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Cost analysis of child health surveillance

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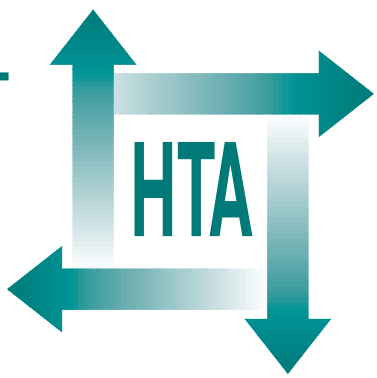
Health Technology Assessment
NHS R&D HTA Programme



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Cost analysis of child health surveillance

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NHS R&D HTA Programme

The NHS R&D Health Technology Assessment (HTA) Programme was set up in 1993 to ensure that high-quality research information on the costs, effectiveness and broader impact of health technologies is produced in the most efficient way for those who use, manage and provide care in the NHS.

Initially, six HTA panels (pharmaceuticals, acute sector, primary and community care, diagnostics and imaging, population screening, methodology) helped to set the research priorities for the HTA Programme. However, during the past few years there have been a number of changes in and around NHS R&D, such as the establishment of the National Institute for Clinical Excellence (NICE) and the creation of three new research programmes: Service Delivery and Organisation (SDO); New and Emerging Applications of Technology (NEAT); and the Methodology Programme.

This has meant that the HTA panels can now focus more explicitly on health technologies ('health technologies' are broadly defined to include all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care) rather than settings of care. Therefore the panel structure has been redefined and replaced by three new panels: Pharmaceuticals; Therapeutic Procedures (including devices and operations); and Diagnostic Technologies and Screening.

The HTA Programme will continue to commission both primary and secondary research. The HTA Commissioning Board, supported by the National Coordinating Centre for Health Technology Assessment (NCCHTA), will consider and advise the Programme Director on the best research projects to pursue in order to address the research priorities identified by the three HTA panels.

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The views expressed in this publication are those of the authors and not necessarily those of the HTA Programme or the Department of Health. The editors wish to emphasise that funding and publication of this research by the NHS should not be taken as implicit support for any recommendations made by the authors.

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Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search, appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

The editors and publisher have tried to ensure the accuracy of this report but do not accept liability for damages or losses arising from material published in this report. They would like to thank the referees for their constructive comments on the draft document.

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Contents

List of abbreviations

ANO	another (as in another person providing support and assistance)
CDH	congenital dislocation of the hip
CHS	child health surveillance
CI	confidence interval
CMO	community medical officer*
FHSA	family health services authority
GP	general practitioner
HDT	hearing distraction test
HV	health visitor*
MTO	medical technical officer*
NA	not applicable*
SD	standard deviation*
SE	standard error*
SIDS	sudden infant death syndrome*

* Used only in tables

Executive summary

Background

Child health surveillance (CHS) forms part of a more general programme of child health promotion. For the purposes of this study, CHS was defined to include routine health checks offered to all children at visits scheduled at approximately 6–8 weeks, 6–9 months, 18–24 months and 39–42 months. These checks generally combine a series of physical checks with health education.

Objectives

To provide:

- estimates of the costs of individual components of the CHS programme
- a register of the costs of each element of the CHS programme in a form that can be updated.

It was not part of the purpose of this work to evaluate the cost-effectiveness of CHS, because of the absence of information on the relative effectiveness of components of the programme.

Methods

The focus of the study was on costs to the NHS and parents, including the cost of first referrals arising from a routine CHS check. The working hypothesis was that costs are likely to be determined primarily by three variables: the range of tests offered at each visit, the location of the visit and the type of staff involved.

The first stage of the research was designed to identify the range of service models found in practice. A postal questionnaire was sent to relevant Trusts in England and Wales, requesting information on local CHS policy and delivery. Replies were received covering 88 Health Authorities: 81.5% of the possible total. The questionnaire demonstrated a high degree of homogeneity in policy, with most Authorities conforming closely to the recommendations contained in *Health for all children*.[1] The main differences between Authorities appeared in the organisation of routine eyesight tests, and in the hearing distraction test (HDT).

A sample of 11 Health Authorities was selected. The sample was designed to be representative of differences in geography (north/south), rurality (rural/urban) and local policy on eyesight tests and the HDT. Two areas reporting the highest proportion of children from ethnic backgrounds were also included. The sampling unit was the main Community Trust providing CHS services within each Health Authority. The consultant community paediatrician at the Trust was asked to select two Trust-run clinics and three GP practices for the fieldwork, giving a sample of 55 subsites.

A member of the research team visited each subsite as an observer. During the visit the researcher collected information on the time spent on each of the components of routine CHS checks and on the type of staff involved. Parents were also asked about the time and other costs involved in attending the clinic. Staff at each subsite completed activity timesheets prospectively over a 3-month period following the initial visit and recorded referrals arising from routine CHS activity.

The aim of the research was to provide information on the costs of individual components of the CHS programme in order to inform policy, and the focus of the study was on identifying the opportunity costs of variable inputs. The research demonstrated that the scale of CHS activity is such that no likely changes in the organisation or content of the programme would be expected to have a significant impact on fixed costs (such as the costs of land, premises or equipment). Costs are estimated on the basis of time inputs valued at midpoint salary scales plus on-costs. Costs associated with gaining qualifications and overhead costs are excluded from the analysis, although the identified costs can be increased by appropriate percentages to reflect these additional costs.

Results

Average costs

No statistically significant differences were found in overall average costs per child between sites in the north and south, or between urban and rural

areas. Despite the fact that high ethnicity was expected to lead to higher mean costs (because of the need for interpreters in some cases), no significant differences were found. However, significant differences were found in mean cost per child between Trust-led and GP-led clinics. On the basis of this result the sample was divided into two subsamples (Trust-led and GP-led) for the remaining analysis.

Average costs of Check 1 (6–8 weeks)

The estimated mean costs per child (1997 values) for Check 1 were £6.24 (Trust-led) and £8.88 (GP-led), a statistically significant difference. The most common models of delivery involved a doctor (i.e. a GP or community medical officer), either alone or with a health visitor.

The main difference between Trust-led and GP-led settings is the proportion of checks carried out by a doctor alone. More than 40% of children are seen by a doctor alone in the Trust setting compared with 19% in primary care.

The guidelines in *Health for all children*[1] suggest that a doctor should carry out this check, preferably in the presence of a health visitor. The estimated mean costs of this model of delivery are £10.74 (GP-led) and £8.74 (Trust-led), which is statistically significant.

Average costs of Check 2 (6–9 months)

The estimated mean costs of Check 2 (for those observations in which the HDT was undertaken at the same time as the other components of the check) were £4.82 (Trust-led) and £8.02 (GP-led) per child, a statistically significant difference. When the HDT was carried out separately, the overall costs of the check were £15.66 (GP-led) and £15.82 (Trust-led). This difference is not statistically significant.

The most common models of delivery in both settings involved either a health visitor alone or a health visitor with another professional. These two models accounted for between 67% and 77% of all observations.

The guidelines in *Health for all children*[1] suggest that this check should be carried out by a doctor, but can equally be the responsibility of a health visitor. However, it is also recommended that two adequately trained staff carry out the HDT. The estimated costs of a model involving a health visitor and another professional are £6.82 (GP-led) and £4.30 (Trust-led) per child, a statistically significant difference.

Average costs of Check 3 (18–24 months)

The estimated mean costs of Check 3 were £7.41 (GP-led) and £8.55 (Trust-led) per child. This difference is statistically significant and was mainly a result of the higher proportion of checks in Trust-led clinics carried out at home (57.7% Trust-led compared with 29.1% GP-led).

For GP-led checks the most common models of delivery were those involving a health visitor alone in a clinic, a health visitor with another professional in a clinic or a health visitor at the child's home. For Trust-led checks the most common models were health visitor and doctor in a clinic and health visitor (either alone or with another professional) at the child's home.

Health for all children[1] suggests that this check does not involve any specific medical or screening procedures, and is concerned primarily with parental guidance. It is often carried out in the family home and it is suggested that the health visitor is the most appropriate person to take responsibility for this check. The costs of Check 3 carried out by a health visitor alone in the family home were £9.44 (GP-led) and £8.70 (Trust-led). This difference is not statistically significant.

Average costs of Check 4 (39–42 months)

The estimated mean costs of Check 4 when the orthoptic screen is carried out with other components of the check are £8.51 (GP-led) and £8.81 (Trust-led). This difference is not statistically significant. Taking account of the additional costs arising when the orthoptic test is carried out separately, the mean costs per child of Check 4 were £9.50 (GP-led) and £10.45 (Trust-led). As with Check 3, there were differences between settings in the proportion of checks carried out at home (43.6% Trust-led compared with 26.3% GP-led).

Health for all children[1] suggests that each primary care team should decide whether this check is best performed by a doctor or a health visitor. In practice no more than 19–22% of checks at this age included any doctor input. The guidance does not specifically mention the desirability of performing this check in the family home, but the importance of making contact with children who have previously failed to attend for immunisation, and the emphasis on developmental, language or behavioural problems, may make a home visit appropriate.

The estimated cost of performing Check 4 by a health visitor in a clinic was £6.38 per child,

irrespective of clinic type. The estimated costs of a health visitor performing the check in the family home were £9.60 (GP-led) and £10.41 (Trust-led). This difference is not statistically significant.

Average costs of check components

For each of the checks the observed range of times required to carry out a particular component was very wide. Few of the individual components cost more than £1.00, with the exception of the HDT and the orthoptic screen when carried out separately from other components of a check. This suggests that the addition or removal of specific components within a check will have a negligible effect on the overall costs of CHS. Furthermore, the physical checks are often performed at the same time as health education topics are discussed.

The HDT takes on average 3.5 to 5 minutes when carried out as part of Check 2 and costs between £1.00 and £2.40 in staff time. Carried out separately, the HDT takes between 15 and 20 minutes and costs in the range of £6.24 to £8.31.

When carried out as part of Check 4, the test of vision takes an average of 2 minutes and costs less than £1.00 in staff time. Carried out by an orthoptist on a separate occasion, the average time is 10–15 minutes and the cost is between £2.00 and £3.00.

Average costs of follow-up activity

Requests to return or referrals arise from 16% of CHS contacts. Approximately 10% of contacts give rise to referrals to a GP (1.8%) or a health visitor (8%). The remaining 6% lead to referrals to a community paediatrician (0.9%), orthoptist (1.2%), audiologist (1.5%), speech therapist (1.5%) or another professional (1.5%). The majority of referrals are made by and to health visitors.

Costing referrals is difficult, but the salary cost of a 30-minute appointment varies from £4.86 (speech therapist) to £17.83 (community paediatrician).

Average costs to parents

The majority of parents, who either walked or drove in their own cars, did not report any direct costs of attending CHS clinics. Parents travelling by bus, train or taxi (3.5%) incurred an average cost of £2.23 per visit. Less than 1% reported indirect costs (e.g. for child-minding) of £2.00 on average, and 3% reported loss of earnings. The average cost to this latter group was £23.56. Overall, the mean cost to parents was less than £1.00 per visit.

Conclusions

- Despite common policies (e.g. for a Health Authority), CHS checks (and their components) vary widely in their actual delivery.
- Because components are often undertaken simultaneously, it is difficult to identify any significant time savings from omitting any of the individual elements (apart from the HDT and vision tests on separate occasions).
- Data on the effectiveness of CHS checks in meeting their broad objectives and on the specific components in meeting their objectives are needed to complement the cost data – cheap models of delivery may or may not be cost-effective.
- There appears to be great variation in the coverage of relevant health education topics.
- Because of the wide diversity observed in practice, a register of the costed time inputs, which could be updated as salaries change, has not been prepared.

Recommendations for research

- Identifying the objectives of CHS (e.g. health promotion, detection of child abuse) to determine whether the CHS programme is the most (cost-)effective way of meeting these objectives.
- The comparative (cost-)effectiveness of the different ways in which hearing is assessed (ranging from asking the parents to performing HDTs in appropriate surroundings).
- The comparative (cost-)effectiveness of the different ways in which vision and eyesight are assessed.
- The comparative effectiveness of checks undertaken by doctors and health visitors (e.g. why do health visitors generate so many more requests to return than doctors?).
- The outcomes of the referrals to specialists arising from the CHS checks – were the referrals appropriate?
- The numbers of problems diagnosed and requiring specialist input outside the CHS framework (e.g. via GP visits, playgroups/nurseries and primary schools).
- The views of parents – what do they want from the checks, and how can their needs be met most appropriately (e.g. for their first and subsequent children)?
- Are there differences in the costs of attending CHS checks for parents from urban and rural areas?

