driver	Sub-contractor	18 months on Olympic site
Carpenter (worker)	Sub-contractor	30 years
Carpenter (worker)	Sub-contractor	45 years
Electrical Site Supervisor	Sub-contractor	11 years
Supervisor	Sub-contractor	25 years
Fitter (worker)	Sub-contractor	First job for organisation
Ceiling Fixer (worker)	Sub-contractor	10 years
Pacify Protection Installer (worker)	Sub-contractor	22 years
Foreman/ Supervisor	Sub-contractor	19 years
Health and Safety Manager	Sub-contractor	17 years

Source: IES records from interviews conducted during 2010

APPENDIX 4: OVERVIEW OF PARK/VILLAGE HEALTH PROCESSES, SERVICES AND STRATEGY

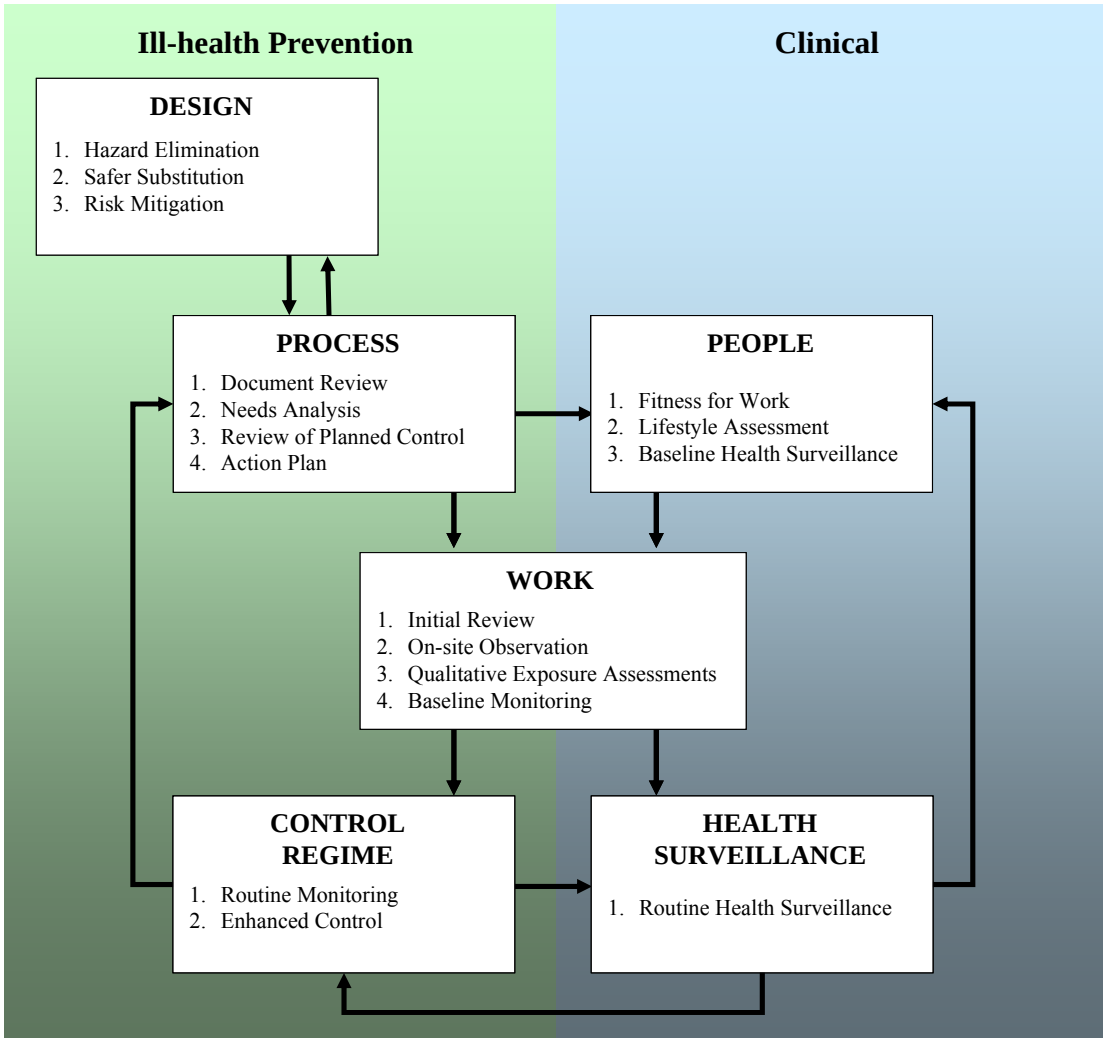


Figure A4.1 ODA/Park Health outline of the OH process on the Park and Village

Table A4.1 Services provided by Park/Village Health

Support to be provided	Details of services
Advice and guidance by competent personnel	Advice on: compliance with health and hygiene aspects of ODA HS&E standard; OH issues as they arise; strategies to reduce exposure to health risks; monitoring performance against KPIs; monitoring to comply with statutory requirements based on risk assessments; health and fitness standards; emergency planning; lifestyle advice
Design involvement	Working with integrated project teams, meeting with designers and others to encourage a constructive dialogue and effective processes to minimise health risks during construction, use and maintenance
Contractor planning	Working with integrated project teams, meeting with contractors and others to encourage a constructive dialogue in the development of HS&E plans for the construction phase
Initial personnel health checks	For safety-critical workers (i.e. those with the potential to significantly harm others) an induction health check. For non-safety critical workers evaluation by questionnaires with referrals to OH practitioners for health checks as required
Induction	Park/Village Health to input to the development of the Park; introduction and principal contractors' induction programmes and their delivery, ensuring that incoming personnel are briefed on the HS&E standards, personal responsibilities and their access to support and services
Education and training	Supporting the site HS&E culture, including the production of communication materials, talks, workshops, campaigns on issues such as eye and hand injuries. Park/Village Health will work with the suppliers in developing a trades/training requirement matrix to support capacity building and the maintenance of a high-quality workforce
Health surveillance	The development and operation of health surveillance programmes to check the health status of personnel exposed or potentially exposed to significant health risks
Emergency response	First aid and first response paramedic service with a target of response to calls within recommended response times as advised by the ambulance service; supplementing first aid arrangements of principal contractors
Treatment	A treatment service including GP provision, nurse supply and administration will be operated for site personnel in addition to referrals being made to personnel's own GPs
Job retention and rehabilitation	When individual health problems arise the information will be used to re-evaluate the health protection arrangements. Support will also be provided to assist the individual to remain in work or to return to work as soon as possible
Drugs and alcohol	A random and post-incident and 'on suspicion' testing regime to be operated for drugs and alcohol. Positive drugs tests and alcohol test at or in excess of the driving limit to result in exclusion from the site
Portal to additional and specialist support	A database of local suppliers to be developed by Park Health (e.g. dentists, physiotherapists) so that information can be made available to suppliers and their personnel

