Award no: L211252052

Award Holders: Dr. J.A. Roberts, Dr. P.W.L. Allen, Dr. B. Croxson, L. Taylor

Title: Risk, contracts and infectious disease in managed markets: an exploration

Full Report of Research Activities and Results
1.0 Introduction

This project aimed to determine how risks associated with infections and infection control were affected by the quasi-market reforms that reconfigured the health sector in the UK following the white paper, Working for Patients (DoH 1989). The reforms erected monetary boundaries between providers and purchasers of services. The boundaries were maintained, with reduced emphasis on competition, by the Labour government (DOH 1997). The NHS was transformed from a unified system of governance into one that charged purchasers with responsibility for using contracts (now called agreements) to purchase for the needs of the population from quasi-competitive providers. In hospitals these reforms recommended the extension of resource management involving a form of devolved budgeting to ensure greater financial accountability (DHSS 1986). Managers of clinical directorates, support service directorates and central services were provided with cash limited budgets thus erecting financial boundaries within the hospital.

Contracts to control infection may be difficult to specify, implement and monitor as practices to contain infection depend on many agents who are subject to organisational and technical constraints. The complexity of infections, the causal agents responsible, the trajectories of its spread and the measures needed to contain it, make infection difficult to predict. Unless arrangements between purchasers and providers to deal with infection are clearly specified and financial responsibility, including the arrangements for sharing unforeseen burdens of infectious disease, are defined and methods for renegotiation of contracts set out, parties to contracts may be exposed to unexpected risks and involved in lengthy negotiations.

Theoretical perspectives used to study risks surrounding infection and its control are derived from new institutional economics, using concepts of governance and transaction costs, networks and agency. Socio-legal literature was used to consider the legal and regulatory environment surrounding NHS contracts and how these differed from normal commercial contracts. Literature on risk was used to illuminate how agents respond to risks to themselves as agents, to the organisation and to public health. This material was considered in the context of the practice of infection control and its management drawing upon an understanding of public health arrangements in place to control infection.

This report provides a background to infectious disease and its control, the research questions addressed and methods used to explore them. Results of the study are summarised for each major theme addressed in the objectives.

2.0 Background

Williamson (1985) distinguishes between external uncertainties unexpected hazards and uncertainties that arise from the behaviour of trading partners. Williamson saw risk and uncertainty as important determinants of transaction costs and the appropriate form of governance. Risk and uncertainty if accompanied by opportunistic behaviour can lead to high transaction costs. Relationships of trust can mitigate against opportunism but trust can be misplaced.

Infections often arise and wane unpredictably (Sockett 1994). Some infections are predictable on a population basis, but not at a particular time and place. Other infections can be catastrophic but are impossible to predict. Professionals dealing with infection aspire to use an ‘evidence-based’ approach; yet many risks are unknown and strategies to reduce risks are unevaluated.
Agent, host and environmental factors are important risk factors for infection and its control (Benenson 1994). Hospitals are reservoirs of susceptible individuals, some predisposed to infection by virtue of their immuno-suppressed status and others undergoing procedures that increase their risk of infection (Plowman et al 1997). Some infections result from failure of infection control, others are by-products of earlier attempts to control infection. The latter take the form of multi-resistant organisms, e.g., MRSA, YRE and MDRTB.

Risk society theorists are interested in problems such as these that emerge as unexpected effects of previous attempts to control the world, (Giddens 1991, Beck 1992). Conflicting explanations offered by scientists for these new phenomena cause disagreements amongst practitioners who may respond differently to controlling the arising infections.

Moral deviations are often used to explain bad events. Blame allocation has an important role in risk management and is a method of exerting political control (Douglas, 1994). Blame is associated with competence, compliance with guidance and good practice and is a central issue in a litigious society (Kemshall et al 1997). Insurance cover is predicated on the allocation of fault. Not surprisingly, ‘blame’ and its allocation is important to professionals dealing with infectious disease.

Reactions to risk are not always symmetrical. Kahneman and Tversky (1981) showed that gains and losses are valued differently depending upon how the scenarios are framed. The asymmetry described in prospect theory was explored further by Loomes and Sugden (1982) who introduced the concept of ‘regret’ to explain asymmetry. Decision-makers facing uncertainties do not work in a ‘choiceless’ environment, events result from their action or inactions. ‘Decision regret’ leads to post hoc unease about losses experienced or gains not realised. The asymmetry between a loss and a gain has a resonance in infectious disease. Risk perceived as ‘dread’ is often the reaction to some infections that have irreversible consequences. Risk may be amplified by the media, potentially distorting priorities (Kaspersen et al 1988). Infectious disease professionals have always operated on a tightrope between ‘scare-mongering’ and ‘cover-ups’ (Giddens, 1998).