Chapter 1
Introduction

Child health surveillance

> "Child health surveillance is a programme of care initiated and provided by professionals, with the aim of preventing illness and promoting good health and development."[2]

Child health surveillance (CHS) is that part of a more general programme of child health promotion that relates to secondary prevention by early detection. For the purposes of this study (and as defined in the project brief), CHS is defined to include those activities routinely offered to all children at visits scheduled at (approximately) 6–8 weeks, 6–9 months, 18–24 months and 39–42 months.

Although recommendations exist about the basic range of tests to be offered to children at each of these visits, there is expected to be considerable diversity in the way in which the CHS programme is organised locally. This diversity may include differences in the location and content of visits and in the types of staff involved.

Most CHS activity is now provided in primary care. GPs with appropriate training receive a capitation payment (at the time of this study, this was £11.65 for each registered child under the age of 5) for the provision of CHS, which is usually undertaken in conjunction with health visitors attached to the practice. The community medical service retains a residual role in providing CHS for children under the care of a GP not contracted to provide CHS.

Objectives of the research

> "The surveillance and monitoring of child growth and development are regarded as good practice throughout the Western world. Until the mid-1980s it was assumed that the value of these activities was self-evident, but there was then, and still is now, a striking paucity of research into the individual tests and other components of the various surveillance programmes. Over the past decade there has been an increasingly critical approach to all forms of surveillance and screening. Limitations in resources and demands for a rational approach to resource allocation have made it essential to evaluate health care activities and seek the most cost-effective means of delivery."[1]

The purpose of this study was to provide cost information that could be used to complement separate studies of the effectiveness of some of the component parts of the CHS programme (such as visual screening and screening for speech and language delay), commissioned as part of the NHS Health Technology Assessment Programme. Very little information exists on the costs of the checks and their specific components, or on the costs of follow-up. According to the project brief, these costs are likely to vary according to the location of service delivery, the timing of the visits, and the professional staff involved in delivering the services. The specific aims of this work were:

- to provide estimates of the costs of components of the CHS programme that could be used in conjunction with the results of effectiveness studies to evaluate cost-effectiveness and to estimate the budgetary consequences of changes in local policy
- to create a register of the costs of each element of the CHS programme in a form that could be updated.

In the absence of information on the relative effectiveness of component checks or of different models of delivery, it is not part of the purpose of this study to evaluate the cost-effectiveness of CHS.

Methods

The focus of this study was on costs to the NHS and to parents, including the cost of referrals arising from routine CHS visits. Our working hypothesis was that the costs of each check are likely to be determined primarily by three variables: the range of tests offered at each visit (i.e. the content), the location of the visit, and the type of staff involved, and that the overall costs associated with CHS will vary according to the number of CHS checks each child receives. *Table 1* shows the main expected parameters of a CHS model, based on the recommendations contained in *Health for all children*.[1] Appendix 1 provides further details.

The first stage of the research was designed to identify the range of service models found in

TABLE 1 *Main parameters of CHS checks at each age range*[*]

Age range	6–8 weeks	6–9 months	18–24 months	39–43 months
Location	Home Surgery/clinic Other	Home Surgery/clinic Other	Home Surgery/clinic Other By post/phone	Home Surgery/clinic Other
Content	Physical examination Plus health education topics	Check vision and hearing Check weight and length CDH check HDT Plus health education topics	Check behaviour, vision and hearing Check gait (Haemoglobin estimation) Measure height Plus health education topics	Discuss vision, squint, hearing, language acquisition and development Measure height (and weight), testicular descent Physical examination Plus health education topics
Professional staff	GP HV Other	GP HV Other	GP HV Other	GP HV Other

[*] *The age ranges and content are as suggested in Hall, 1996,*[1] *pp 223–32*

CDH, congenital dislocation of the hip; HDT, hearing distraction test; HV, health visitor

practice and the main parameters of these models, as identified in the project brief. This was necessary in order to be able to select a representative sample for further detailed analysis. A postal questionnaire was sent to all relevant Trusts in England and Wales, requesting information on their local CHS policy and delivery. Replies were received covering 88 Health Authorities, 81.5% of the possible total.

The questionnaire survey demonstrated a high degree of homogeneity in CHS policy, with most Authorities conforming closely to the recommendations contained in *Health for all children*,[1] which are illustrated in *Table 1*. The main differences between Health Authorities appeared to be in the organisation of routine vision and eyesight checks and the hearing distraction test (HDT). Differences were also apparent in the extent to which additional staff were used to assist with checks for children from ethnic backgrounds.

A sample of 11 Health Authorities (i.e. 10% of the total) was selected from the responses for the costing exercise. The project proposal explained that it would not be possible to define the sample size in advance of the questionnaire survey. This was because the optimal sample size would be influenced by the number of different models identified, and by the population variance in key parameters. None of this was known *a priori*. The decision to select a 10% sample of Health Authorities was made on the basis of information available and the budget for the work. The sample was designed to be representative of differences in geography (north/south), rurality (urban/rural), and local policy on eyesight tests and the HDT. The two areas reporting the highest proportion of children from ethnic backgrounds (one north and one south) were also included.

The sampling unit was the main Community Trust providing CHS services within each Health Authority. The consultant community paediatrician at the Trust was asked to select two Trust-run CHS clinics and three GP practices for the fieldwork. The costing exercise was therefore based on a total of 55 subsites.

The aim of the costing exercise was to provide information on the costs of individual components of the CHS programme, in order to inform policy about possible changes in models of organisation. It was therefore decided that the focus of the study should be on identifying the opportunity costs of variable inputs. The scale of CHS activity is such that likely changes in the organisation or content of programmes would not have a significant impact on fixed costs (such as the costs of land, premises or equipment), because of the relatively small volume of activity when compared with the volume of other activities undertaken in GP practices and health clinics. All overhead costs were therefore excluded from the reported analysis, although allowances for overheads and a component to cover the costs associated with gaining the relevant professional qualifications were also identified and can be added on if necessary.

The main driver of variable resource use is staff time, and the main part of the research was devoted to obtaining estimates of the time involved in the delivery of each of the separate components of a

CHS programme. Time is valued at the cost to the employer (in this case the NHS) on the basis that, at the margin, the cost to the employer (the 'full' wage) is a reasonable proxy for the opportunity cost of time.[3] The rationale is that time spent in delivering CHS is time that cannot be spent undertaking other work-related activities. The full wage represents the implicit value placed (by the NHS) on CHS and, at the margin, on the best alternative use of time.

A member of the research team attended each of the subsites as an observer. During this visit the researcher collected information on the time spent on each of the component checks and the type of staff involved. Parents were also asked about the time and other costs involved in attending the clinic. Staff at each of the subsites involved in the CHS checks were asked to complete activity timesheets prospectively, identifying time spent either directly or indirectly on CHS-related activity over a 3-month period following the researcher's visit. Staff were also asked to record requests to return and referrals arising from routine CHS checks over this period.

Unit costs were derived from midpoint salaries and associated on-costs (employer's national insurance and superannuation) of relevant pay scales adjusted for average annual hours of work. Staff costs are shown in *Table 2*. These costs, combined with estimates of staff time inputs, form the basis of the reported costing exercise.

The costs in *Table 2* exclude any overhead costs because, as stated above, it was not felt that the scale of CHS activity would affect these fixed costs. However, Netten and Curtis[4] include annual estimates of overheads (both direct and indirect), capital overheads and qualifications (not included in their 1997 version[5]) in their unit cost estimates for community-based staff. Their figures indicate that health visitor costs should be increased by 50% (25% for overheads and 25% for qualifications) to account for these elements. GP costs are less straightforward because of the ways in which GPs are remunerated, but the figures suggest that their net remuneration should be increased by about 83% (25% for overheads and 56% for qualifications). No estimates are available for community paediatricians or community medical officers. However, the estimates for hospital-based medical consultants suggest increases of 36% for overheads and 44% for qualifications, whilst the figures for specialist registrars suggest adding 12% for overheads and 66% for qualifications.

The time costs of travel for staff making home visits to undertake CHS checks are included in the cost estimates, although other travel costs (such as the cost of petrol) are not. However, Netten and Curtis[4] estimate an average travel cost of approximately £1 per visit for health visitors and district nurses. Therefore £1 can be added to the staff-related costs of checks requiring home visits, to reflect these travel costs.

Information from the site visits and from the prospective records was used to estimate the staff costs of CHS checks (including their component parts) at 6–8 weeks, 6–9 months, 18–24 months and 39–42 months, the costs of subsequent referrals, and the costs to parents.

TABLE 2 *Staff costs (midpoint salaries correct at September 1997)*

Grade	Salary midpoint (including on-costs) (£)	Weeks worked per year	Average hours per week	Cost per hour (£)
GP	49,944	46	40	27.14
HV – Grade G	21,993	45	37.5	13.03
Other nursing	20,101	45	37.5	11.91
Community paediatrician	59,993	42	40	35.71
CMO	29,403	42	40	17.50
Speech therapist – Grade 1	14,659	42	36	9.70
Speech therapist – Grade 2	20,063	42	36	13.27
Speech therapist – Grade 3	31,024	42	36	20.52
Orthoptist	15,606	45	36	9.63
Senior orthoptist	19,982	45	36	12.33
Audiologist – MTO Grade 2	15,927	45	36	9.83

CMO, community medical officer; MTO, medical technical officer

Structure of the report

Chapter 2 discusses the data collection process. Chapters 3–6 present results of the cost analysis. Chapter 3 shows average costs per child for checks at each of the four ages, chapter 4 shows average costs for each component of the four checks, chapter 5 shows the costs of referrals, and chapter 6 shows costs incurred by parents. Some conclusions and recommendations are presented in chapter 7.

Chapter 2
Data collection

Identifying models of provision

Most Health Authorities have a CHS policy, usually drawn up in conjunction with local Trusts and GPs. A questionnaire was designed to provide information about different ways of providing CHS checks, to determine whether a number of broad models of delivery could be identified at this stage for subsequent costing. This was the objective of the questionnaire – it was not intended to analyse the resulting information in depth (although the broad findings are reported on page 6). The questionnaire was sent to an identified individual (usually a consultant community paediatrician) in all Trusts in England and Wales providing community care services. Respondents were asked to complete the questionnaire and to send a copy of their local CHS policy (defined as being the policy for the Health Authority area in which they were located). A copy of the questionnaire is included as appendix 2.

Whilst it was recognised that a substantial proportion of CHS work is carried out by GPs rather than by doctors employed by Trusts, this approach was felt to be the most effective way of identifying the broad range of local policies and models of delivery. Health visitors play a significant role in delivering CHS, but may be deployed in a variety of ways. For example, many health visitors are employed by a Trust but attached to a specific GP practice. Therefore Trusts generally have a significant input into CHS, and some Trusts are responsible for the overall monitoring of CHS activity within their Authority.

As well as collecting general information about staffing and locations of CHS checks, it was recognised from the outset that there are several broad areas where local custom and practice may vary, and the questionnaire focused on identifying any variations in these areas.

Screening of children aged over 3 years

Although *Health for all children*[1] focuses on four checks for pre-school children (see appendix 1), with the fourth at 39–42 months, it was suggested during piloting that in some areas this check may instead be performed on all children when they start school. Although costing school-based medical checks was outside the brief of this project, the operation of such a policy would obviously shift the costs of CHS provision across local budgets and significantly reduce the costs of undertaking the routine checks in non-school settings.

Orthoptic screening

Health for all children[1] states that it is very difficult to measure visual acuity in children under the age of 3 years because of the need for cooperation. Therefore, universal screening by an orthoptist of all very young children may not be justified. However, the guidelines also recognise that a programme of universal vision screening of all pre-school children aged 3 years and above by doctors or health visitors may be less effective than one involving orthoptists. It was therefore expected that some places would use orthoptists for at least some routine eyesight checks, whereas in other locations children may only be seen by an orthoptist if referred for a specialist opinion. In those locations where an orthoptist was involved in some routine screening, this may or may not require an additional visit by the child. Furthermore, if a doctor or health visitor wants a specialist opinion, the child could (theoretically) be referred either to a community-based orthoptist or to a hospital-based consultant ophthalmologist. The questionnaire therefore sought to identify the extent to which these different models of orthoptic screening operated.