Source: ODA's 2008 HS&E Standard

Table A4.2 Park/Village Health Strategy

Key areas	Examples of progress
Programme management	
OH management to be integrated into day-to-day operational activity, not just seen as a time limited initiative	Development of HHI OH prevention/health surveillance matrix tailored specifically to each contractor Dedicated occupational hygienist for each project. Regular meetings took place with project teams re. upcoming activities and risk reduction
Demonstrable understanding of occupational ill-health programmes by Tier 1 contractors and their supply chains	OH risks training provided Meeting with sub-contractors asap following Tier 1 mobilisation to filter down OH assistance and follow up on Tier 1 contractors' policies with supply chain Participation in health maturity model, applying OH-based targets to this
Leadership programmes that address and encourage healthy as well as safe behaviours	Forum used to discuss 'what good looks like'. Visual standards library and ill-health prevention used to demonstrate that health risk management is not just about providing personal protective equipment Good health practice recognition in the forum Training at the practitioners' forum' Participation in Safety Health Environment Leadership Team (SHELT) venues event for new Tier 2 contractors with follow-up engagement
A baseline ill-health prevention index against which improvements in occupational ill-health prevention strategies can be measured	HII finished and baseline established Best OH practice of the month award at health and safety forum Data from the HII collected and presented an monthly HSE fora
Provision of OH and hygiene advice	
Advise ODA/DP on the development of its OH strategy via workshops	Ongoing
Attend the monthly (HS&E Leadership Team) meetings and present a quarterly report	A Park Health representative attended all SHELT meetings and provided updates to senior managers regarding Park/Village Health progress or initiatives
Work with Tier 1s to ensure OH a part of health and safety plan and practice, and integrated into supply chains and contractors	Climate survey analysis to determine whether there has been improved understanding of health issues on site through better communications[42]

[42] *Another learning legacy research project by the Health and Safety Laboratory examined the results of a climate survey used on the Park and Village which explored a range of indicators of good practice through a series of surveys which took place annually.*

Key areas	Examples of progress
Design	
Work actively through on-site intermediaries with designers to help them understand opportunities to reduce risk exposure through design (i.e. through elimination and substitution)	All quarterly CDMC and design team meetings were attended by a representative of Park/Village Health and presentations on good/bad case studies were presented along with relevant information on upcoming design challenges
Participate, through the health and safety team, in design evaluations	All quarterly health and safety plan reviews were attended by a Park/Village Health representative
Health checks	
Park/Village Health will continue to evaluate all new workers on site through a health questionnaire and provide safety-critical worker medicals	This work was ongoing throughout Park/Village Health's time on the site
Health surveillance undertaken as required, in partnership with the employer	Each contractor engaged with Park Health for health surveillance was provided with an individual plan using the associated contractors risk register All contractors were made aware of health surveillance availability
Park/Village Health will offer well-person clinics, for general health checks on a voluntary basis	This work was ongoing throughout Park/Village Health's time on the site
Workers recalled for health check after one year of activity on site	Safety-critical workers were recalled for health assessment on regular basis in accordance with recommended best practice
Managing exposures	
Actively compile and maintain its own 'significant risk of exposure to health risks' register, based on a review of the Tier 1s health and safety plan, discussion with CDMCs etc	Health impact index used DP health and safety co-ordinators project risk profiles amended and signed off by Park/Village Health Continual update of relevant risks across the site
Develop a specific intervention strategy for each project based on the register, focusing on hazard elimination and substitution, risk assessment, risk reduction, risk mitigation	Each contractor, via dedicated occupational hygienist provided with specific interventions suitable to their project
Well-being	
Develop an agreed well-being programme with four main strands: respiratory health, healthy skin, personal health and fitness (including reducing risks of MSDs), noise-induced hearing loss (NIHL) and HAV syndrome Use strands across the Park/Village with other issues highlighted in medical centre	Well-being programmes integrated with key OH risks
Drugs and alcohol	
Provide testing and advisory service, with leadership on safe behaviours provided by the Tier 1s (supported by ODA/DP)	This work was ongoing throughout Park/Village Health's time on the site

Key areas	Examples of progress
Practical steps to achieve goals	
Ensure health is integrated into all HS&E programmes (e.g. maturity model, supervisors academy, CDMC review programmes)	Inclusion of OH-based risks in current maturity model provided by DP OH content of supervisors' course was checked and recommendations made for further development with focus on prevention
Ensure healthy behaviours are visible, recognised and rewarded on site (i.e. more than documentation)	Health Safety Environment forum used to encourage contractors to present health-based good/bad practice on site Monthly award presented for best OH practice
Ensure supervisors receive on-site practical coaching and mentoring so they understand the required actions and have the confidence as well as the competence to implement them	OH content of supervisors course checked and recommendations made for further development
Develop a set of 'what good looks like' antecedents (e.g. posters/leaflets showing how to carry out high-risk tasks without risk to health) for use with toolbox talks etc	Content of all toolbox talks were checked and updated to include elimination risk mitigation etc Visual standards to reflect health risks
Collection and sharing across the Park of validated exposure data to ensure the appropriateness of control regimes, particularly PPE (respirators and ear defenders)	This work was ongoing throughout Park/Village Health's time on the site
Prompt follow-up of reported occupational ill-health issues, creating risk-management improvement programmes for use across the Park	Sharing of information/actions regarding prevention of ill-health through fora and health information sheets to all contractors on site
Inclusion of a health message in every safety initiative	Liaison with relevant parties made this a priority
Develop/implement ill-health near miss reporting system to prioritise health in same way as safety	HII developed and tested Reporting at every SHELT on OH issues

Source: Park/Village Health strategy documents for 2009 and 2010

APPENDIX 5: OH MATURITY MATRIX

Categories	Infancy	Developing	Evident	Established	Integrated
	No strategy in place for effective OH risk reduction Awareness of OH risks is minimal; little understanding across management and supervisory levels of the importance of OH No strategy for drug and alcohol (D&A) testing or health surveillance Little evidence of well-being initiatives Little employee training in OH risks No strategy in place for management of supply chain OH risks or health surveillance	Basic compliance with OH risk management Some awareness of OH risks by managers/supervisors; some understanding across management and supervisory levels of the importance of OH Basic strategy for D&A testing and health surveillance Some evidence of well-being initiatives Some training for employees in OH risks; Some evidence of management of OH risk from supply chain and knowledge of health surveillance needs	Some evidence of strategic OH risk management Awareness of OH risks by managers/supervisors; good understanding across management and supervisory levels of the importance of OH Good strategy for D&A testing and health surveillance Evidence of access to regular well-being initiatives Regular training for employees in OH risks Good evidence of management of supply chain OH risks and health surveillance needs OH risks identified at design phase	Evidence of strategic OH risk management at all levels Systems in place for assessing OH risks at management / supervisory level; good understanding across management and supervisory levels of the importance of OH and how it integrates with H&S strategy Strategy for D&A testing and health surveillance exceeds standard Evidence of regular focused well-being initiatives Employees trained in OH risk management Strategic management of supply chain OH risks and health surveillance policy for supply chain Tools in place to eliminate/reduce OH risks at design phase	**Your supply chain has:** Evidence of strategic OH risk management at all levels Systems in place for assessing OH risks at management/supervisory level Good understanding across management and supervisory levels of the importance of OH and how it integrates with health and safety strategy Strategy for D&A testing and health surveillance exceeds standard Evidence of regular focused well-being initiatives Employees trained in OH risk management **At design phase there is evidence of the use of tools to eliminate/reduce oh risks**
OH focus on the WORKPLACE	Leaders have had OH risks reviewed Supervisors and employees have some training in OH risks; supply chain is aware of OH risks	Leaders have been proactive in following up on OH risks identified Supervisors, employees and the supply chain have received some training in OH risks and	Leaders discuss OH risks in SLT meetings Supervisors are aware of the main OH risks relevant to their work; employees and the supply chain have received	Leaders discuss and resolve OH risks in SLT meetings Supervisors are aware of/able to give toolbox-talks (TBTs) on more than two of the main OH risks in construction	Supply chain leaders have participated in OH risk assessment reviews Supervisors for the supply chain are aware of/able to give TBTs on more than two of the