Infection control has the characteristics of a public good, i.e. once in place it benefits everyone regardless of whether they pay or not. This poses problems, firstly, whose values should be used to determine how much should be invested and how should those values be elicited? And, secondly, is free-riding to be expected as exclusion is not possible and is inefficient, so who should pay?

Infectious disease is complex and it is unlikely that contracts for its treatment or control can be ‘complete’ (Allen, 1995). Scope is needed to reopen contracts if an unexpectedly large problem (appropriately defined) arises. Even if it is impossible to allocate all risks in advance, the contract documents can contain guidelines about service delivery. Such guidance may be difficult to monitor and opportunistic agents may not adhere to it. Audit of the public sector has increasingly replaced trust in professionals, (Power, 1994). But extensive monitoring could alienate staff (Leibenstein 1987, McMaster 1998) and attribution of blame may not be possible (Crawshaw et al 2000).

Thus infection and its control present problems for systems of governance. It is complex, uncertain and difficult to monitor and if trust between the parties does not exist there will be scope for ‘opportunistic’ behaviour. In such circumstances, Williamson suggests that, ‘Transactions that are subject to ex-post opportunism will benefit if appropriate safeguards can be devised ex ante’. ‘Incentives may be realigned or superior governance structures devised.” (Williamson 1996: 48). In his analysis firms are expected to evolve to deal with contractual complexity and maximise efficiency, but the form of the public sector is determined by governments. This study is concerned with the appropriateness of the organisational arrangements put in place to deal with infectious disease.
Formal arrangements for the management of infection in the NHS recognise some special characteristics of infection and its control. In 1988 the post of Consultant in Communicable Disease Control (CCDC) was created (Acheson 1988). The CCDC is responsible for the surveillance, prevention and control of communicable disease throughout a health authority. This role incorporates membership of Hospital Infection Control Committees (HICCs), accountability to local authorities, liaison with Public Health Laboratories and, since the reforms, responsibility for advising the health authority on contracts. Guidance published in 1995 recommends that each hospital should have an HICC, an infection control team (ICT), to include an Infection Control Doctor (ICD) and sufficient Infection Control Nurses (IGN) (Cooke 1995). The Public Health Laboratory Service (PHLS) is funded “to prevent and control infectious disease threats to individual and public health by providing evidence for action by the PHLS and others” (PHLS 1998). The management structures within PHLS now include tight budgetary accountability. This study examines whether these organisational arrangements are appropriate for managing risk of infection.

3.0 The study

3.1 The specific objectives of the study were:

1. to evaluate the effectiveness of formal contracts, regulations and informal practices relating to risks of infection and their likely effectiveness.

2. to consider how agency relationships within professional and managerial systems affect the implementation of programmes to reduce risk and cope with outbreaks of infections;

3. to consider how contracting agents perceive risks associated with infectious disease and the values placed on risk avoidance practices compared with preventive practices;

4. to consider how risks, financial, social and psychological, are distributed amongst NHS agencies, other agencies, patients and families; to consider how initial allocation of risk in the contracting process affects the eventual distribution of this burden; and to consider attempts to pool risks.

3.2 Achievement of objectives

Objective One: examination of contracts from study sites, interviews, case studies of outbreaks and the national survey, see 4.1 Contracts and 4.2 Governance.

Objective Two: Agency and networks were explored in each of these studies and relationships were compared with contracts and regulations as alternative methods of managing risks, see 4.2 Governance and 4.3 Professional relationships and networks.

Objective Three: was addressed in each component of the study. Perception of risks to professionals, organisations and the public health and the perception of risk by organism was gathered from the national survey, see 4.4 Risks.

Objective Four Distribution of risks amongst NHS agencies and budgets arising from unforeseen events and allocation of risks in contracts is addressed, Distribution 4.5. But distribution of risks to patients and their families could not be assessed because of logistical difficulties and resistance from Trusts to approaching infected patients. This was revised to include a survey of all outbreaks in the six months following site visits, see Methods 3.3.2.
3.3 Methods

The project took place between 1997-1999. The methods included in-depth interviews at five case study sites; telephone surveys of outbreaks in the six months following the site interviews; and a national postal survey. An analysis of relevant contractual documents in each case study site was undertaken.