HDT

There are many possible strategies for screening for hearing loss, but there was particular interest in the provision of the HDT at 6–9 months. Ideally this requires two trained people working in collaboration, although sometimes the parent is directly involved instead of a second healthcare professional. Quiet conditions, proper equipment, adequate sound level monitoring and careful technique are essential. In some places this test is performed at the same time as the other CHS checks (either by the staff who are present at the time or by specialist staff), or it may be performed at a separate visit, either by a health visitor (and assistant) or by specialist audiology staff. In addition, children requiring a specialist opinion could be referred to a community audiology clinic or to a hospital-based consultant otolaryngologist.

It was therefore important to identify the extent to which these possible models of care operated.

Combined clinics/activities

Given the wide range of preventive and promotional clinics offered in many areas, the questionnaire asked whether Trusts had a policy of operating combined clinics involving CHS. For example, a mother's 6-week postnatal check could be combined with the child's first CHS check. Such an approach would obviously impact the costs of providing CHS.

Vaccination and immunisation

This is a specific example of combining two programmes locally, which could influence the costs of provision. This is particularly relevant for the 6–8-week check, because the primary course of immunisations generally starts at 8 weeks.

Ethnicity

Areas with a high proportion of residents from ethnic minority backgrounds may face higher costs of providing CHS checks if additional resources or staff (e.g. link staff or interpreters) are employed. The questionnaire asked about the proportion of residents from ethnic backgrounds and whether this meant that additional staff were used to assist with CHS.

Selecting sample sites

In total, 300 copies of the questionnaire were distributed in England and Wales at the beginning of January 1997. Over half of these were sent to named individuals within Trusts (usually a consultant community paediatrician), but copies were also sent to all Trusts providing community services, to ensure that no potential provider was omitted. At the time of distribution there were 108 Health Authorities in England and Wales. It was recognised that some of the questionnaires would be distributed inappropriately, which would result in a relatively low overall response rate, but the aim was to receive at least one response from each Health Authority. By the end of February, 153 questionnaires representing 88 Health Authorities (i.e. 81.5%) had been returned, and these were used to select the sites for subsequent detailed analysis.

It was not apparent beforehand how many models of delivery would be identified. Neither was it obvious at the outset how many sites would be required to ensure that a large enough sample was selected to generate sufficient data to undertake the cost analysis. Indeed, it was only possible to determine the number of sites after the questionnaires had been analysed.

Although the questionnaire was designed to identify the different models of delivery of CHS (e.g. number of checks, age of child, content of check, staff involved), it was apparent from the responses that there was a considerable degree of uniformity across the country, with the vast majority of local policies following the recommendations in *Health for all children*.[1] For example, 98.4% of respondents undertook the 6–8-week and 6–9-month checks within these timeframes. The 18–24-month check was performed during this period by 95.2% of respondents. Two Trusts used the telephone to undertake this check, and only one Trust did not perform this check. Slightly more variation was apparent in the timing of the 39–42-month check, but about 85.5% of respondents undertook it within this timeframe, although one performed it at 33 months, and another at 4 1/2 years (i.e. 54 months). Telephone calls were used by three Trusts, and a few checks were performed in day nurseries. Policy on routine school checks varied, but these checks were not included in this study. However, these policy variations did not appear to have much impact on the delivery of the 39–42-month check. As well as indicating very little variation in the number of checks undertaken and the ages at which these are carried out, the responses showed little variation in the types of staff involved.

There were, however, identifiable variations in the performance of the HDT and routine eyesight and vision checks. For example, although 94.4% of the respondents routinely performed the HDT at 6–9 months, half (50.0%) performed it at the same time as the other check components, just under a third (30.6%) undertook it on a separate occasion, and the others had a flexible approach. Approximately two-fifths (40.3%) of respondents indicated that routine orthoptic screening during the 39–42-month check was provided by community orthoptists (usually on a separate occasion from the other elements of the check). The sample was selected in order to reflect these differences. The only other clear distinguishing feature identified by the questionnaire was that some Trusts employed additional staff to help with CHS checks for children from ethnic minority backgrounds.

This analysis led to a total of 11 representative Trusts being identified (representing 11 Health Authorities, or 10% of the total). This decision was made on the basis of the information available

from the questionnaire and the overall project budget. These sites were selected according to a number of criteria:

- on the basis of location (north or south – with the north defined as the area above a line from Liverpool to the Wash through Nottingham)
- whether they served predominantly urban or rural populations (urban populations were defined as those where the Health Authority served all or part of a major conurbation, and where the population density was high)
- how they claimed to undertake the HDT and/or routine eyesight and vision checks.

Several criteria could have been used to select the Health Authorities/Trusts for the more detailed analysis. If the Health Authorities/Trusts had been selected randomly, there was a significant risk that insufficient sites would be included to ensure appropriate numbers undertaking the HDTs and routine eyesight and vision checks in different ways. All English Health Authorities were classified according to the north/south and urban/rural criteria as defined above, and the additional information about the hearing and eyesight checks was considered alongside this classification. Using this information, the research team then selected the 11 Trusts. The team felt that the resultant sample represented the various dimensions under consideration, and therefore was representative of the country as a whole (and certainly more representative than a random sample drawn from across all 108 Health Authorities).

Other possible selection criteria include income levels, unemployment rates, social class composition, and healthcare expenditure. Health Authorities cover populations of approximately 0.25–0.75 million, and often include both very affluent and highly deprived subpopulations. Information on factors such as average income levels, average unemployment rates and social class composition were generally not routinely available by Health Authority. It was decided to use the north/south and urban/rural selection criteria because these were relatively transparent and ensured comprehensive coverage. Furthermore, they may also serve as proxies for income levels, unemployment rates and social class composition.

In addition, the two responding areas with the highest proportion of children from ethnic backgrounds (of which one was in the north and the other in the south) were included, as their costs may have been increased as a result of the need to employ translators. *Table 3* lists the 11 initially selected areas by their identifying characteristics.

Once the 11 sites had been identified, it was decided to select five subsites providing CHS clinics in the area covered by the Health Authority, to provide representative coverage of the local population. The consultant community paediatrician (or equivalent) at each selected Trust was asked to identify two Trust-run clinics and three GP practices, giving a total sample of 55 clinics. They were asked to select these Trust-run clinics and GP practices to represent different parts of the area (e.g. relatively deprived, relatively affluent) and different qualities of GP and Trust premises, to ensure that the research drew upon data from across the whole community. Asking the community

TABLE 3 *Sample areas*

Health Authority area	North/ south	Urban/ rural	High ethnic	Routine HDT	HDT with other checks	Routine orthoptic screen
A	N	U	✔	–	–	–
B	S	R		✔	✔	–
C	N	U		✔	✘	✘
D	S	U	✔	✔	✘	✔
E	N	U		✔	✔	–
F	S	R		✔	✘	✘
G	N	R		–	–	✔
H	N	U		✔	✔	✔
I	S	U		✔	✘	✔
J	N	R		✔	✘	✔
K	N	R		✔	✔	✘

–, data missing from questionnaire; N, north; S, south; U, urban; R, rural

paediatricians to identify a random sample of three GP practices and two Trust-run clinics may not have produced a representative sample, given the small numbers. By providing selection criteria for the community paediatricians and drawing on their local knowledge, this approach was intended to reduce the risk of only including atypical (or outlier) clinics or practices in the sample, whilst capturing local diversity and thus representing the local population.

The project team considered the issue of ethical approval in depth, and spent considerable time discussing this with the contact consultant community paediatricians at the selected sites. At the time of the study there was no single body that could grant ethical approval for the study as a whole, and so it would have been necessary to obtain ethical approval locally for each of the 11 sites. This would have been very time-consuming, especially given that some of the relevant local committees only met every 6 months. Seeking such approval would have delayed many of the site visits considerably. To ensure patient confidentiality, the project team ensured that they never received any information that would enable specific children or families to be identified (which also prevented any subsequent data being collected for children requested to return or being referred to other specialists). The consultant community paediatricians and other staff working at the locations visited felt that this was acceptable. Furthermore, no checks were observed by members of the research team (i.e. to time the individual components – see below) without permission from the children's parents. Two of the initially selected sites had concerns about the time requirements and/or ethical aspects of the study and withdrew early. They were replaced by Health Authorities with similar characteristics to ensure that the sample remained as representative as possible.

Site visits and prospective data collection

Once the subsites had been identified, arrangements were made for a member of the research team to attend a CHS clinic as an observer. These visits served several purposes:

- They provided the researcher with information about how CHS activity was actually undertaken locally (e.g. staff mix and staff grades, local policies on HDTs and the use of orthoptists).
- They enabled the observer to time the component parts of the CHS checks and therefore to identify not only what was included in the checks, but also the amount of time spent on the various component parts by those performing the checks. Examples of the forms used for recording this information are included in appendix 3.
- Those bringing the children to the clinic (usually their parents) were asked about the costs to themselves of attending (see appendix 4).
- The staff involved in the clinic were briefed about the forms they were asked to complete prospectively over the following 3 months, recording the time spent on different elements of CHS activity (see appendix 5). The forms were used to record the 'direct' and 'indirect' time spent on CHS-related activities (where 'direct' time was that spent in face-to-face contact with the child/parent, and 'indirect' time was that spent on a specific child, undertaking activities such as administration and travel to home visits, but not in direct contact with the child/parent). The forms were also used to record information about requests to return and referrals made as a result of the check. Staff were also asked to complete summary timesheets of their activity for each day during each month, including any other time spent on CHS-related activity that was not child-specific (e.g. meetings and training).

Staff were assured that their participation in the study was voluntary and that none of the data would be linked to specific individuals or locations. The few subsites that withdrew at this stage of the project (e.g. because of concerns about the amount of time and effort required to complete the prospective data collection forms) were replaced with others in the same area.

The CHS delivery context

The site visits did not cover the full range of organisational models (e.g. a few places use postal questionnaires or telephone calls for some checks or aspects of checks), but nevertheless they revealed considerably greater diversity than initially anticipated. This was apparent not only **between** Health Authorities, but also **within** them. Therefore, although the local policy on CHS may state that certain procedures should be followed for all CHS activity within the Health Authority's boundaries, the site visits revealed that this did not always occur in practice. Furthermore, the organisation and content of CHS checks are not

static, and indeed changes were introduced at some of the sites and subsites during the data collection period (e.g. ceasing to undertake the HDT routinely during the second check).

In addition, although *Health for all children*[1] suggests the most suitable staff to undertake each check, this may not always be appropriate or feasible locally. For example, although some places held clinics devoted entirely to CHS (either for one specific check at a session or for a mixture of all four checks), others integrated CHS activity into their child-related clinics. Trust-led clinics may be organised differently from GP-led clinics for valid reasons – for example, if a Trust is employing a doctor (e.g. a community medical officer) to run a clinic, it may be more appropriate to use them to undertake a check that could be provided by a health visitor. This will depend on the opportunities foregone by both doctor and health visitor. This same logic applies to other combinations of staff in both Trust and GP settings – if additional nursing staff are already present (e.g. to provide vaccinations and immunisations), it may be sensible to use them to undertake certain CHS activities, such as weighing and measuring, if they would otherwise be under-occupied.

However, although some places had considered the optimal staffing configurations for their CHS activities, others were following longstanding local tradition. For example, although the role of doctors in providing CHS has decreased considerably in recent years, some doctors (especially GPs) continue to be involved because they have traditionally contributed to the checks and because they see it as an integral part of their workload and responsibilities (e.g. as a family doctor).

CHS is not a discrete activity. In some places undertaking the checks overlaps with other activities, such as vaccination and immunisation. Furthermore, discussion of concerns and some of the health education components can be done while the physical checks are being carried out, making it impossible to allocate specific, discrete amounts of time to each of the different components. It is also important to remember that the four checks are not homogenous, with some placing more emphasis on physical checks, and others focusing primarily on health education.