Categories	Infancy	Developing	Evident	Established	Integrated
		control measures	OH training in both risks and control measures OH risks are identified on design risk registers	relevant to their work Employees receive regular (at least quarterly) training in OH risks and controls	main OH risks in construction Employees of the supply chain receive regular training in OH risks and controls (at least quarterly) The primary contractor has evidence of the use of tools to eliminate/reduce OH risks at design phase
OH focus on the **worker**	Leaders are aware of the D&A testing regime and can explain it Supervisors, employees and the supply chain are aware of the role of OH on site.	Leaders have implemented D&A testing on site and are ensuring that any health surveillance is undertaken Supervisors and the supply chain have received information on D&A testing and procedures Employees are aware of some OH risks relevant to their job role	Leaders keep a D&A testing schedule and can demonstrate that regular health surveillance is undertaken Supervisors can demonstrate an understanding of the policy for D&A testing; employees and the supply chain have received D&A awareness training Supply chain receive legislatory health surveillance.	Leaders have instigated robust policies for and health surveillance for both employees and the supply chain Supervisors receive regular training (at least quarterly) in OH risks and controls Employees – health surveillance is undertaken as necessary	The supply chain has a robust policy in place for and health surveillance and adheres to this Supervisors for the supply chain have received regular training in OH risks and control Employees of the supply chain – health surveillance is undertaken as necessary
OH focus on **well-being**	Leaders have participated in or hosted at least one initiative for well-being Supervisors have given at least one toolbox talk on well-being Employees and supply chain are aware of well-being initiatives on site	Leaders have hosted/ participated in two initiatives for well-being Employees and the supply chain have participated in two initiatives for well-being Supervisors have given TBT on well-being	Leaders have hosted/ participated in three initiatives for well-being Employees and the supply chain have participated in three initiatives for well-being Supervisors have at least three TBTs on well-being in their portfolio	Leaders ensure that regular well-being initiatives are built into their on-site schedules Employees participate regularly in these initiatives Supervisors give regular TBTs on well-being (at least quarterly)	Supply chain leaders ensure that regular well-being initiatives are introduced Supervisors of the supply chain give regular TBTs on well-being Employees of the supply chain regularly participate in well-being initiatives

Source: Park/Village Health, referencing ODA's behavioural safety matrix exposure to and protection from OH risks

APPENDIX 6: SUPPORTING DATA

CHAPTER 2 SUPPORTING DATA

Table A6.1 Managers' view of the availability of protective equipment

	Much better	A little better	About the same	Not as good	Don't know	*No. of responses (N)*	*Not applicable (N)*	*Total (N)*
Hearing protection	34.1	7.3	43.3	1.8	3.7	*148*	*16*	*164*
Gloves	34.8	6.7	43.9	1.2	3.7	*148*	*16*	*164*
Lifting aids	34.8	6.7	43.9	1.2	3.7	*148*	*16*	*164*
Low vibration machinery	34.8	6.7	43.9	1.2	3.7	*148*	*16*	*164*
Cutting/dust extraction equipment	34.8	6.7	43.3	1.2	3.7	*147*	*17*	*164*

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010

Table A6.2 Managers' view of the design of work to reduce ill-health

	Much more common	A little more common	About the same	Less common	Don't know	*No. of responses (N)*	*Not applicable (N)*	*Total (N)*
Use of lighter weight/smaller blocks, lintels, panels etc	26.8	14.0	40.2	3.7	5.5	*148*	*16*	*164*
Use of materials without solvents/isocyanates /lead etc	26.8	14.0	40.9	3.0	5.5	*148*	*16*	*164*
Avoiding processes that create dust	26.8	14.6	40.9	3.0	5.5	*149*	*15*	*164*
Avoiding manual handling/breaking	26.8	14.6	40.9	3.0	5.5	*149*	*15*	*164*
Use of pre-cast concrete	26.8	14.0	40.2	3.0	5.5	*147*	*17*	*164*

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010

Table A6.3 Managers' view of on-site welfare facilities

	Much more common	A little more common	About the same	Less common	Don't know	*No. of responses (N)*	*Not applicable (N)*	*Total (N)*
Washing facilities	53.7	15.2	23.2	4.3	1.8	*161*	*3*	*164*
Barrier creams	53.0	15.2	23.8	4.3	1.8	*161*	*3*	*164*
Weather shelters	53.0	15.2	24.4	3.7	1.8	*161*	*3*	*164*
Hot/cold drinks	52.4	15.9	23.8	4.3	1.8	*161*	*3*	*164*
Breaks/job rotation	53.7	14.6	24.4	3.7	1.8	*161*	*3*	*164*

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010

Table A6.4 Levels of exposure to potential OH risks by job role

	Levels of exposure to OH hazards (index from different types of risks)				
Job role	**No exposure (%)**	**Low exposure levels (%)**	**Mid-level exposure (%)**	**Higher exposure levels (%)**	***Total (N)***
Construction	18.6	48.0	30.8	2.6	*783*
Non-construction	83.0	15.0	2.0	0.0	*147*
Management	70.9	25.4	3.8	0.0	*213*
All jobs	36.6	39.7	22.0	1.7	*1,164*

Note: there were 19 missing responses to this question.

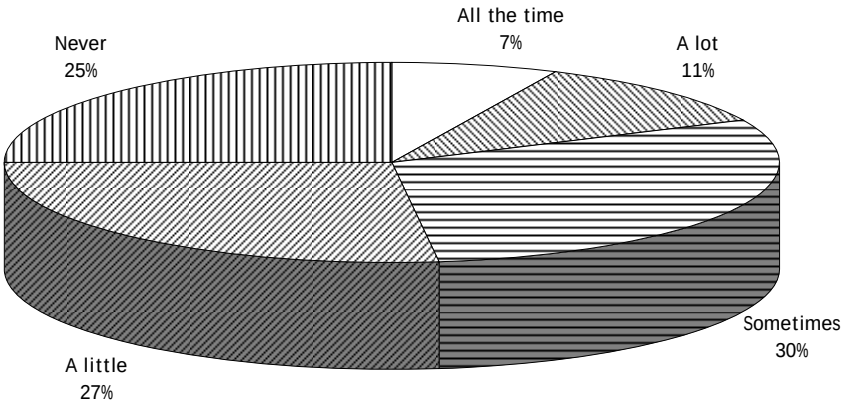
Source: IES/Employment Research Ltd Worker Survey 2010