3.3.1 Case Studies

The case studies examined the arrangements for managing the risks of infectious disease in five health districts. A purposive sampling technique was used to select sites that included large conurbations and county towns, and district general hospitals and specialist teaching hospitals. Sites were guaranteed anonymity. Semi-structured in-depth interviews were conducted between November 1997 and November 1998 with CsCDC and Directors of Public Health (DsPH) in health authorities, ICDs and ICNs in Trusts, and financial officers (or others involved in contracting). Interviews with key actors in each site enabled multiple perspectives to be obtained (Britten 1995). Thirty-seven people were interviewed at 35 interviews. Interview transcripts were circulated to the project team to minimise reporter bias (Britten 1995).

A modified form of grounded theory analysis (Glaser and Strauss 1967) was used to analyse the interviews. Theories and knowledge guiding the project aims and objectives were used to generate categories to code the interview data. If necessary the classificatory system was amended (Silverman, 1993).

3.3.2 Telephone Survey

It was originally intended that the first outbreak in each site following the visit would be a case study. As a result of a survey with public health laboratories, and discussion with Trusts the original study design was modified to include a systematic account of all outbreaks that occurred in each site in the six months following the initial meeting. This took the form of a telephone survey of CsCDC and ICNs.

Most ICNs were contacted (27/30 interviews) but not all CSCDC (17/30 interviews) could be contacted systematically. Twenty-three outbreaks were reported by ICNs and 13 by CsCDC. Data were entered into a database, checked and analysed. Qualitative responses were coded and interpreted by the interviewer and a second researcher.

3.3.3 National Survey

A survey of all CsCDC, ICDs and ICNs in England was conducted. Once invalid cases were removed from the denominator the survey included CsCDC (112), ICD (195) and ICN (320) in 1998. Questionnaires, derived from the interviews at the study sites, were designed for each professional group. These were piloted and revised.

Valid responses were received from 55% of ICNs, 47% of ICDs and 52% of CsCDC. Gender and year of qualification characteristics of respondents and non-respondents corresponded well, showing that for these characteristics responders were not atypical of the sample. But London was under represented among respondents.
4.0 Results

The results will be reported for the main themes that are addressed by the objectives:

Contracts, Governance, Professional Relationships and Networks, Perception of Risk and Distribution of Risk.

4.1 Contracts

High transaction costs meant that formal NHS contract documents between health authorities and Trusts did not, as predicted, conform to the classical ‘complete’ model in the sites visited. Contracts were incomplete, contained no specifications of good practice in the management of infection nor quality indicators relating directly to infection, and they did not fully govern the allocation of financial risk, see section 4.5.1. This is consistent with the predictions of theory, which suggest that it is not possible to write or monitor complete contracts for a complex entity such as infection control.

The implications of contractual relationships in the context of outbreaks were gathered from the telephone survey. Contracts defined the resources and output targets. Outbreaks affected potential output and used additional resources. Contracts were used by health authorities, with some exceptions, to deflect demands for additional funding to deal with outbreaks back to Trusts. There was some understanding that financial risks could be realigned if necessary. Conflict between other contractual obligations and infectious disease control was one of the most important issues that emerged from the survey of outbreaks. Waiting list targets led to pressures to keep wards open. An ICN reported that wards infected with MRSA had to stay open because of pressure on beds induced by contractual obligations. On another occasion the Regional Office insisted that an extra intensive care bed be opened in spite of no extra nurses being available to support it. An outbreak occurred leading to the unit being closed.

Contracts between Trusts and ancillary service providers affected infection control. Almost all ICNs and ICDs reported that at least one ancillary service was contracted out, half of these service contracts included clauses about infection control. Contracts were seen as difficult to monitor and were usually not monitored. They were not under the jurisdiction of the ICT. On two occasions outbreaks were attributed to failure to monitor cleaning contracts. Cleaning contracts were not flexible enough to deal with additional requirements during outbreaks. An ICN who tried to ensure that domestics did not move between infected and uninfected wards, reported that managers would go pale because that meant another ward would not be cleaned. This distancing of contractors from users of services has been found in other studies of quasimarkets, Vincent-Jones and Harries (1998).