The objectives of the four checks may vary. The primary objectives of the checks are generally to identify any physical and developmental problems and to act as a vehicle for health promotion and education. However, the checks may also be used implicitly as a means of achieving other objectives, such as identifying potential child abuse or neglect. Observation (for example, of the child's development and of the interactions between parent and child) is an important, if less visible, component of all checks. The checks may also identify other underlying maternal health issues, such as postnatal depression. In general, doctors are more confident about undertaking physical checks than they are about discussing health education and related aspects. Health visitors, however, tend to have a greater affinity for educative and advisory activities, and may lack the skills and/or confidence to undertake at least some of the physical checks (e.g. for CDH). If the parent and child are to receive all of the recommended components from professionals who are both competent and comfortable with their provision, it may be appropriate to utilise both doctors and health visitors (although their roles will need to be clearly defined to avoid unnecessary duplication).

Another potential variable is the location of the check, which usually takes place either in a clinic/surgery or in the child's home. There may be sound clinical reasons for undertaking at least some of the checks in the child's home (and the child may be more cooperative in a familiar environment), and it may also be more convenient for the parents. However, there may be more pragmatic reasons – for example one Trust in the sample undertook a relatively high proportion of home visits because of a lack of suitable NHS facilities. This was the result of the recent closure of a number of its health centres because of their poor condition.

Refining the analysis in the light of the visits

Models of delivery

As a result of the site visits, models of delivery were grouped into nine broad categories, shown in *Table 4*. Four of the models refer to 'ANO', signifying that another person provided support and assistance to the doctor and/or health visitor. This 'ANO' category included several types of staff, such as practice nurses, clinic nurses, clinic assistants and nursery nurses. Model 7 – doctor only and home visit – was never observed in the sample, but is included in the list of possible models for completeness.

Adjusting for HDTs and eyesight checks

The site visits revealed considerable variation in the local delivery of both the HDT during

TABLE 4 *Models of delivery*

Model	Description
1	Doctor only
2	HV only
3	Doctor and HV
4	Doctor and ANO
5	HV and ANO
6	Doctor, HV and ANO
7	Doctor only – home visit
8	HV only – home visit
9	HV and ANO – home visit

ANO, another

Check 2 and the eyesight checks undertaken during Check 4. Furthermore, these variations occurred at sites **within** Health Authorities as well as **between** them (irrespective of local policy). Some places required the child to return on another occasion specifically for the HDT, whilst others performed it as an integral part of Check 2. A few places had ceased to perform the HDT at all and instead relied on parental observation.

These findings made it necessary to subdivide the data set for Check 2 to reflect the two broad forms of practice observed during the site visits.

The site visits also showed considerable variation with regard to the use of orthoptists to undertake the eyesight and vision screening that forms part of Check 4. In some places the child spends some time with an orthoptist during the same visit as the remaining components of the check are undertaken. However, other places require the child to make a separate visit (possibly elsewhere) for the orthoptist component. Some subsites, however, did not routinely involve orthoptists in this check (and only children causing concern were referred to orthoptists).

Ethnicity

Two sites with relatively high proportions of children from ethnic minorities were included in the sample – one in the north and one in the south. The visited subsites sometimes employed cultural link workers and interpreters, although in some places the health visitor was fluent in more than one language and had a sound cultural awareness.

Chapter 3

Analysis of total costs

Testing for differences in average costs

The sample was selected in such a way that systematic differences in costs between sites resulting from geography, rurality and ethnicity could be detected. In addition, data were collected separately for Trust-led and GP-led clinics. In order to test for economically meaningful differences in average costs per child for each of the four checks, the full data set was divided into four paired subsets: north/south, urban/rural, ethnic/non-ethnic and Trust-led/GP-led (*Table 5*). At this stage differences in the organisation of the HDT (Check 2) and eyesight tests (Check 4) were not considered.

With the relatively large sample sizes (i.e. for number of CHS checks) generated by this research, it is highly likely that relatively small differences in mean values will be shown to be significant using conventional statistical tests of significance. It is important to consider all of the available statistical evidence and to use some judgement in assessing which differences are economically meaningful. It was decided to base judgements of significance on 95% confidence intervals (CIs) calculated around differences in mean values. These are given in appendix 6, which also includes full details of the results. All of the tables in this and the subsequent chapters show summary results only.

Table 6 summarises the conclusions drawn from calculating 95% CIs for differences in mean costs for each pairwise comparison shown in *Table 5*. As a result of this exercise it was decided that in all subsequent analysis, data for the four checks should be subdivided into Trust-led and GP-led activity. Furthermore, the site visits indicated that there was often a considerable difference between the ways in which Trust-led and GP-led checks were delivered, although such differences were not apparent for clinics in the north and the south or in urban and rural areas. Although there is no significant difference between the average cost of Trust-led and GP-led clinics for Check 4, the data for this check are nevertheless presented separately for consistency.

Given that there is no consistent direction of difference for north/south and urban/rural costs, or any obvious rationale for such differences, the data were not further subdivided according to these variables. Furthermore, although clinics in areas with high proportions of children from ethnic minorities were expected to be more expensive because of the need to employ interpreters or cultural link workers, the overall evidence does not support this hypothesis. Therefore data from all areas were pooled for the subsequent analysis.

TABLE 5 *Average cost per child (£) for each CHS check, grouped by underlying variables*

	Check 1		Check 2		Check 3		Check 4	
	Number of observations*	Average cost (£)	Number of observations*	Average cost (£)	Number of observations*	Average cost (£)	Number of observations*	Average cost (£)
North	406	7.27	678	7.89	469	7.91	504	9.03
South	310	9.03	476	7.26	306	7.67	321	7.94
Urban	311	7.22	467	8.02	331	8.05	348	8.86
Rural	405	8.65	680	7.37	448	7.64	477	8.42
Trust-led	230	6.24	324	7.00	274	8.55	250	8.81
GP-led	486	8.89	805	7.90	505	7.41	575	8.51
Ethnic	173	7.51	228	8.08	113	8.19	92	8.53
Non-ethnic	543	8.19	926	7.52	666	7.75	733	8.62

* *The unit of observation is the child*

TABLE 6 *Indications from statistical analysis using 95% CIs for differences in means*

Variable	Check 1	Check 2	Check 3	Check 4	Overall
North vs south	N < S	N > S	N = S	N > S	N = S
Urban vs rural	U < R	U > R	U > R	U = R	U = R
Trust-led vs GP-led	T < GP	T < GP	T > GP	T = GP	T ≠ GP
Ethnic vs non-ethnic	E = NE	E > NE	E = NE	E = NE	E = NE

N, north; S, south; U, urban; R, rural; T, Trust-led; GP, GP-led; E, ethnic; NE, non-ethnic

The remainder of this chapter summarises the results of the statistical analysis comparing the mean costs of the various models of delivery identified in *Table 4*. Appendix 7 provides a description of the different models of delivery observed at the site visits. The material in this appendix complements the costing information in the report, and provides important contextual information. A wide variety of organisational models were observed, and the type and quality of the accommodation were often constraints. These aspects of delivering CHS need to be borne in mind when considering the cost analysis. Appendix 8 presents the models of delivery and associated costs of each check by site, which vary considerably.

Cost comparisons for Check 1

Table 7 shows the mean cost for each model of delivery for Trust-led and GP-led clinics. Although there are no clinical reasons why this check cannot be undertaken by a health visitor alone, this was not local policy at any of the subsites from which data were collected. However, in several places the health visitor (with or without an assistant) provided the majority of the check components, with the doctor completing the remaining elements when they next saw the child. These elements include parts of the physical check – for example, it may be local policy for the GP to check the heart on a separate occasion, but for the health visitor to carry out all of the other components. In these places the CHS elements undertaken by the doctor will typically take place during time funded either for the provision of general medical services or during time funded for vaccinations and immunisations. Unless the doctor encounters problems, these checks are unlikely to take long to complete. They are therefore unlikely to add much to the overall cost of meeting the local CHS policy requirements for this check.

TABLE 7 *Mean cost by model of delivery for Trust-led and GP-led checks – Check 1*

	Model									Total/ average
	1 Dr only	2 HV only	3 Dr and HV	4 Dr and ANO	5 HV and ANO	6 Dr, HV and ANO	7 Dr: home	8 HV: home	9 HV and ANO: home	
Trust-led										
Number	100	11	41	15	49	12	–	1	1	230
%	43.48	4.78	17.83	6.52	21.30	5.22	–	0.43	0.43	100
Mean cost per child (£)	4.88	5.75	8.74	10.90	4.95	7.65	–	12.98	14.16	6.24
SD (£)	1.62	4.05	2.44	6.01	5.09	0.99	–	–	–	3.86
GP-led										
Number	92	61	119	15	64	116	–	19	–	486
%	18.93	12.55	24.49	3.09	13.17	23.87	–	3.91	–	100
Mean cost per child (£)	7.17	3.78	10.74	6.83	8.93	11.13	–	9.55	–	8.88
SD (£)	2.95	1.96	3.38	1.21	3.94	3.87	–	2.83	–	4.10

SD, standard deviation

A number of points arise from *Table 7*:

- The costs for models 2, 5, 8 and 9 must be considered incomplete because of the absence of any doctor input.
- Over 70% of checks involved a doctor in both Trust-led and GP-led clinics. The main difference is in the proportion of checks undertaken by a doctor alone (43.5% for Trust-led and 18.9% for GP-led).
- The most prevalent model for GP-led checks is a doctor and health visitor working together (model 3) (24.5%), with a similar proportion (23.9%) being performed by a doctor, health visitor and other member of staff (e.g. clinic assistant) (model 6).
- More than one-fifth of the Trust-led checks (21.3%) were provided by a health visitor working with an assistant (model 5) (compared with 13.2% in a GP setting), although these figures exclude the additional input on another occasion by a doctor.
- Health visitors worked alone (model 2) for 12.6% of GP-led clinics compared with 4.8% for Trust-led clinics.
- Very few checks were undertaken at the child's home (models 8 and 9), with these models accounting for approximately 4% of GP-led checks and approximately 1% of Trust-led checks.

Table 8 summarises the results of statistical testing undertaken to compare the costs for Trust-led and GP-led checks of the different models of delivery. The full results are presented in appendix 6. In this table (=) is used to denote that the null hypothesis (that the two means are equal) cannot be rejected.

Table 8 shows that:

- For GP-led and Trust-led clinics, a doctor and health visitor working together (model 3) is significantly more expensive than a doctor working alone (model 1), although there is no significant difference between the cost of a doctor and health visitor working together (model 3) and a doctor, health visitor and assistant (model 6).
- With regard to the 'health visitor' models, a health visitor working alone in GP-led clinics (model 2) is significantly cheaper than when working with an assistant (model 5), but there appears to be no significant difference between these costs in Trust-led clinics (although there are relatively few observations for model 2 in this setting).
- The statistical tests indicate that GP-led checks undertaken by a health visitor alone in the child's home (model 8) are considerably more expensive than when performed by a health visitor alone in the practice setting (model 2), although the former values are derived from relatively few observations. A possible explanation is that children seen in the home setting have particular health or social-related problems (which is why they do not attend the practice), resulting in a longer time being required to perform the check.

Cost comparisons for Check 2

The sample was selected to incorporate the finding from the initial questionnaire that some areas perform the HDT at the same time as the rest of Check 2, whilst in other places it is carried out on a separate occasion. None of the subsites visited used an audiologist to perform the test. Although *Health for all children*[1] recommends that the HDT is carried out by two trained staff (e.g. a health visitor and an assistant) in an appropriate (i.e. quiet) setting, the site visits revealed considerable diversity in the delivery of this component.

Table 9 subdivides the data into two categories for Trust-led clinics and GP-led clinics:

- where the HDT is undertaken during the CHS check
- where the HDT is undertaken on a separate occasion.