Table A6.5 Worker views on availability of welfare facilities and provisions to promote good OH

Access to…	Most of the time (%)	Some of the time (%)	Hardly ever (%)	Base (N)	Not needed in job (N)
Soaps and cleaners	93.0	5.9	1.1	1,104	66
Washing/drying facilities	91.2	6.6	2.2	1,078	92
Warm food and hot drinks	88.9	9.1	2.0	1,063	107
Overalls and gloves that fit	86.2	9.5	4.3	1,008	162
Regular breaks	86.0	11.1	2.9	1,077	93
Creams before and after work	83.8	11.4	4.8	1,000	170
Hearing protection that works	78.9	16.0	5.2	814	356
Masks that are replaced or kept clean	66.1	17.8	16.1	663	507
Masks that fit	65.2	22.0	12.7	676	494
Shelter from cold, windy conditions	59.8	23.9	16.3	930	240
Lifting or handling aids	57.9	26.4	15.7	598	572
Doing different jobs to vary work	51.7	34.0	14.3	845	325
Help stop smoking	49.4	20.7	29.8	516	654
Use of anti-vibration handles	47.9	26.0	26	553	617
Well-maintained dust-extraction equipment	45.6	28.6	25.8	643	527
Checks on noise levels	36.8	28.8	34.4	712	458
‘Quiet days’ when taken away from noise	33.3	34.2	32.5	720	450

Note: there were 13 missing responses to this question.

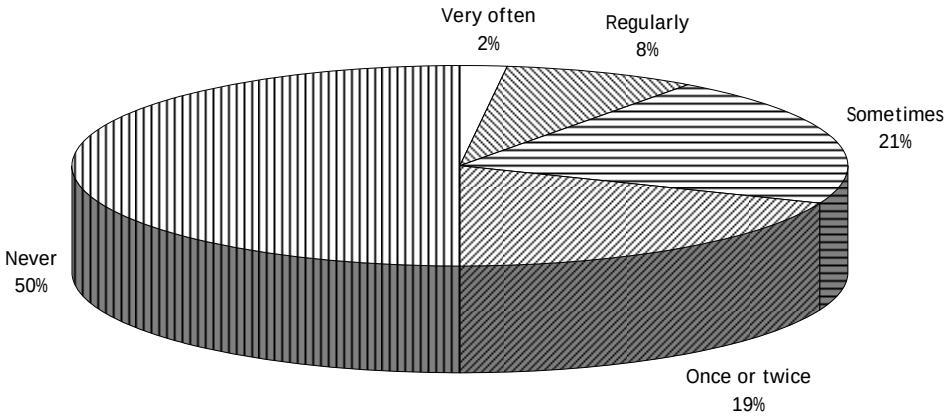
Source: IES/Employment Research Ltd Worker Survey 2010



The table is based on the responses of all workers providing an answer (1,141, with 42 missing responses).

Source: IES/Employment Research Ltd Worker Survey 2010

Figure A6.1 Extent to which workers feel that their health is affected by their work on the Park/Village



The table is based on the responses of all workers providing an answer (1,134, with 49 missing responses),

Source: IES/Employment Research Ltd Worker Survey 2010

Figure A6.2 How regularly workers believe that their health is at risk from their work on the Park/Village

Table A6.6 Provider records of clinical services delivered

Type of service provision		Total no. recorded Aug 2008 to May 2011
Fitness-for-work tests	Pre-employment	63,344
	Safety-critical medicals	14,314
	Contaminated land medicals	102
Statutory health surveillance	Audiometry	15,207
	Lung function	2,038
	Skin surveillance	530
	HAV assessment	97
	Other	285
Clinical	Emergency call-outs	127
	London Ambulance Service call-outs	103
	Treatments	9,071
	Works accidents	1,507
	Non-works accidents	499
	Follow-up appointments	1,228
	Fitness-to-work management referrals	22
Referrals	Occupational physician	293
	Site GP (or physiotherapist)	656
	Hospital A&E	625
	Hospital clinic	132
	Optician	141
	Other	388
Drug and alcohol testing	No. of tests conducted	2,192
Lifestyle checks	Mini health checks	765
Total number of contacts		113,666

Source: Park/Village Health monthly reports April 2008 to June 2011

Table A6.7 Who helped contractors manage OH risks

Sources of support on OH	%
Park/Village Health	76.0
DP	48.1
Olympic Delivery Authority (ODA)	14.7
Tier 1 or other contractor	17.1
Other	5.4
No. of responses on which %s are based (N)	*129*
Not applicable (didn't receive any help)	*35*
Total (N)	*164*

Note: This was a multiple-response question, with managers free to list as many sources of help as applied to them. As a result the percentages sum to more than 100.

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010

Table A6.8 Managers' views on their access to OH provisions on the Park/Village

	Much better	A little better	About the same	Worse	Don't know	*No. of responses on which %s are based (N)*	*Not applicable (N)*	*Total (N)*
Access to OH services for workforce	65.9	5.5	12.8	8.5	6.7	*163*	*1*	*164*
Quality of OH service	61.6	7.9	6.7	0.6	21.3	*161*	*3*	*164*
Attention given to OH risks	78.0	8.5	6.1	0.0	6.1	*162*	*2*	*164*

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010

Table A6.9 Managers' rating of training on the Olympic Park/Village provided compared to normal provision

	How much training	The quality of training	How useful the training was
Much more/better/more useful	61.0	61.0	65.9
A little more/better/more useful	12.2	14.6	9.8
About the same	19.5	17.1	17.1
Less/not as good/not as useful	2.4	-	-
Don't know	4.9	7.3	7.3
No. of responses on which %s based (N)	*41*	*41*	*41*
Training not received by themselves or their workers (N)	*122*	*122*	*122*
Didn't know whether they/their workers had received any training (N)	*1*	*1*	*1*
Total (N)	*164*	*164*	*164*

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010

Table A6.10 Worker views on their access to OH provisions on the Park/Village

	Rating of the Park/Village compared to other sites they have worked on	
Rating	**Access to OH provision %**	**Attention given to health risks %**
Much better/more	59.6	59.4
A little better/more	18.6	20.9
About the same	12.5	12.3
Worse	2	1.4
Don't know	7.3	6
Base	1,148	1,107
Missing	35	76
Total	1,183	1,183

Source: IES/Employment Research Ltd Worker Survey 2010

CHAPTER 6 SUPPORTING DATA

Table A6.11 Overview of briefing sessions delivered by Park/Village Health

Content of training session	Total no. of attendees	Total no. of contractors taking up sessions	% of all sessions delivered on site
D&A awareness	662	10	18.1
Asbestosis	541	12	14.8
Silicosis	474	9	13.0
Occupational dermatitis	280	6	7.7
Manual handling (including MSD awareness training)	204	12	5.6
HAV (including level 1 testing and HAV assessor training)	161	5	4.4
Well-being/hygiene/healthy eating/heart/cholesterol/diabetes	245	8	6.7
Hand injuries	132	3	3.6
OH workshop/strategy	161	6	4.4
Noise and vibration awareness	128	5	3.5
COSHH	108	10	3.0
Skin monitoring	99	11	2.7
Swine flu	81	1	2.2
Noise	77	2 3	2.1
Eye injuries	44	4	1.2
Wood/other dust	35	2	1.0
Respiratory PPE selection/use	99	1	2.7
Leptospirosis	80	1	2.2
Cold weather	26	2	0.7
Burns	10	1	0.3
Display screen equipment	10	1	0.3
Total of all sessions	3,657	26	100