The national survey indicated that respondents generally lacked knowledge about the contracting regime and few were involved in the contracting process. ICNs had the least knowledge and lowest involvement; 20% of the ICDs were involved; CsCDC had the greatest involvement, but only about half were involved in contracting. Only 60% of these thought their involvement was effective in achieving their aims for infection control, although CsCDC were formally advisors to purchasers about infectious disease. The finding is reflected in the low ranking given by respondents to contracting, compared to professional networks and guidelines as a method for improving infection control. But less than a third considered contracts not important, see Table 1.
4.2 Governance

We explored governance relationships both between and within health authorities and Trusts. The arrangements in place did not seem to be sufficient to ensure effective governance of infection control, see section 2.

The governance structure between health authorities and Trusts was partly in the form of contracting arrangements and partly one of hierarchical authority, represented by the formal position of the CsCDC as a provider of infection control expertise to the health authority and the Trusts as a member of the HICC. But health authorities were also able to exert pressure over Trusts as major purchasers. This indicates the incomplete separation of the purchasers and providers in NHS quasi-markets. This mixed form of governance, a hybrid form, described by Williamson (1996) and noted by Vincent-Jones and Harries (1998).

Within the Health Authority, the hierarchical structure and the authority of the CsCDC appeared to be more effective than ICNs and ICDs in Trusts in eliciting funds. There appeared to be greater trust between the officers in health authorities and few difficulties were reported in obtaining funds to manage outbreaks. Although CsCDC did have difficulties in obtaining funding, particularly to employ ICNs.

It was reported that no hospital followed all the guidelines governing formal internal organisation and management of infection control. The HICC had a low priority and attendance at meetings by those with executive authority was variable. Business plans were expected for very small amounts of expenditure (£200 on one occasion), took a long time to process and were often unsuccessful. Small increases in staff took two or three years to achieve. This impacted on strategic and day-to-day management. Many respondents reported that day-to-day management was hampered by budgetary systems within Trusts. Only 40% of ICTs held a budget, and the place of the ICT within the directorate structure of Trusts was ill defined. ICTs’ authority to change behaviour was undermined by their position within the Trust. Responsibility for funding small items of importance for infection control was shifted amongst reluctant budget holders (Crawshaw et al 2000). Almost all ICNs and ICDs felt constrained by lack of nursing and cleaning staff, low levels of knowledge among staff generally, and lack of resources for the infection control team. Resources for outbreak control were usually made available although pressures on beds did affect some control procedures, and some budget holders were not recompensed for resources used.

These rather inadequate governance structures were mitigated by interrelationships amongst professionals undertaking every day work of infection control.

4.3 Professional relationships and networks

Respondents of all three professional groups emphasised the importance of professional networks as methods for negotiating, specifying and monitoring infectious disease issues. Many ICDs and CsCDC explained how they had professional contact with each other at local Control of Infection Committees and other ad hoc meetings. Relationships amongst these professionals and others in Trusts, laboratories and reference laboratories were mentioned in accounts of outbreak investigations. Informal practices and professional networks were used to transfer information and engender cooperation. Documentation was seldom referred to and there were flexible responses to changing circumstances. For example ad hoc personal contact was considered the primary means of securing funding for infection control by 40% of ICNs. The remainder relied upon formal mechanisms.
Relationships were usually positive and collaborative but disagreements amongst professionals were recorded in the case studies and in the telephone interviews e.g. disagreement between CsCDC and ICDs regarding MRSA control procedures, closure of wards and funding of infection control.

Protocols and guidelines were seen as useful in day to day management and in protecting professionals from professional risk but neither guidelines nor professional networks were able to make up for fundamental deficiencies in governance structures for managing infection control.

4.4 Perceived Risks

Three aspects of risk emerged from the research: professional risk, organisational risk and public health risks (risks to the health of the population).

4.4.1 Professional Risk

Professional risk was seen as personal liability of professionals. Professionals had different approaches to risk depending upon whether it affected them as accountable professionals. There is ‘no risk as long as the procedures have been followed’ was a typical approach of CsCDC and of DsPH. Things that could go wrong include using the wrong control measures, inaccurate advice about immunisation and prophylaxis, excluding people or failing to exclude them from work or school and handling the media. Potentially leading to more disease, increased mortality, closing down wards or schools and bad publicity. In the telephone survey, four lapses in procedure were reported and local media were interested in five outbreaks.

ICNs and CsCDC interviewed about outbreaks sought out areas of non-compliance with standard practice in their exploration of outbreaks.