TABLE 8 *Summary of significant differences in mean costs of Check 1 by model*

GP-led	Trust-led
Dr (1) < Dr and HV (3)	Dr (1) < Dr and HV (3)
Dr and HV (3) = Dr and HV and ANO (6)	Dr and HV (3) = Dr and HV and ANO (6)
HV clinic (2) < HV home (8)	Insufficient observations
HV clinic (2) < HV and ANO clinic (5)	HV clinic (2) = HV and ANO clinic (5)

See Table 4 *for a description of the models*

TABLE 9 *Mean cost by model of delivery for Trust-led and GP-led checks and by delivery of HDT component – Check 2*

	Model									Total/ average
	1 Dr only	2 HV only	3 Dr and HV	4 Dr and ANO	5 HV and ANO	6 Dr, HV and ANO	7 Dr: home	8 HV: home	9 HV and ANO: home	
Trust-led										
HDT with CHS										
Number	14	32	14	–	36	5	–	–	–	101
%	13.86	31.68	13.86	–	35.64	4.95	–	–	–	100
Mean cost per child (£)	4.45	3.49	8.31	–	4.30	8.28	–	–	–	4.82
Separate HDT check										
Number	47	3	11	2	63	2	–	44	69	241
%	19.50	1.24	4.56	0.83	26.14	0.83	–	18.26	28.63	100
Mean cost per contact (£)*	4.43	12.68	8.34	11.39	8.05	6.71	–	7.68	9.97	7.91
Total	**61**	**35**	**25**	**2**	**99**	**7**	**–**	**44**	**69**	**342**
GP-led										
HDT with CHS										
Number	–	44	21	–	180	23	–	10	12	290
%	–	15.17	7.24	–	62.07	7.93	–	3.45	4.14	100
Mean cost per child (£)	–	6.22	16.02	–	6.82	14.42	–	8.55	5.94	8.02
Separate HDT check										
Number	29	155	41	–	190	47	–	56	4	522
%	5.56	29.69	7.85	–	36.40	9.00	–	10.73	0.77	100
Mean cost per contact (£)*	3.77	6.09	9.00	–	7.58	13.38	–	9.43	16.58	7.83
Total	**29**	**199**	**62**	**–**	**370**	**70**	**–**	**66**	**16**	**812**

* *One child = two contacts*

Further details of the analysis are provided in appendices 6 and 8.

Table 9 shows that when the HDT is undertaken at the same time as other components of the check, the average cost per child of Check 2 is £4.82 for Trust-led and £8.02 for GP-led clinics. This difference is statistically significant, although the main reason for the difference may be that none of the Trust-led checks were carried out at the child's home.

Where the HDT is carried out separately from other components of the check, the average costs shown in *Table 9* represent the average costs per contact rather than per child. Because the check requires two contacts in this situation, the overall cost of the check ranges from £15.66 (GP-led) to £15.82 (Trust-led). Independent data from the sample indicates that the HDT takes on average between 15 and 20 minutes to complete when done separately from other components of the check. Assuming the HDT is carried out by a health visitor and nursing assistant, the expected cost (of the HDT alone) on this basis is between £6.24 and £8.31. This is consistent with the estimated costs per contact of £7.83 and £7.91 shown in *Table 9*.

The following points also arise from *Table 9*:

- Focusing on the data for the subsites where the HDT is undertaken during the same visit as the other components shows a considerable diversity of models of delivery, including some where the check is undertaken by one professional working alone. This suggests that the HDT is not being performed using two trained

people, although the child's parent may be directly involved in the test as an informal assistant.
- There is much less doctor involvement in Check 2 than in Check 1 and, as expected, considerably greater use of assistants.
- A higher proportion of home visits are undertaken for Check 2 than for Check 1 (although considerably lower than for Checks 3 and 4).
- The costs for Trust-led clinics where Check 2 only requires one visit are considerably lower than their GP-led equivalent (see appendix 9 for statistical analysis), but the costs are almost identical for both Trust-led and GP-led checks when two visits are required. There is no obvious rationale for this observation.
- Comparing the costs per contact where two visits are required with the costs per check where only one visit is needed suggests that very little 'dedicated' time is devoted to the HDT if it is undertaken during the same visit as the other components.

Cost comparisons for Check 3

Table 10 shows the prevalence and mean costs for each model of delivery for Check 3. Further details are presented in appendices 6 and 8.

A number of points arise from *Table 10*:

- Health visitors play a major role in providing Check 3, with doctors only contributing to about 26% of Trust-led clinics and 17% of GP-led clinics.
- About 58% of Trust-led checks are provided in the child's home, and 29% of GP-led checks are carried out within the home (models 8 and 9).
- Very few checks are provided by a doctor alone (model 1) in either setting. However, 18.6% of Trust-led clinics are provided by a doctor and health visitor together (model 3), compared with 3.6% of GP-led clinics. This may partly be due to the organisation of Trust clinics, which will be attended by a dedicated doctor, whereas a GP is more likely to be working on other things but available if required to give a second opinion.

The only meaningful difference in mean cost between models is between models 2 and 8. Home visits by a health visitor are significantly more expensive (by approximately 40%) than checks undertaken by a health visitor in a clinic setting. This may be a result of the (indirect) time spent by the health visitor travelling to the child's home.

Cost comparisons for Check 4

There was considerable variation across the sample in the use of an orthoptist to undertake the eyesight checks required for this age group. The sample of 825 observations fell into the three broad groups shown in *Table 11*.

The underlying data showed that most of the 67 observations from subsites where an orthoptist was routinely seen during the same visit as the remainder of Check 4 was undertaken were from the same area. This suggests that this practice is

TABLE 10 *Mean cost by model of delivery for Trust-led and GP-led checks – Check 3*

	Model									Total/ average
	1 Dr only	2 HV only	3 Dr and HV	4 Dr and ANO	5 HV and ANO	6 Dr, HV and ANO	7 Dr: home	8 HV: home	9 HV and ANO: home	
Trust-led										
Number	3	37	51	2	9	14	–	87	71	274
%	1.09	13.50	18.61	0.73	3.28	5.11	–	31.75	25.91	100
Mean cost per child (£)	4.23	6.41	9.12	8.99	7.94	5.26	–	8.70	9.99	8.55
SD (£)	0.34	4.22	2.01	0.46	3.37	2.84	–	2.77	3.80	3.45
GP-led										
Number	15	156	18	14	117	38	–	131	16	505
%	2.97	30.89	3.56	2.77	23.17	7.52	–	25.94	3.17	100
Mean cost per child (£)	3.48	6.33	7.39	6.38	6.42	8.32	–	9.44	11.05	7.41
SD (£)	2.76	2.25	2.29	2.57	2.06	3.23	–	4.36	6.31	3.55

TABLE 11 *Use of an orthoptist to undertake routine eyesight checks during Check 4*

	Number	%	GP-led clinics	Trust-led clinics
Subsites not routinely using an orthoptist	349	42.3	298	51
Orthoptist routinely seen during same visit as remainder of Check 4 undertaken	67	8.1	39	28
Orthoptist routinely seen on a separate occasion	409	49.6	238	171
Total	**825**	**100.0**	**575**	**250**

probably not widespread. Therefore when an orthoptist is seen routinely as part of Check 4, this occurs on a separate occasion. The cost data in *Table 12* exclude the additional costs associated with the orthoptist component.

Sensitivity analysis was undertaken to determine whether or not there was a significant difference in mean costs of Check 4 in those places where no orthoptist was seen compared with those where an orthoptist was seen on a separate occasion. The relevant tables are presented in appendix 10. No differences were observed for the combined data set or for the separate GP and Trust data sets, which may indicate that the health visitors and doctors undertaking the check are not spending any additional time checking vision in those places where the children do not routinely see an orthoptist (e.g. they may just ask for a parental opinion).

Table 12 shows the prevalence and mean costs of the various models of delivery for Check 4. Additional information is presented in appendices 6 and 8.

The following points arise from *Table 12*:

- There are many similarities between Checks 3 and 4, with a considerable proportion of the work being undertaken by health visitors, often in the child's home.
- Relatively few home-based checks are carried out by a health visitor and an assistant for GP-led checks (model 9) compared with the equivalent proportion for Trust-led checks (0.9% compared with 26.8%).
- This position is reversed for checks performed by a health visitor and assistant (model 5) held in GP surgeries (21.4%) and in Trust clinics (4.4%).
- The location of Check 4 may be determined by the availability of suitable premises (as identified for Check 3).
- 14.4% of the Trust-led checks are provided by a doctor working alone (model 1), which is almost twice the proportion for GP-led checks (7.3%).
- However, GPs are more likely to provide the check jointly with a health visitor (and possibly an assistant) than Trust-employed doctors (13.9% compared with 3.6% of checks).

TABLE 12 *Mean cost by model of delivery for Trust-led and GP-led checks – Check 4*

	Model									Total/ average
	1 Dr only	2 HV only	3 Dr and HV	4 Dr and ANO	5 HV and ANO	6 Dr, HV and ANO	7 Dr: home	8 HV: home	9 HV and ANO: home	
Trust-led										
Number	36	83	7	2	11	2	–	42	67	250
%	14.40	33.20	2.80	0.80	4.40	0.80	–	16.80	26.80	100
Mean cost per child (£)	8.69	6.38	12.25	13.83	11.32	5.27	–	10.41	10.14	8.81
SD (£)	2.60	2.42	7.12	3.45	1.88	2.92	–	4.31	4.86	4.18
GP-led										
Number	42	174	55	5	123	25	–	146	5	575
%	7.30	30.26	9.57	0.87	21.39	4.35	–	25.39	0.87	100
Mean cost per child (£)	4.67	6.37	14.78	7.79	7.60	13.40	–	9.59	12.73	8.51
SD (£)	1.88	2.41	3.96	0.00	3.09	3.95	–	3.34	2.98	4.12

The costs shown in *Table 12* exclude the additional costs associated with the 49.6% of observations in which an orthoptist was seen on a separate occasion. Sample data indicate that the average contact time for an orthoptic check when carried out separately is between 10 and 15 minutes. Using the staff cost data presented in *Table 2* puts the additional cost per check in the range £2.00 to £3.00.

Taking into account the proportion of separate orthoptic checks observed in Trust-led and GP-led clinics, and assuming the orthoptic check takes 15 minutes, the average costs per child of Check 4 are £9.50 (GP-led) and £10.45 (Trust-led).

Summary

Table 13 summarises the prevalence and mean costs of the various observed models and the comparative analysis of the mean costs of each model for each check. The statistical tables showing confidence intervals are presented in appendix 6. A summary of the findings for each check is presented after *Table 13*. The total costs reported for each check in this chapter and summarised in *Table 13* show the weighted means for each check for GP-led and Trust-led checks. It is not, however, appropriate to use these to determine an overall weighted mean for each check unless the proportions of GP-led and Trust-led checks are known. Although the observations reported for each site

TABLE 13 *Cost comparisons by model by check*

	Total	Model								
		1 Dr	2 HV	3 Dr and HV	4 Dr and ANO	5 HV and ANO	6 Dr, HV and ANO	7 Dr: home	8 HV: home	9 HV and ANO: home
Check 1										
GP-led (%)	486	18.9	12.6	24.5	3.1	13.2	23.9	–	3.9	–
GP-led (£)	8.88	7.17	3.78	10.74	6.83	8.93	11.13	–	9.55	–
Trust-led (%)	230	43.5	4.8	17.8	6.5	21.3	5.2	–	0.4	0.4
Trust-led (£)	6.24	4.88	5.75	8.74	10.90	4.95	7.65	–	12.98	14.16
Significant difference	GP > T	GP > T	(GP < T)	GP > T	(GP < T)	GP > T	(GP > T)	–	*	–
Check 2**										
GP-led (%)	290	–	15.2	7.2	–	62.1	7.9	–	3.4	4.1
GP-led (£)	8.02	–	6.22	16.02	–	6.82	14.42	–	8.55	5.94
Trust-led (%)	101	13.9	31.7	13.9	–	35.6	5.0	–	–	–
Trust-led (£)	4.82	4.45	3.49	8.31	–	4.30	8.28	–	–	–
Significant difference	GP > T	–	GP > T	(GP > T)	–	GP > T	*	–	–	–
Check 3										
GP-led (%)	505	3.0	30.9	3.6	2.8	23.2	7.5	–	25.9	3.2
GP-led (£)	7.41	3.48	6.33	7.39	6.38	6.42	8.32	–	9.44	11.04
Trust-led (%)	274	1.1	13.5	18.6	0.7	3.3	5.1	–	31.8	25.9
Trust-led (£)	8.55	4.23	6.41	9.12	8.99	7.94	5.26	–	8.70	9.99
Significant difference	GP < T	*	GP = T	(GP < T)	*	(GP < T)	(GP > T)	–	GP = T	(GP = T)
Check 4										
GP-led (%)	575	7.3	30.3	9.6	0.9	21.4	4.3	–	25.4	0.9
GP-led (£)	8.51	4.67	6.37	14.78	7.79	7.60	13.40	–	9.60	12.73
Trust-led (%)	250	14.4	33.2	2.8	0.8	4.4	0.8	–	16.8	26.8
Trust-led (£)	8.81	8.69	6.38	12.25	13.83	11.32	5.27	–	10.41	10.14
Significant difference	GP = T	GP < T	GP = T	*	*	(GP < T)	*	–	GP = T	*

* *< 7 observations*

** *HDT at same visits as other check components only*

( ), > 7 but < 25 observations

(i.e. each Health Authority) are based on observations from five subsites (i.e. three undertaking GP-led checks and two undertaking checks led by a consultant community paediatrician, community medical officer or similar), this does not mean that 60% of checks are led by GPs. It is therefore crucial that weighted costs are calculated for both models of delivery, and that weighted means are not calculated unless the appropriate local weighting between the two models is known.