Source: Park/Village Health provider records

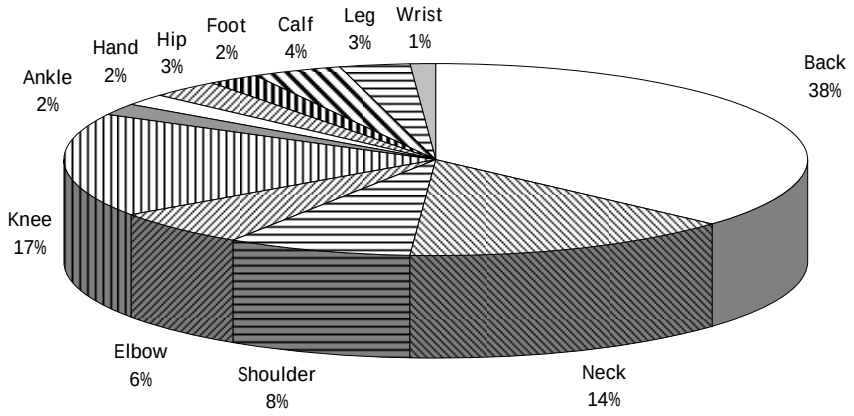
Table A6.12 Levels of exposure to health risks and access to related briefings

Exposure to health risks associated with…	Had a briefing on the health condition
Dermatitis	**
HAV	***
MSD	***
Hearing	***
Dust	***

Asterisks denote any significant differences between workers who identify themselves as experiencing higher exposure levels to a particular health risk factor and those with lower exposure levels.

*p = 0.05 **p = 0.01 ***p = 0.001

Source: IES/Employment Research Ltd Worker Survey 2010



Source: Park Health physiotherapist analysis of body mapping activities

Figure A6.3 Percentage of areas affected as recorded during body mapping program

Table A6.13 Total encounters during drop-in clinics on site

Area of body	Total physiotherapy encounters (N)
Back	*45*
Neck	*11*
Shoulder	*8*
Elbow	*6*
Knee	*19*
Ankle	*3*
Hand	*4*
Hip	*1*
Foot	*2*
Total (N)	*99*

Source: Park Health physiotherapist records of type of contact with individuals on site, 2010/2011

Table A6.14 Results of health checks delivered on site

	Safety-critical medicals %*	Random testing %**
Overweight (BMI 25–30)	41	45
Obese (BMI>30)	28	28
Hypertension Grade 1	23	-
Hypertension Grade 2	5	-
Hypertension Grade 3	0.6	-
Mildly high blood pressure	-	13
Moderately high blood pressure	-	2
Severely high blood pressure	-	0.8
Referred to GP to investigate elevated blood sugar levels	-	13
All results	858	352

*Sources: * analysis of a sub-set of Park/Village Health data for 2010; ** collected during seven visits to the site in early 2010 by Hackney Diabetic Team*

Table A6.15 Exposure to health risks and experience of associated health conditions

Exposure to health risks	Had associated health condition on site	Had associated health condition before	Had health condition checked by Park/Village Health
HAV	***	*	***
Musculoskeletal	***	*	
Hearing	***	***	*
Dust	***		
Dermatitis			***

Asterisks denote statistically significant differences between workers who identify themselves as experiencing higher exposure levels to a particular health risk factor and those with lower exposure levels using t-test: *p = 0.05 **p = 0.01 ***p = 0.001.

Source: IES/Employment Research Ltd Worker Survey 2010

CHAPTER 7 SUPPORTING DATA

Table A6.16 Changes made to how OH risks are managed since working on the Park/Village

Changes made to management of OH risks since being on site	No. of responses*
Better policies introduced to protect workers	26
Better risk assessments conducted to spot OH risks	22
Greater awareness of OH risks	16
Training provided to staff on OH issues	12
Health checks conducted on staff	7
Better communication with staff about OH issues	2
Other changes	2
No. of respondents on which %s are based (N)	*59*
Not applicable (no changes made/no contact with Park/Village Health) (N)	*105*
Total (N)	*164*

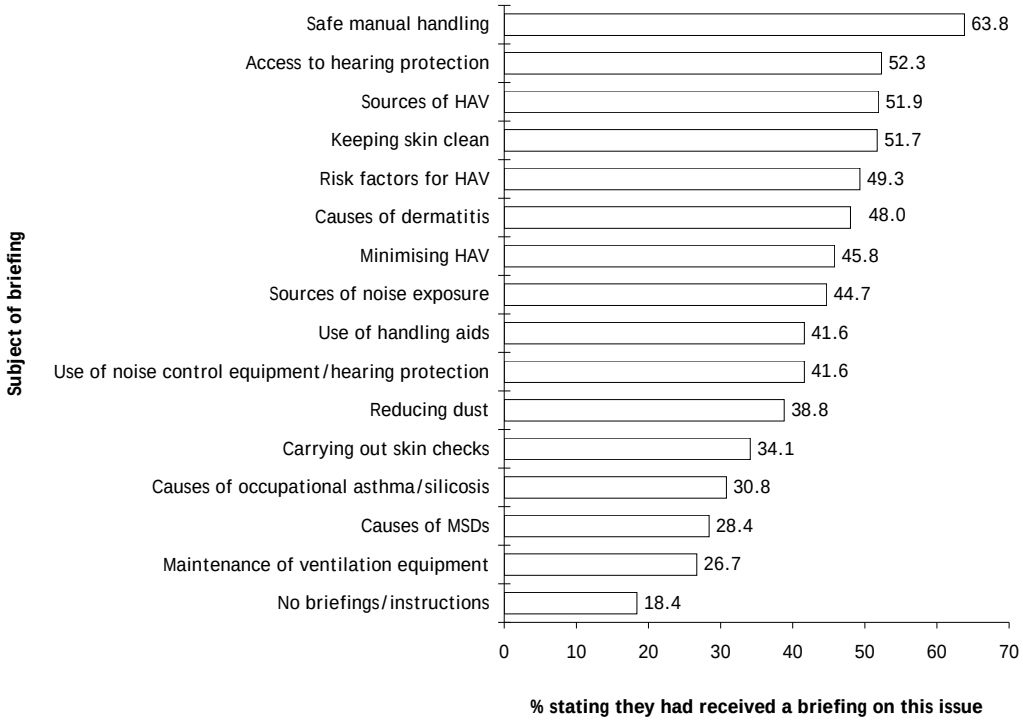
*Note: due to the small number of respondents answering this question, the results are presented as frequencies (i.e. numbers) rather than percentages.