4.4.2 Organisational Risk

Non-compliance ‘lapses’ were strongly associated with perceived organisational risk. Organisational risk was also seen as anything that had financial implications for the organisation or attracted adverse publicity. Organisational anxiety was reported in 14 outbreaks. The Chief Executive and the Director of Public Health often became personally involved. Most ICDs and ICNs reported some involvement in dealing with infection related complaints. Less than a third reported that their Trust had assessed liability towards litigious complaints as a result of HAI. There was a marked difference between Trusts who reported HAI litigation as a regular occurrence and those who had not had a case. Trusts were seen, by one finance officer, as independent entities that had corporate responsibility for their own liabilities and as such should make provision to cover risks. See section 4.5.4.

4.4.3 Public health risk

Quantification of perceived risk by organism was collected. Perceptions did vary between organisms.

National survey respondents were asked to identify two hospital and two community based micro-organisms which they considered to pose a major ‘risk’ to the population. They ranked these against eight criteria on a five-point scale 0-4 (see Tables 2 and 3). Respondents listed 28 organisms considered infection risks in the hospital and 35 organisms in the community. Average risk scores for each organism by profession were calculated.
In the hospital, MRSA scored highly on the criteria of virulence, transmission, difficulty to control, public and political concern, media interest and litigation by all three professions. Media issues and litigation did not appear to affect the likelihood of an infectious disease being regarded as of great risk in the hospital. In the community meningitis was rated very high for virulence, public impact in the community, public and political concerns and media interest. This is consistent with findings in the case studies and telephone survey, which discuss the ‘dread’ factor of meningitis. The short incubation period, suddenness of death, susceptibility of young people and the role of the media contribute to this.

The diseases chosen and the ratings of the risk criteria were supported for outbreaks reported in the telephone survey and by outbreaks reported by ICDs and CsCDC in the national survey. In the national survey ICDs reported a total of 43 MRSA outbreaks, a number described the situation as endemic: one ICD reported a total of 600 cases in 34 wards. CsCDC reported 25 meningitis outbreaks.

4.4.4 Asymmetry between outbreaks and preventive measures

In the event of an outbreak funds were made available to minimise the risk of loss—either in terms of cases affected or in terms of being seen to do all that was necessary or in terms of professional accountability. There was considerable asymmetry, however, in so far as there was a reluctance when faced with small budgets to accept responsibility for procedures to avoid future risks. There was under-investment in appropriate infection control. Examples include inability to procure hand towels, soap, basic works provision such as hand wash basins, ward curtains. In one instance an orthopaedic surgeon had problems in obtaining protective clothing when working with known MDRTB patients.

4.4.5 Social Amplification of Risk

Professionals sought to prevent the social amplification of risk, (Kaspersen et al 1988). One CCDC tried to avoid social amplification by speaking to parents of school children in small groups rather than at mass meetings to avoid group anxiety. CsCDC sought to involve the media in a constructive way using local media to provide information to the community. Another persuaded local media to delay breaking a story until helplines were installed. During an outbreak at a community home, there were anxieties that the media would report three related deaths. This caused those involved to make sure that it appeared that what should have been done was done. The media did not pick up the story.

4.4.6 Personal Risk

Potential physical risk to ward and ancillary staff and their families from working in infected areas was reported. The future employability of staff was affected if they became infected or colonised by particular organisms. On some occasions infected ward staff were required to keep working in infected areas to maintain nursing levels. A lack of policies regarding patient isolation, treatment and movement was implicated in staff infection.
4.5 Distribution of Risk

4.5.1 Financial risk

Attempts had been made to allocate financial risk in contracts to achieve formal financial completeness. Cash limited budgets were given as an explanation for this by health authorities. Authorities appeared to be well defended against the threat of opportunistic behaviour by Trusts. They used unexpected events to reemphasise the extent of the responsibility that had been accepted by the Trusts. However, in two study sites, the allocation of financial risk was qualified by force majeure clauses allowing renegotiation in the event of a ‘major outbreak’. In practice, interviews revealed some flexibility and a willingness to share the financial burden with Trusts and apply for more money from other levels of the NHS.

4.5.2 Opportunity Costs

Financial cost rather than the resource costs were seen by Trusts and HA to be the major risk accompanying outbreaks, see section 4.4.4. Only when the physical implications of an outbreak affected other contractual obligations e.g. waiting lists, were the alternative uses of resources considered. An extreme example of this was reported by an ICD who debated about whether it would be better for patients to acquire self-limiting viral infection in a ward, i.e. accept the infection risk rather than wait in the emergency medical unit or at home. The cost to the patient who either had treatments delayed or postponed or length of stay increased due to infection was not considered.