Check 1 (6–8 weeks)

- The estimated mean costs per child for Check 1 are £6.24 (Trust-led) and £8.88 (GP-led). The difference in cost between the two settings is statistically significant, and this is true for each of the separate models (with the exception of health visitor only and Dr/ANO, for which sample numbers are small).
- The most common models of delivery in both settings involve a doctor, either alone (1) or with a health visitor (3), or with a health visitor and another professional (6).
- The main difference between GP-led and Trust-led clinics is in the prevalence of model 1 (doctor alone). More than 40% of children are seen by a doctor alone in the Trust setting compared with 19% in primary care.
- The guidelines in *Health for all children*[1] (appendix 1) suggest that this check is usually done by a doctor, preferably in the presence of a health visitor (model 3). The estimated mean costs of this model are £10.74 (GP-led) and £8.74 (Trust-led) per child. The difference in means is statistically significant.

Check 2 (6–9 months)

- The estimated mean costs of Check 2 (for those observations in which the HDT is undertaken at the same time as other components of the check) are £4.82 (Trust-led) and £8.02 (GP-led) per child. The difference between the two settings is statistically significant and this is true in all models where meaningful comparison is possible.
- The most common models of delivery in both settings involve either a health visitor alone (2) or a health visitor with another professional (5). These two variants account for between 67% and 77% of all observations.
- The guidelines suggest that this check could be carried out by a doctor but can equally be the responsibility of a health visitor alone (model 2). However, it is also recommended that two adequately trained staff carry out the HDT, which makes model 5 more appropriate in situations where the hearing test is carried out at the same time as other components of the check. The estimated mean costs of model 5 are £6.82 (GP-led) and £4.30 (Trust-led) per child. The difference in means is statistically significant.

Check 3 (18–24 months)

- The mean costs of Check 3 are £7.41 (GP-led) and £8.55 (Trust-led) per child. This difference in costs is statistically significant. The main reason for this observed difference appears to be in the higher proportion of Trust-led checks carried out at home (57.7% compared with 29.1%).
- For GP-led checks the most common models of delivery are those involving a health visitor alone in the clinic (2), a health visitor with another professional in the clinic (5), or a health visitor at the child's home (8). For Trust-led checks the most common are health visitor and doctor in the clinic (3) and health visitor alone or with another at the child's home (8, 9).
- Guidance in *Health for all children*[1] suggests that this check does not involve any specific medical or screening procedures and is concerned primarily with parent guidance and education. It is often carried out in the family home and it is suggested that the health visitor is the most appropriate person to take responsibility for this examination. Models 8 and 9 conform most closely with the guidance.
- The estimated mean costs of model 8 are £9.44 (GP-led) and £8.70 (Trust-led) per child. This difference is not statistically significant.
- The estimated mean costs of model 9 are £11.04 (GP-led) and £9.99 (Trust-led) per child. This difference is not significant, although the number of observations for GP-led checks in this setting is small.

Check 4 (39–42 months)

- The estimated mean costs for Check 4 are £8.51 (GP-led) and £8.81 (Trust-led) per child. This difference is not statistically significant. Taking account of the additional costs arising when the orthoptic check is carried out separately, the mean costs per child are £9.50 (GP-led) and £10.45 (Trust-led).
- As with Check 3, there is a noticeable difference between settings in the proportion of checks carried out at home (43.6% Trust-led compared with 26.3% GP-led). For GP-led checks the most common models of delivery are the same as for Check 3: health visitor alone in the clinic (2), health visitor and another professional in the clinic (5) or health visitor at the child's home (8). For Trust-led clinics the most common are health visitor alone in the clinic (2) and health

visitor alone or with another professional at the child's home (8, 9).

- *Health for all children*[1] suggests that each primary healthcare team should decide whether this check is best performed by a doctor or by a health visitor. In practice it appears that the involvement of doctors is relatively small. No more than 19–22% of checks at this age include any doctor input. The guidance does not specifically mention the desirability of performing this check in the family home, but the importance of making contact with children who have previously failed to attend for immunisation and the emphasis on developmental, language or behavioural problems may make a home visit appropriate, at least for some children.
- The estimated costs of model 2 (health visitor in a clinic) are £6.38 per child, irrespective of clinic type. The estimated costs of models 8 (health visitor alone in the child's home) are £9.60 (GP-led) and £10.41 (Trust-led). This difference is not statistically significant. The costs of model 9 (health visitor and another in the child's home) are £12.73 (GP-led) and £10.14 (Trust-led). The small number of observations of model 9 for GP-led checks makes any meaningful comparison difficult.

Conclusions

Analysis of the data on CHS-related activity collected over 3 months from the selected subsites shows that there are significant cost differences between GP-led and Trust-led checks, but not between northern and southern or urban and rural Health Authorities/Trusts. Areas with high ethnic populations do not have higher costs (e.g. as a result of using interpreters). GP-led checks are more expensive than Trust-led checks for Checks 1 and 2, despite a higher proportion of Trust-led checks for Check 1 being undertaken by a doctor alone. This may be because GPs are more expensive than community medical officers (who typically provide the doctor input into Trust-led clinics).

The overall position is reversed for Check 3, where Trust-led checks are more expensive, possibly because of the higher proportion of (more expensive) home-based checks associated with the Trust-led activity. However, no significant overall cost differences occur for Check 4, despite the higher proportion of home-based checks associated with Trust-led activity.

The data reveal considerable diversity in the delivery of the four checks across the selected subsites, and also some divergence in staffing from the recommendations of *Health for all children.*[1] For example, although *Health for all children*[1] suggests that the health visitor is the most appropriate professional to carry out Check 3, doctors contribute to about one-sixth (16.9%) of GP-led checks and a quarter (25.5%) of Trust-led checks.

The data also show that the costs of home-based checks (which are undertaken for between a quarter and two-thirds of Checks 3 and 4) are higher than those for checks undertaken in clinics. However, this conclusion is based only on a consideration of the staff time (including travel time) involved, and does not include any costs associated with capital overheads. Although the opportunity cost associated with using clinic space that otherwise would have been empty is low, home-based checks may make financial sense if clinic space is scarce (even after including petrol-related costs of approximately £1 per visit).

The cost data on HDTs (Check 2) suggest that very little 'dedicated' time is devoted to the test if it is undertaken during the same visit as the other components of the check.

The cost data for Check 4 suggest that doctors and health visitors are not spending any additional time during the check assessing vision in those places where children do not routinely see an orthoptist on a separate occasion as part of this check.

The cost data indicate that the staff cost component of CHS checks is approximately £7.50 to £9.00. This includes time spent on administration related to the check. Based on the discussion on page 3, these costs could be increased by about 25% (i.e. to approximately £9.40–£11.25) to account for costs associated with overheads and capital overheads, if these are felt to be a relevant consideration. However, the relative scale of CHS activity is such that few, if any, overhead costs are likely to change with any change in the scale of CHS. If costs associated with gaining professional qualifications are also considered, models of delivery including doctors become relatively more expensive than those excluding doctors, because of the high costs of their initial medical education.

Chapter 4

Costs of the components of the CHS checks

Introduction

This chapter describes the findings from the observational component of the study. As suggested in the initial briefing/tender, a researcher visited each of the subsites and recorded (in seconds) the time spent on each activity comprising the four CHS checks. Copies of the data collection sheets are included in appendix 3. The researchers were briefed on identifying the component parts of each check, but the member of staff leading the check also ensured that the researcher knew what component was being undertaken through their conversation with the child's parent. The observer also sought permission from the child's parent before sitting in during the check. At no time did the observer record any specific details about the child.

The observers collected information based on the guidelines in *Health for all children*,[1] especially with regard to the physical checks (see appendix 1 for further details). As noted on page 9, some activities may take place simultaneously – such as undertaking a particular physical check whilst talking about a health education topic. Some, such as observing the interaction of the parent and child, and assessing the child's overall development, would be expected to be carried out throughout the check. In addition, all checks include an element of 'process time' (e.g. introductions and farewells) at the beginning and end of the visit. This element was not timed, but it should be noted that the more different staff contribute to the check in different parts of the building, the greater will be the total time spent on this 'process' element.

Table 14 shows the total number of children observed by the researchers for each of the four CHS checks. Checks were observed in full if all the elements were performed in the same room, but only in part (albeit the majority part) if some components were undertaken elsewhere.

Tables 15–19 summarise the observational findings for each check. It must be noted that the column showing 'number of observations' does not mean that a particular activity was not performed for all of the other children observed receiving that check (although there was not complete consistency across the 55 visited subsites). The tables show the average observed times (in seconds) taken by doctors, health visitors and others (e.g. clinic assistants or clinic nurses) to undertake the identified activities, and the costs associated with these times (based on the staff costs in *Table 2*). Where more than one activity occurred simultaneously (e.g. discussing concerns whilst undertaking a physical check), the researcher recorded the time spent on the physical check. *Table 17* summarises the observations of the HDT. It must be stressed that all the figures presented below exclude any qualitative aspects. Although a certain professional may perform a particular activity more cheaply than another, they may or may not deliver it as effectively or accurately.

TABLE 14 *Number of full and partial checks observed*

Check	Number of children observed
Check 1	62
Check 2	57 (including 28 HDTs)
Check 3	43
Check 4	60
Total	**222**

Costs of components of Check 1

Three types of staff were observed providing the various components of this check – doctors (both GPs and Trust-employed doctors such as community medical officers), health visitors, and others, generally clinic assistants. *Table 15* summarises the numbers observed and their distribution across the different staff types for each component, along with the average time and average cost. Some observations were also recorded for other models, such as 'doctor and health visitor' and 'health visitor and ANO', but in each instance there were fewer than four observations and these data have been omitted from the analysis.