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010

Table A6.17 Changes in workers' behaviour and attitudes observed by managers

	%
Better awareness of OH risks	76.6
Take OH risks more seriously	37.5
Better use of PPE	20.3
Take better care of themselves/take their health more seriously	15.6
Better use of procedures for manual handling	1.6
Better use of procedures for use of vibrating machinery	1.6
Better control of/avoidance of dust	1.6
Other changes	1.6
No. of respondents on which %s are based	*64*
Not applicable (no changes seen) (N)	*100*
Total (N)	*164*

Source: IES/Employment Research Ltd Survey of Managers and Supervisors 2010



This figure is based on the responses of all workers, and was a multiple response question, with workers able to indicate they had received as many different briefing sessions as applied to them

Source: IES/Employment Research Ltd Worker Survey 2010

Figure A6.4 Workers recall of briefing sessions they had received

Source: IES/Employment Research Ltd Worker Survey 2010

Figure A6.5 OH briefings received by workers according to the specific health condition to which they relate

Table A6.18 Whether workers at risk of particular health conditions have access to appropriate protective measures on site

Health condition of which they are at risk	Preventative measure	High-risk worker more likely to receive protection than low-risk worker
Dermatitis/skin conditions	Overalls and gloves that fit	*
	Washing/drying facilities with hot/cold water	
	Soaps and cleaners	
	Creams before and after work	**
HAV conditions	Regular breaks	*
	Use of anti-vibration handles/mounts or jigs	**
	Shelter from cold, wet or windy conditions	**
	Help stopping smoking	
	Warm food and hot drinks	
MSD conditions	Lifting or handling aids	**
	Doing different jobs to vary your work	**
Noise pollution	Hearing protection that works	**
	'Quiet days' when you are taken away from work	
	Checks on noise levels	
Dust pollution	Well-maintained dust-extraction equipment	**
	Masks that fit	**
	Masks that are replaced or kept clean	**

Key: * p = 0.05, **p = 0.01

Source: IES/Employment Research Ltd Worker Survey 2010

APPENDIX 7: EXAMPLES OF PARK/VILLAGE ACTIVITIES

Appendix Table 7.1 is a summary table to accompany the case studies, which together describe some of the work undertaken by the Park/Village Health Prevention Team to maintain exposure to health risk at levels below recognised occupational exposure limits thus helping to ensure the prevention of ill-health and occupational disease in future years.

In common with most of the construction industry, when Park/Village Health commenced work on the project, OH practice was in its infancy amongst the contractors involved, without exception. For this reason, much of the work completed, particularly during the early days, involved basic interventions to help contractors begin their journey towards better Occupational Health Management, and this is reflected in the examples here.

The case studies provided intentionally describe both the proactive and reactive approach of Park/Village Health and have been written with the express aim of making practical solutions to occupational health risk over-exposure accessible to those who do not routinely work in occupational health or hygiene. For this reason, references to legal detail and academic research have been kept to a minimum.

It should however be noted that all work undertaken by Park/Village Health was in accordance with the principles of good occupational hygiene practice intended to ensure, at the very least, compliance with the legal minima set out in relevant statutory requirements.

The prevention team's work, as illustrated here, should be considered in the context of Park/Village Health's holistic workplace, worker and wellbeing focused strategy rather than in isolation. The strategy involved partnership working between clinical and occupational hygiene specialists.

Table A7.1: Summary of preventative interventions

Issue	Prevention Intervention	Outcome
Ill-health prevention advice not filtering through the supply chain	Development of the safety maturity matrix to include health Baseline OHMM reviews across all tier 1s and their supply chains Annual OHMM reviews	Implementation of prevention plans improving use of the hierarchy of control Significant performance improvement year on year
Lack of ill-health prevention awareness and expertise within the construction industry	Ill health prevention team working alongside safety and operational professionals and SHELT, Production meetings, Tier 1 specific leadership meetings	Use of Health Impacts Index as a leading indicator of occupational ill-health prevention performance Occupational health and ill-health prevention integrated into all learning and development activities on site as well as TBTs and induction training Quantitative exposure monitoring used to inform risk assessments as necessary, and ensure appropriate application of the hierarchy of control. Health surveillance where PPE was relied upon for control of exposure

Issue	Prevention Intervention	Outcome
Lack of a leading indicator for health	Creation of a Health Impact Frequency rating used alongside the AFR and the Environmental Incident Frequency Rate (this is calculated using the number of reported environmental incidences per 100,000 hours worked)to show improvements in ill-health prevention activities.	Greater awareness, evidenced using the OHMM, of what good looks like regarding healthy behaviours An appetite across Tier 1s to drive down the incidence of health impact in the same way as near misses, evidenced through greater reporting of health related issues
Contractors relying on PPE without always considering the Hierarchy of Control	Risk assessment review and action plan development to ensure due consideration was given to application of the hierarchy of controls Development of the occupational health risk register and risk profiling process to ensure that on a task-by-task basis, all health risks were identified and suitable control regimes and monitoring programmes were implemented	Greater use of controls higher up in the hierarchy such as isolation and engineering controls better selection of work processes and tools (such as hydraulic piling this is a method of piling with reduced noise levels)as evidenced during risk assessment reviews and CDM reviews as well as reducing HIFRs and better OHMM scores Consideration given to isolation and administrative controls
Gap between controls documented on Risk Assessments and Method Statements and actual practice on site	CDM Reviews undertaken jointly by safety and occupational hygiene staff, and CDMCs	CDM-Cs better able to identify good ill-health prevention practice and export this to other Tier 1s around the Olympic Park and Athletes' Village
Health risk management advice difficult to communicate	Creation of health Common Standards and Information Sheets The integration of health into inductions, CDM and design reviews, supervisor training etc	Tier 1s and their supply chains thinking and acting on health information in the same manner as safety – health like safety
Technical information difficult to translate into easy-to-implement adequate controls regimes	Creation of RAG maps for contaminated land RAG targets for and noise RAG lists for Hazardous substances	Health risk assessment outcomes created and communicated with the end user, in mind
Designers not considering health implications of design choices	Designers' workshops	Designers skilled in the recognition of the health implications of their design decisions

Example 1: Substitution - finding healthier processes

Five temporary bridges were constructed to access the Olympic Park and surrounding area. The bridge design included wooden decking. This required approximately 16,000 holes to be drilled into the concrete base, then decking to be screwed into place. Prior to work starting, operatives undertaking the decking works were inducted onto site and hand-arm vibration risks were identified by the Principal Contractor. This led to operatives being identified as needing baseline HAV level 1 health surveillance. Two were subsequently confirmed as having Carpal Tunnel Syndrome by an occupational physician, their condition would have been exacerbated by the use of vibrational tools during deck works.

The on-site occupational hygienist was contacted and asked to review the risk assessment and method statement with a view to improving the control regime if necessary. HAV monitoring was undertaken, with results revealing significant exposure. The work/rest regime required to maintain exposure at a safe level would have restricted drill use to no longer than 30 minutes per day. Under this regime, work would have taken approximately one month – too long for a workable programme.

Further monitoring highlighted issues relating to silica, wood dust and noise exposure as well as manual handling concerns. As a result of the intervention a low vibration drill with an integral extraction system was sourced. Verification monitoring showed that it could be used for up to eight hours without exceeding standards.