4.5.3 Pooling of risks amongst Trusts, health authorities and laboratories.

When outbreaks were large and many directorates or organisations were involved, a virtual firm emerged in which the parties worked together to control the outbreak and to share the costs (Sako 1992). An outbreak of MRSA in one ITU, is an example. The outbreak could have cost the Regional Office £1.5m in lost revenue had the ITU been closed. To avoid this the ITU was kept open. The laboratory costs were contained in the laboratory budget. Nursing in the ITU was doubled because of the need for one to one nursing. The cost was absorbed in the nursing budget. The ‘few thousand pounds needed for extra medicines’ was absorbed in the pharmacy budget and the extra equipment was funded out of supplies budgets. Another example was a lookback study instigated when a midwife was found to be HIV positive. Risks were pooled amongst three adjacent health authorities, a GUM clinic, a PHLS laboratory, and three Trust hospitals.

4.5.4 Insurance

Insurance is the usual way of spreading actuarially based risks. However, insurance to cover outbreaks was rare. At one site a laboratory had negotiated an insurance policy to cover increased costs of work related to MRSA. The initial policy cost around £1000. A claim was made for £60,000. The laboratory claimed for additional workload and the Trust for ward closure. The Trust could not secure a further policy as the insurers saw risk of expenditure related to MRSA as uninsurable.
4.6 Discussion of Findings

The methods used enabled exploration of the management of risk in the contractual environment of the reformed NHS from a number of perspectives. The face-to-face interviews were useful for exploring attitudes to risk, and to contracts and relationships amongst professionals and the constraints they experienced in undertaking their work. They provided insights into issues addressed in the national survey and were used to frame survey questions. The telephone interviews enabled understanding of day-to-day impact of contracts, regulations and guidelines on outbreaks and their control. They shed light on how infection control was affected by contractual obligations between purchasers and providers, by different contract obligations and by contracts with other service providers. The survey quantified many aspects of the study and provided confirmation of the issues noted in site visits. The national survey was sent out shortly after an NAO survey (NAO 2000) and this affected response rates. However, findings of the two studies were complimentary, each contributing to government policy and to framing improved mechanisms for infection control.

Findings relating to professional risk indicated the stress placed on being seen to have followed procedures. This was an important feature in limiting organisational risk. Risks to public health of different infectious diseases accorded well with known pathogenicity of the organism, the transmissibility, the prevalence of the organism and the ease with which it could be controlled. Willingness to fund outbreak control contrasted with the lack of willingness to pay small amounts to reduce risks of potential infections. Outbreaks as well as imposing extra hazards, including increased risk of morbidity and mortality to those affected, caused others to have treatments postponed.

Risks of infectious diseases were not adequately handled in contracts between purchasers and providers. This is consonant with the predictions of theory. It does not appear possible to efficiently write or monitor complete contracts for an area as complex as infection control. High transaction costs would be expected if contracts were used to internalise the risk of infectious disease and infection control. National standards and guidelines may substitute more efficiently for contracts as a means of governing infection control. National guidelines were not, however, widely applied.

Control measures were vulnerable to free-riding. Individual cost centres often tried to economise by under-investing in infection control. This impeded ICTs’ ability to manage risk. Trusts are under continuing pressure to meet activity targets. In a minority of Trusts this was achieved by compromising infection control or outbreak management. Some risks were being shifted from the NHS to staff and patients, as both faced increased risk of contracting infection. If this increased in-patient length of stay or staff absence, some cases have to wait longer for treatment and some financial consequences remained in the NHS.

Data about the resources that were used in the outbreaks described in the telephone interviews and from the national survey were collected, but these were not sufficient to estimate the precise costs of the outbreaks. Further work on larger outbreaks would allow this to be assessed. We were not able to estimate the cost of infections on patients and their families. However two parallel studies one on Hospital Acquired Infection (Plowman et al 1999) and another of Intestinal infectious Disease (DOH 2000) include costs of infections to patients and their families. These could be used to estimate costs for some infections in this project.

The newly issued controls assurance prescriptions aimed to ensure greater accountability for infection control were informed by the findings of the study, (NHSE 2000). The accountability structures included assigning responsibilities to all concerned including the chief executive. These potentially improve the quality of infection control procedures. But if they merely assign responsibility without ensuring the means by which the controls can be implemented they will be weak. Financial means must be aligned to recommendations to improve infection control.