TABLE 15 *Average costs of Check 1 components when undertaken by different professionals*

Component	No. of observations	% of observations undertaken by each professional			Average time (s)			Average cost (£)		
		Dr	HV	Other	Dr	HV	Other	Dr	HV	Other
Immunisation	11	54.5	(36.4)	(9.1)	249.0	(91.0)	(258.0)	1.88	(0.33)	(0.46)
Discuss concerns	25	76.0	24.0	–	108.6	106.7	–	0.82	0.39	–
Weight	41	12.2	39.0	48.8	12.8	31.3	18.1	0.10	0.11	0.03
Head circumference	41	41.5	36.6	22.0	12.5	24.1	17.0	0.09	0.09	0.03
Length	41	17.1	48.8	34.1	19.1	28.8	16.9	0.14	0.10	0.03
Testes	27	100.0	–	–	15.8	–	–	0.12	–	–
Jaundice	(1)	(100.0)	–	–	(10.0)	–	–	(0.08)	–	–
Hearing	28	96.4	(3.6)	–	14.3	(12.0)	–	0.11	(0.04)	–
Vision	47	95.7	(4.3)	–	43.8	(29.5)	–	0.33	(0.11)	–
Other physical	59	98.3	(1.7)	–	72.3	(4.0)	–	0.54	0.01	–
Discuss immunisation	19	63.2	36.8	–	40.3	87.1	–	0.30	0.32	–
Discuss feeding	24	70.8	29.2	–	48.1	144.3	–	0.36	0.52	–
Discuss nutrition	13	61.5	38.5	–	17.4	20.4	–	0.13	0.07	–
Discuss weaning	(2)	(100.0)	–	–	(15.0)	–	–	(0.11)	–	–
Discuss SIDS	(3)	(100.0)	–	–	(14.0)	–	–	(0.11)	–	–
Other health education	24	79.2	20.8	–	119.1	116.6	–	0.90	0.42	–
Administration	10	70.0	(30.0)	–	180.4	(128.7)	–	1.36	(0.47)	–

Values in parentheses denote < 5 observations

SIDS, sudden infant death syndrome

Table 15 shows:

- There is considerable variation in the range of times and in the average times taken by doctors, health visitors and (where relevant) by others to undertake specific tasks.
- Only certain tasks – immunisation, weight, head circumference and length – are undertaken by clinic assistants. The observations suggest that they tend to perform these tasks quickly and cheaply, although nothing can be learned about the accuracy of their performance.
- Each check component generally costs more if undertaken by a doctor rather than a health visitor, even though the average time for doctors is usually less than for health visitors.
- Very few components cost more than £1.00 and many cost less than £0.20. This suggests that omitting any particular component would be unlikely to make much difference to the overall time and cost of the check, although it may affect the quality of the check.
- 'Administration' during or immediately after the check is a significant component for both doctors and health visitors and accounts for quite a high proportion of the time and costs of each check (any time spent on administration outside the clinic is excluded from this analysis, although it was included in the analysis of overall costs discussed in chapter 3).
- In addition, a few observations of doctors and health visitors working together were recorded, the maximum being four observations of the discussion of parental concerns. The maximum observed time for this activity was 30 minutes, which shows that occasionally a child can require a much greater amount of time than most others. This component alone cost over £20.00 in this case.

Costs of components of Check 2

Excluding the HDT, which is considered separately below, all of the components were performed by either a doctor or a health visitor. *Table 16* shows the average times and costs for each component. *Table 17* summarises the HDT observations for cases where the HDT was carried out as part of Check 2.

TABLE 16 *Average costs of Check 2 components when undertaken by different professionals*

Component	No. of observations	% of observations undertaken by each professional		Average time (s)		Average cost (£)	
		Dr	HV	Dr	HV	Dr	HV
Length	26	(11.5)	88.5	(24.7)	37.2	(0.19)	0.13
CDH	42	61.9	38.1	29.8	35.9	0.22	0.13
Testes	20	80.0	(20.0)	17.6	(16.8)	0.13	(0.06)
Hearing (not HDT)	18	50.0	50.0	21.0	26.4	0.16	0.10
Vision	42	52.4	47.6	26.7	46.3	0.20	0.17
Other physical	45	53.3	46.7	94.3	90.0	0.71	0.33
Discussed accidents	18	38.9	61.1	35.9	35.9	0.27	0.13
Discussed nutrition	21	23.8	76.2	171.0	192.8	1.29	0.70
Discussed iron	(2)	0.0	(100.0)	0.0	(52.5)	0.00	(0.19)
Discussed smoking	(1)	(100.0)	0.0	(10.0)	0.0	(0.08)	0.00
Discussed safety in cars	(1)	(100.0)	0.0	(20.0)	0.0	(0.15)	(0.00)
Discussed dental issues	15	(13.3)	86.7	(20.0)	46.0	0.15	0.17
Development	(4)	0.0	(100.0)	0.0	(45.0)	0.00	(0.16)
Discussed sunburn	(1)	(100.0)	0.0	(10.0)	0.0	(0.08)	0.00
Other health education	25	20.0	80.0	56.0	118.5	0.42	0.43
Administration	18	27.8	72.2	172.0	231.2	1.30	0.84

Values in parentheses derived from < 5 observations

TABLE 17 *Times and costs associated with providing the HDT*

Provided by	No. (and %) of observations		Average time (s)	Average cost (£)	Time range (s)	Cost range (£)
HV alone	3	(10.7%)	(265.0)	(0.96)	(90.0–475.0)	(0.33–1.72)
Doctor and HV	7	(25.0%)	212.7	2.37	120.0–435.0	1.34–4.85
HV and ANO	18	(64.3%)	293.1	1.60	70.0–503.0	0.38–2.74

Values in parentheses derived from < 5 observations

Tables 16 and *17* show that:

- Health visitors are consistently cheaper (although not necessarily slower) for almost all of the components of Check 2. This is apparent not only from average costs but also from the range of costs (based on the range of observed times). This suggests that, other things being equal, unless doctors are performing the tasks significantly more effectively (in which case both the marginal costs and benefits would need to be taken into account), health visitors should generally undertake this check.
- However, this conclusion may not apply in all settings and will depend on the local clinic organisation and the alternative activities of the staff concerned. It may, for example, be entirely rational for a community medical officer to undertake this check at a Trust clinic if they would otherwise be under-occupied.
- When undertaken at the same visit as the other components of Check 2, the HDT should probably be performed by a health visitor working with an assistant if it really is essential to have two trained staff present. If the health visitor and parent can achieve acceptable accuracy, then the health visitor working alone is likely to be cheaper.
- The HDT is the only part of Check 2 (other than administration) that costs a significant amount (i.e. more than £1.00) to perform. The average times recorded for the HDT when undertaken as part of Check 2 (between 3.5 and 5 minutes) are however substantially less

than the 15–20 minutes typically required when this test is undertaken on a separate occasion.
- It should be noted that none of the subsites visited used an audiologist to undertake the HDT, although children causing concern were referred to an audiologist for a specialist opinion.

Costs of components of Check 3

Table 18 shows the costs of the components of Check 3.

The following points emerge from *Table 18*:

- The majority of recorded timings for this check were of health visitors, which is to be expected given the nature of the check.
- Because the doctor times and costs are based on so few observations, any comparisons should be treated with caution, but the tables appear to indicate that the components cost less (although generally take longer) when performed by a health visitor.
- When the average times and costs are considered, it is clear that no particular component (apart from administration) takes much time.
- Doctors generally spend less time than health visitors on the 'softer' components (e.g. development, health education and social skills).
- In addition, the range of time spent on individual components is much wider than for the first two checks.

Costs of components of Check 4

Costs for Check 4 are summarised in *Table 19*, which shows:

- In general, the same observations apply to this check as to Check 3, namely that almost all of the observations were for health visitors, who generally cost less to undertake each component than a doctor, and that the range of times (and therefore costs) observed for each component are considerable.
- Discussing development in general, and language development in particular, appear

TABLE 18 *Average costs of Check 3 components when undertaken by different professionals*

Component	No. of observations	% of observations undertaken by each professional		Average time (s)		Average cost (£)	
		Dr	HV	Dr	HV	Dr	HV
Immunisation	12	(11.5)	88.5	(24.7)	37.2	(0.19)	0.13
Concerns	14	61.9	38.1	29.8	35.9	0.22	0.13
Behaviour	12	80.0	(20.0)	17.6	(16.8)	0.13	(0.06)
Vision	25	50.0	50.0	21.0	26.4	0.16	0.10
Hearing	20	52.4	47.6	26.8	46.3	0.20	0.17
Walking	12	53.3	46.7	94.3	90.0	0.71	0.33
Communicating	9	38.9	61.9	35.9	35.9	0.27	0.13
Language development	17	23.8	76.2	171.0	192.8	1.29	0.70
Discussed iron	(4)	0.0	(100.0)	0.0	(52.5)	0.00	(0.19)
Haemoglobin	(1)	(100.0)	0.0	(10.0)	0.0	(0.08)	0.00
Height	30	(100.0)	0.0	(20.0)	0.0	(0.15)	(0.00)
Other physical	33	(13.3)	86.7	(20.0)	46.0	0.15	0.17
Discussed accidents	17	0.0	(100.0)	0.0	(45.0)	0.00	(0.16)
Discussed smoking	(1)	(100.0)	0.0	(10.0)	0.0	(0.08)	0.00
Discussed development	(1)	20.0	80.0	56.0	118.5	0.42	0.43
Playing	17	(5.9)	94.1	(30.0)	123.3	(0.23)	0.45
Mixing with others	18	(16.7)	83.3	(73.3)	69.0	(0.55)	0.25
Management of behaviour	17	(5.9)	94.1	(30.0)	83.4	(0.23)	0.30
Other health education	31	(9.7)	90.3	(190.0)	318.8	(1.43)	1.15
Administration	27	(14.8)	85.2	(142.5)	227.5	(1.07)	0.82

Values in parentheses derived from < 5 observations

TABLE 19 *Average costs of Check 4 components when undertaken by different professionals*

Component	No. of observations	% of observations undertaken by each professional		Average time (s)		Average cost (£)	
		Dr	HV	Dr	HV	Dr	HV
Immunisation	10	(40.0)	60.0	(86.0)	46.7	(0.65)	0.17
Concerns	14	(21.4)	78.6	(130.0)	179.6	(0.98)	0.65
Behaviour	8	0.0	100.0	0.0	57.5	0.00	0.21
Language development	23	(8.7)	91.3	(419.0)	124.1	(3.16)	0.45
Development	38	13.2	86.8	221.0	589.5	1.67	2.13
Height	44	(2.3)	97.7	(14.0)	34.6	(0.11)	0.13
Weight	43	0.0	100.0	0.0	33.0	0.00	0.12
Testes	5	(80.0)	(20.0)	(13.3)	(13.0)	(10.00)	(0.05)
Hearing	35	25.7	74.3	67.9	197.5	0.51	0.72
Vision	30	30.0	70.0	120.8	139.5	0.91	0.51
Other physical	30	26.7	73.3	79.0	131.9	0.60	0.48
Discussed accidents	6	(50.0)	(50.0)	(61.7)	(120.0)	(0.46)	(0.43)
Discussed school	27	(14.8)	85.2	(58.8)	105.9	(0.44)	0.38
Discussed nutrition	22	(18.2)	81.8	(27.5)	51.1	(0.21)	0.19
Discussed dental issues	17	0.0	100.0	0.0	53.1	0.00	0.19
Other health education	29	(10.3)	89.7	(111.7)	258.8	(0.84)	0.94
Administration	19	(5.3)	94.7	(147.0)	156.7	(1.11)	0.57

Values in parentheses derived from < 5 observations

to be the two most time-consuming components of this check.

Summary

- For all of the checks, the range of times observed was very wide. Equally important from the point of view of costs is the type of staff involved. Both times and costs per unit of time depend on whether a particular component is carried out by a doctor, health visitor or other professional.
- Very few of the individual components cost more than £1.00, with the exception of the HDT and the orthoptic test when carried out separately from other components of a check. This implies that the addition or removal of any single specific component will have a negligible impact on the overall costs of a check.
- The HDT takes, on average, 3.5 to 5 minutes when carried out as part of Check 2 and costs between £1.00 and £2.40 in staff time. Carried out separately, the HDT takes between 15 and 20 minutes and costs in the range £6.24 to £8.31.
- When carried out as part of Check 4 by a health visitor or doctor, the testing of vision takes an average of 2 minutes and costs less than £1.00 in staff time. Carried out by an orthoptist on a separate occasion, the average time is 10–15 minutes and the cost is between £2.00 and £3.00.

Conclusions

The observers recorded a wide variety of times for some of the components, especially for the two later checks (when some children may have been less cooperative). Their recorded data generally showed that, on average, very few components cost more than £1.00 to undertake, indicating that omitting some elements would be unlikely to have a significant impact on the overall time required for each check. Furthermore, those undertaking the checks often discussed parental concerns and provided health education at the same time as performing the physical checks.

When sufficient observations were available for both doctors and health visitors, the overall conclusion is that, although health visitors may take longer to perform the various checks, they are generally cheaper. However, no conclusions

on their comparative effectiveness (and therefore cost-effectiveness) can be drawn.

The observers also noted considerable differences in the ways some checks were undertaken and in the extent to which the parent was asked for information about the child. This was especially notable for the HDT at Check 2 and the vision screening at Check 4. Many children had their hearing assessed without receiving a full HDT in an appropriate environment. The effectiveness of the alternative approaches could be considered further, to determine the most cost-effective way to assess these aspects. If a test is undertaken relatively quickly but inaccurately, the time has been used inappropriately. However, if the less rigorous approaches provide acceptable outcomes then time and resources are being wasted performing full HDTs (unless a problem is suspected). These conclusions also apply to the eyesight tests.