Had the issue been identified earlier, such as during the initial design risk register reviews, the CDM review of the design or the Tier 1's review of the method statement and risk assessment, then a solution further up in the hierarchy of controls could have been secured. Lessons learnt in this regard were communicated through ODA's leadership teams and impacted on later designs.

This included the ability to understand and identify health risks during the design and build phases as well as the cumulative nature of health risks. This placed occupational health risk at the forefront when assessing workplace risk by providing tangible evidence of the benefit of addressing health risk at the earliest opportunity. The aim is for designers to give OH risks the same consideration as safety issues when reviewing designs.

Example 2: Use of the Hierarchy – Control at Source

During a fit-out the contractor was cutting steel framework for the fitting of internal walls. To control fire risk during the task the contractor was using a cold-cut saw to reduce sparks. This was done without consideration of the impact on other health and safety risks such as exposure to noise. This triggered concerns to be expressed regarding the noise dose experienced by those in the vicinity of the operation and the likelihood of harm being caused as a consequence. As is still typically the case during fit-out activities, those directly exposed were using hearing defenders as the primary means of protection.

Following initial on-site evaluation of the exposure scenario (aka a preliminary qualitative exposure assessment), Village Health concluded that a quantitative exposure assessment was necessary in order to develop a control regime that would ensure compliance with the Control of Noise at Work Regulations (adequate control through application of the hierarchy of control) and ***most importantly*** prevent exposure to those in the vicinity through practical application of the principles of occupational hygiene. As a result, work in the vicinity was stopped and a noise survey conducted including 2 min Leqs, measurement of personal noise dose and octave band analysis etc.

Following evaluation of results it was clear that potential for noise exposure above the upper action level stated in the Noise at Work Regulations existed for workers within a 30 to 40 metre area of the cutting task. Work was placed on stop whilst discussions took place with managers, supervisors and workers to establish an adequate control regime.

The technical expertise of the Occupational Hygienist regarding noise attenuation and the principals of prevention together with the practical knowledge of the contractor quickly lead to a sensible conclusion. Due to the nature of the task and the equipment being used, the most sensible solution was control of noise at source through use of an acoustic enclosure, capable of attenuating to a level that would allow work in the vicinity to be undertaken without the need for hearing protection, thus preventing exposure to levels at or above occupational exposure limits.

Consideration was briefly given to the procurement of a proprietary enclosure, but this was quickly discounted for a number of reasons, primarily the availability of a device capable of meeting the needs of the task in terms of flexibility.

A purpose-built acoustic enclosure was built, using materials with attenuating properties readily available on site. Noise measurements were used to verify that its attenuating properties were capable of controlling exposure to below statutory occupational exposure limits, a level considered to be as low as is reasonably practicable for the purposes of legislation.

As part of the booth commissioning process a repeat noise survey was conducted. This demonstrated a significant reduction in noise levels requiring only those working within a few metres to wear hearing defenders, preventing exposure above occupational exposure limits for 20 workers. Furthermore, only those workers directly involved in the cutting task required health surveillance.

Once work was complete, as part of the roll-out of the new control regime, all workers participated in on-site training. Supervisors were given additional information regarding the design of the booth and how it could be used as work progressed to other Village Blocks. It is estimated that this activity prevented noise exposure to approximately 500 workers overall.

Example 3: Simple and easy-to-use solutions avoiding overuse of PPE

The prevention team's focus was to evaluate and control hazards to health on site thus preventing occupational disease in future years. This was partly accomplished through the RAG (Red/Amber/Green) rating system which used visual prompting to make ill-health prevention decisions consistent and easier to understand.

Through effective risk assessment, the RAG system helped to establish both the circumstances through which hazardous substances (including contaminated land) and occupational noise can have an adverse effect on health, and the steps necessary to prevent over-exposure to risks.

With the assistance of the Park Health prevention team high hazard substances were often substituted for less hazardous alternatives though use of RAG lists. This helped the Aquatics Centre contractor to substitute a high hazard lead-containing primer (Red rating) to one without lead content (Green rating), for example.

Contaminated land was assessed through RAG maps, which used site investigation data to map where hazardous substances – such as mercury or benzene – were present in the soil. A Red area was defined as heavily contaminated and required a site-specific risk assessment and control regime to prevent exposure that could lead to ill-health; Amber areas required additional hygiene requirements provided on a checklist, and an additional tool box talk highlighting the need for vigilance when undertaking groundwork and the importance of good hygiene practice. Green areas required the usual site standard of protection and personal hygiene.

The maps were a new and innovative method of assessment of occupational risk from contaminated land and its communication, and were used to ensure that workers had adequate protection and controls in place before the ground was broken.

Occupational noise could also be assessed through a RAG target system. Once a noise assessment of a specific task – such as piling – had been carried out, a three-layer 'bull's eye' target could be established of inner, secondary and outer rings. The innermost circle was the red area, where hearing protection was to be worn (mandatory); workers in the secondary (Amber) circle were to be offered hearing protection (optional); while no additional protection was needed for workers in the outer (green) circle. This meant that hearing protection zones around noisier operations could be easily delineated, reducing the risk to staff while allowing quieter operations to be planned in areas within the Green circle.

These RAG targets were used on a major venue to establish a system enabling quieter works to be undertaken away from pilling operations thus preventing exposure, and also to establish where pedestrian routes could be marked out in order for operatives not to be exposed to excess noise whilst walking around the site.

Example 4: Health promotion activities as part of 'Big Breakfast' week

The clinical team carried out activities to encourage eating breakfast during April as part of London 2012 Big Breakfast week.

A survey of almost 400 workers was conducted by Park/Village Health and ODA in February 2010 to explore workforce breakfast eating habits. This revealed that the majority of the workforce took their first meal during the mid-morning break (between 10am and 11am). Not eating breakfast is linked to a reduction in productivity as well as exacerbating existing health conditions such as obesity and diabetes. A review of recorded near misses suggested that majority significant proportion of them occurred before the first meal break. The mini health checks carried out in 2009 had also identified a number of workers with low blood sugar levels. While not different from the UK picture, this did have implications for safety-critical workers, and Park/Village Health had been called out on two occasions to respond to workers who had collapsed or felt faint, and who it subsequently transpired had not had breakfast.

A communication strategy was developed to promote the importance of eating breakfast and improve access to inexpensive, healthy breakfast options. Health promotion campaigns were targeted in on-site canteens as these were found to be the most popular places for rest breaks. A PowerPoint display was provided to caterers to show in their canteens, outlining the importance of eating breakfast and the long-term health effects associated with not eating breakfast. Caterers were encouraged to provide a subsidised high-energy breakfast of porridge with toppings. Posters were displayed around the site.

TBTs were offered to contractors and materials provided if contractors preferred to deliver their own talks on breakfast to their workforce. The team also linked with the Hackney Diabetic Team to raise awareness of the risks of diabetes and also the importance of safety-critical medicals and releasing workers to attend well-being checks. Subsequent surveys confirmed behavioural change across the population, and the reported incident became more evenly distributed through the working day and showed an overall reduction.

Example 5: Working with the Crossrail project

The Park/Village Health team undertook some attempts to ensure legacy by using lessons learned from the Olympic Park in working with the Crossrail project.

The team discussed the importance of the integration of OH risks at the design phase, and the Crossrail HS&E board were given a presentation on the importance of designing out health risks. An 'OH in design' workshop was also delivered to assist Crossrail design packages, using knowledge of both good and bad practice observed on the Park.

As a result of the workshops and the closer interaction with designers, Park/Village Health created a book entitled *The Designers' Guide to OH* which was subsequently disseminated by Crossrail to all their design teams. These workshops and the designers guide will be used in further projects to encourage better understanding of OH risk amongst designers.

APPENDIX 8: TIME SAVED DATA USED IN COST–BENEFIT ANALYSIS

Table A8.1: Calculations used to estimate amount of time saved by Park/Village Health

		Time taken per assessment by Park/Village Health	Estimated time taken per assessment (including travel) in an off-site facility	Total no. of assessments recorded December 2007 to July 2011 on the Park or Village	Total time spent in Park or Village Health	Estimated time taken (including travel) in off-site facilities	Estimated total time saved (offsite hours - Park Health/Village hours)
Type of service provision		Hours	Hours	Assessments	Hours	Hours	Hours
Treatments		5,222.3	73,162	9,071	5,222.3	73,162	67,939.7
Fitness for work tests	Pre-employment	0.166	4	63,344	10,515.1	253,376	242,860.9
	Safety-critical Medicals	0.33	6	14,314	4,723.6	85,884	81,160.4
	Contaminated land medicals	1	8	102	102.0	816	714.0
Statutory health surveillance	Audiometry	0.33	4	15,207	5,018.3	60,828	55,809.7
	Lung function	0.33	4	2,038	672.5	8,152	7479.46
	Skin surveillance	0.25	4	530	132.5	2,120	1,987.5
	Hand arm vibration assessment	1	8	97	97.0	776	679.0
	Other	0.33	6	285	94.1	1,710	1,616.0

		Time taken per assessment by Park/Village Health	Estimated time taken per assessment (including travel) in an off-site facility	Total no. of assessments recorded December 2007 to July 2011 on the Park or Village	Total time spent in Park or Village Health	Estimated time taken (including travel) in off-site facilities	Estimated total time saved (offsite hours - Park Health/Village hours)
Clinical	Emergency call-outs	0.5	60	127	63.5	7620	7,556.5
	London Ambulance Service call-outs			130			
	Works accidents	0.33	8	1,507	497.3	12,056	11,558.7
	Non-works accidents	0.33	8	499	164.7	3,992	3,827.3
	Follow-up appointments	0.25	8	1,228	307.0	9,824	9,517.0
	Fitness to work management referrals	1	8	22	22.0	176	154.0
Referrals	Occupational physician	0.5	8	293	146.5	2,344	2,197.5
	Site GP (or physiotherapist)	0.33	8	656	216.5	5,248	5,031.5
Drug and alcohol testing	No. of tests conducted	0.33	6	2,192	723.4	13,152	12,428.6
Lifestyle checks	Mini health checks	0.33	4	765	252.5	3,060	2,807.6
						TOTAL	**515,325.3**

APPENDIX 9: COST BENEFIT CALCULATIONS FOR THE WHOLE OH SERVICE

Taking the estimated benefits of all services provided by the clinical team[43] we can provide two estimates of the monetary benefits of providing the service. These estimates are substantially higher than those used in Chapter 8, but illustrate the benefits to the ODA of providing the service that they did. The calculations are subject to the same limitations and are based on the same assumptions used in Chapter 8.

The first takes the hourly wage estimates (of £35 per hour), and suggests that the net benefits of providing the service are:

Calculation 1: CBA analysis of savings from all clinical services using average hourly wage estimates

CBA	Costs £	Benefits £	Net benefits £
All provision costs for clinical services	5.2 million	18.0 million	12.8 million

Source: IES analysis of Park and Village Health data

The second uses the estimate of £70 per hour production costs for the site and sees net benefits of:

Calculation 2: CBA analysis of savings from all clinical services using average hourly production cost estimates

CBA	Costs £	Benefits £	Net benefits £
All provision costs for clinical services	5.2 million	36.1 million	30.9 million

Source: IES analysis of Park and Village Health data

The actual benefits of the whole programme are likely to lie somewhere between the estimate based on wage costs and that based on production costs.

10.2.6 Sensitivity analysis

It is also good practice to examine how sensitive the results of the CBA are to changes in assumptions/underlying estimates. While some elements of the analysis can be measured directly (e.g. costs of the Park/Village Health clinical services), other elements involve estimations (i.e. off-site treatment times and hourly wage and production costs) or assumptions (i.e. that all treatments and health assessments would have taken place in the absence of the Park/Village Health facility). It is therefore necessary to assess how the results would change with changes to these parameters.

[43] *Excluding off-site referrals*

Changes to the monetary value of hours saved

The first areas where the estimates could be different are:

- the number of hours saved
- the monetary value attached to these hours saved results in revised estimates.

If there was a +/- 10 per cent change in the hours saved or the hourly wage/production cost estimate used, this would provide a range of between £11.0 million and £14.6 million net benefits in terms of wages and between £27.3 million and £34.5 million net production cost benefits.

Changes to the counterfactual position

As discussed earlier, the present counterfactual assumes that all the various treatments and assessments made by the on-site OH service would have taken place in the absence of the service. In fact, not all workers may have sought out health checks or other services if they were required to travel off site or take time out of their working day to do so, or if there was no or little management commitment to health and well-being. It is therefore valuable to consider different levels of off-site use when compiling the CBA. Calculation 3 provides details of how the benefits assessment would be affected by different levels of assumed off-site take-up of these same services.

Calculation 3: CBA analysis of savings from all clinical services using different levels of assumed off-site take up of services

Assumed off-site take up of services (when compared to on-site assessments undertaken)	Estimated hours saved*	Estimated net benefits using hourly wage costs	Estimated net benefits using hourly production costs
100%	515,325	£12.8 million	£30.9 million
50%	243,177	£3.3 million	£11.8 million
33%	150,647	£0.1 million	£5.3 million

* This figure is arrived at by reducing the number of each different treatment types which took place. As each type of treatment is allocated a different number of hours saved, the amount of hours saved will not be a direct division of the original time saved.

Source: IES analysis of Park and Village Health data

As these calculations demonstrate, even if as little as a third of the assessments and treatments had been taken up off-site as were taken up on-site, the service still more than breaks even on wage costs alone.

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Occupational Health Provision on the Olympic Park and Athletes' Village

Final report

The construction of the Olympic Park and Athletes' Village was an enormous job, with the site extending over 500 acres of formerly mixed-use land, and involving an estimated 30,000 workers.

In order to ensure that the health of workers was protected throughout their time working on the project, a comprehensive, preventative occupational health service was established and offered to all contractors free of charge. This report examines the work of this service using a range of data from contractors, workers and the occupational health providers themselves.

The service provides an example of what good practice can look like in assisting contractors to both meet their legal obligations and also take a more informed and involved approach to workplace health management. It was viewed as one of the best occupational health services that has been in operation on a major construction site to date in the UK. The report details examples of how the service worked, and what contractors and workers valued about it.

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