Chapter 5

Costs of follow-up activity

Introduction

Two types of follow-up activity may arise as a result of a CHS check – a child may be asked either to return to see their GP and/or the health visitor or may be referred to a specialist (e.g. a consultant or an audiologist). Data were collected on both types of activity during the 3-month period following the site visit and these are presented and discussed below and in appendix 11.

Number of requests to return and referrals

Table 20 shows that Checks 2 and 4 generate the most requests to return and referrals (34.8% of the total requests to return/referrals for each check). Check 1 results in relatively few requests to return/referrals (7.5%). Checks led by health visitors generate over 80% of requests to return/referrals, whereas doctors working alone rarely generate requests to return/referrals (3.2%).

Table 21 shows the number of requests to return/referrals as a percentage of the number of checks led by each type of professional. More detailed information is provided in *Tables 74–77* in appendix 11, which also show the breakdowns for GP-led and Trust-led checks. *Table 21* shows that the 3474 contacts (for approximately 3092 children) resulted in a total of 563 requests to return/referrals (i.e. overall 16.2% of contacts resulted in a request to return/referral), with the 2173 checks led by health visitors resulting in a total of 455 requests to return/referrals (i.e. 20.9% of the checks led by health visitors resulted in a request to return/referral). The figure of 563 referrals/requests to return relates to 516 children because some children were referred to more than one specialist.

Table 22 shows the numbers of requests to return/referrals to various professionals as a percentage of all the CHS checks performed according to whom the referral was made. The percentages in the total row for each check in *Table 22* are the same as those shown in the total row in *Table 21*. The

TABLE 20 *Summary of requests to return/referrals by CHS check*

Check led by	Check 1		Check 2		Check 3		Check 4		Total (%)	
	No.	% row % col	No.	% row % col	No.	% row % col	No.	% row % col	No.	% row % col
Doctor	0	0.0 0.0	6	33.3 3.1	8	44.4 6.2	4	22.2 2.0	18	100.0 3.2
HV	0	0.0 0.0	177	38.9 90.3	101	22.2 78.3	177	38.9 90.3	455	100.0 80.8
Dr and HV	42	46.7 100.0	13	14.4 6.6	20	22.2 15.5	15	16.7 7.7	90	100.0 16.0
Total	**42**	**7.5** **100.0**	**196**	**34.8** **100.0**	**129**	**22.9** **100.0**	**196**	**34.8** **100.0**	**563**	**100.0** **100.0**

TABLE 21 *Requests to return and referrals as a percentage of CHS activity by check and check leader*

Led by	Check 1	%	Check 2	%	Check 3	%	Check 4	%	Total	%
Doctor	0/0	0.0	6/92	6.5	8/34	23.5	4/85	4.7	18/211	8.5
HV	0/0	0.0	177/898	19.7	101/624	16.2	177/651	27.2	455/2173	20.9
Both	42/716	5.9	13/164	7.9	20/121	16.5	15/89	16.9	90/1090	8.3
Total	**42/716**	**5.9**	**196/1154**	**17.0**	**129/779**	**16.6**	**196/825**	**23.8**	**563/3474**	**16.2**

TABLE 22 *Requests to return or referrals by professional as percentages of total CHS checks*

Referral or return to:	Check 1		Check 2		Check 3		Check 4		Total	
	No.	% col	No.	% col	No.	% col	No.	% col	No.	% col
Community paediatrician	10	1.4	6	0.5	4	0.5	10	1.2	30	0.9
GP	5	0.7	23	2.0	23	3.0	10	1.2	61	1.8
HV	11	1.5	115	10.0	70	9.0	77	9.3	273	7.9
Orthoptist	3	0.4	16	1.4	11	1.4	12	1.5	42	1.2
Audiologist	1	0.1	29	2.5	5	0.6	16	1.9	51	1.5
Speech therapist	0	0.0	1	0.1	8	1.0	44	5.3	53	1.5
Other	12	1.7	6	0.5	8	1.0	27	3.3	53	1.5
Total	**42**	**5.9**	**196**	**17.0**	**129**	**16.6**	**196**	**23.8**	**563**	**16.2**

values show the percentage of recipients of each check who are requested to return or referred to a specialist (and therefore do not sum to 100%).

Table 22 shows that 7.9% of all checks result in a return visit to the health visitor, whereas referrals to any other specialist occur much less frequently. Approximately 10% of CHS checks result in a request to return to see either the GP (1.8%) or the health visitor (7.9%), and about 6% lead to a referral to a community paediatrician (0.9%), an orthoptist (1.2%), an audiologist (1.5%) or a speech therapist (1.5%). A further 1.5% of checks led to a referral to some other professional (either a consultant or a community-based specialist such as a dietician). The majority of requests to return are made both by (80.8%) and to (48.5%) health visitors. *Tables 74–77* in appendix 11 show this breakdown for each check, according to whether the checks were doctor-led, health visitor-led or jointly delivered.

Costing requests to return and referrals

Cost of requests to return

The most straightforward way to cost requests to return is to use the same basis as that used to cost the CHS checks, that is the amount of staff time required. *Table 23* shows the staff cost associated with 5, 10 and 15-minute sessions with GPs and health visitors (based on the costs shown in *Table 2*). Most GP appointments last (or are booked to last) for 10 minutes.

Table 24 shows approximately how much this adds to the cost per contact if aggregated across all CHS checks. The additional costs associated with requests to return are relatively low when considered across all CHS checks.

TABLE 23 *Costs of requests to return to GPs and health visitors*

Return to:	5 minutes	10 minutes	15 minutes
GP	£2.26	£4.52	£6.78
HV	£1.09	£2.17	£3.26

TABLE 24 *Additional cost per child of requests to return*

Return to:	5 minutes	10 minutes	15 minutes
GP	£0.04	£0.08	£0.12
HV	£0.09	£0.17	£0.36

Cost of referrals

Costing referrals to other specialists is more complex. One approach would be to use the prices quoted by NHS Trusts for referrals to each type of specialist. The contributing Trusts were contacted for this information. The objective was to identify the costs associated with the initial contact with the relevant specialist rather than the cost of the subsequent episode of treatment. However, several of the Trusts could not provide the required information because they did not calculate their costs on this basis. *Table 25* shows, as an example, the range of prices quoted for speech therapy.

TABLE 25 *Range of prices quoted by different Trusts for speech therapy*

£29 per attendance
£327 per episode
£109 for first attendance (no cost for follow-up available)
£18 to £103.70 (unspecified)
£25.09 per contact
£456 for an outpatient referral
£18.89 for first attendance, £17.78 per follow-up (for GP fundholders)

Many Trusts could not quote a price for audiology or orthoptist appointments, or for an appointment with a community paediatrician. The costs that were quoted for an outpatient appointment with a consultant paediatrician ranged from £79 to £271.

An alternative approach is to adopt the method used elsewhere in this study and to cost the relevant staff time on the same basis (i.e. staff salary costs and on-costs). Local custom and practice will differ regarding which grade of speech therapist is used and the organisation, time and location of the first contact. *Table 26* shows the cost of follow-up referrals based on the staff costs shown in *Table 2*. It should be noted that many staff also spend a significant amount of time on indirect client-specific activity (especially for the first appointment), often as much as is spent in face-to-face contact. Therefore, for example, the true staff cost to the NHS of a 30-minute appointment with an audiologist is likely to be about twice the cost shown in *Table 26*.

Summary

- Requests to return or referrals arise from about 16% of CHS contacts, and are more likely to occur as a result of Checks 2, 3 and 4 than Check 1.
- Approximately 10% of CHS checks result in a request to return to see either the GP (1.8%) or the health visitor (7.9%) and about 6% lead to a referral to a community paediatrician (0.9%), an orthoptist (1.2%), an audiologist (1.5%) or a speech therapist (1.5%). A further 1.5% of checks led to a referral to some other professional.
- The majority (80.8%) of requests to return and referrals are made **by** health visitors, and almost half (48.5%) are made **to** health visitors.
- Checks by doctors working alone rarely result in requests to return or referrals (3.2%), whilst doctors and health visitors working together generate a significant amount of such activity (16.0%).
- The Trusts involved in the study quoted a wide range of costs for appointments with other specialists, but using the midpoints of respective salary scales shows that the cost of direct staff time associated with a 30-minute appointment ranges from £4.86 (speech therapist – Grade 1) to £17.85 (community paediatrician).

Conclusions

Relatively few referrals to specialists result from the routine CHS checks, although a few children are referred to audiologists, orthoptists and speech therapists. Very few are referred directly to specialist consultants.

About 1 in 13 children are requested to return. These mostly arise during Checks 2, 3 and 4. Four-fifths of these requests are generated by health visitors, and about half of these return visits are to see the health visitor. These requests to return add to the overall costs of the checks performed by health visitors. Checks led by doctors result in far fewer requests to return.

It is not known why the requests to return or referrals were made, or whether they were appropriate. For example, requests to return could have been made because the child would not cooperate or because of concerns about the child's development. Some of these concerns may arise because the health visitors generally spend longer with each child than the doctors. Also, health visitors tend to spend longer than doctors discussing parental concerns about the child's development. Therefore a check undertaken by a doctor without health visitor input is different from a check that includes a health visitor. These are areas where some additional research could be undertaken.

TABLE 26 *Cost of time spent in direct face-to-face contact with client*

Referral to:	10 minutes	15 minutes	20 minutes	30 minutes	45 minutes	60 minutes
CMO	£2.92	£4.38	£5.84	£8.76	£13.14	£17.52
Speech therapist – Grade 1	£1.62	£2.43	£3.24	£4.86	£7.29	£9.72
Speech therapist – Grade 2	£2.21	£3.32	£4.42	£6.63	£9.95	£13.26
Speech therapist – Grade 3	£3.42	£5.13	£6.84	£9.72	£14.58	£19.44
Orthoptist	£1.72	£2.58	£3.44	£5.16	£7.74	£10.32
Senior orthoptist	£2.20	£3.30	£4.40	£6.60	£9.90	£13.20
Audiologist – MTO Grade 2	£1.76	£2.64	£3.52	£5.28	£7.92	£10.56
Community paediatrician	£5.95	£8.93	£11.90	£17.85	£26.78	£35.71

Chapter 6

Costs incurred by parents

Introduction

All parents attending the researcher-observed clinics were asked to complete a short questionnaire (appendix 4) regarding their mode of transport to the clinic and any cost incurred or income lost as a result of attending. Completion was voluntary and anonymous. Questionnaires were completed by 344 respondents, who were most likely to be parents who had to wait for some time between the different elements of the check. As a result, the opportunistic nature of the sample might lead to bias. No distinction was made between parents in 'urban' and 'rural' areas. This number is greater than the total of checks observed because the organisation of some clinics meant that it was not possible to observe all attenders, although all clinic attenders were asked to complete the questionnaire.

Travel costs

Table 27 lists the different modes of travel used by parents and their associated costs. None of the respondents stated that they had to pay for parking, and no one travelling by private car attributed any cost (e.g. of petrol) to the journey.

Over three-fifths of those taking children for CHS checks walked (62.5%), and almost one-third (30.8%) used their own car. Only 12 respondents (3.5%) incurred a direct travel-related cost (e.g. a ticket or a taxi fare). Using an estimate of £2.50 as the return cost of the train journey, the above figures give an average cost of £2.23 for each of these 12 respondents and an overall average travel cost of £0.08 per visit.

TABLE 27 *Mode of travel and associated costs*

Mode of travel	Number	%	Average cost of visit
Walking	215	62.5	–
Bus	9	2.6	£0.87 single, £1.69 return
Taxi	2	0.6	£4.50
Own car	106	30.8	–
Other's car	9	2.6	–
Train	1	0.3	(est. £2.50 return)
Not specified	2	0.6	–
Total	**344**	**100.0**	**£0.08 per visit**

Other costs and lost income

Respondents were also asked whether they had incurred any other costs (such as child-minding) as a consequence of attending, and whether they would lose any income. The responses are shown in *Table 28*.

TABLE 28 *Other costs incurred and lost income as a result of attendance*

	Number	%	Average cost/ loss per visit
Other costs			
Incurred	3	0.9	£2.00
Not incurred	341	99.1	–
Lost income			
Will earn less	10	2.9	£23.56
Will not earn less	334	97.1	–
Total	**344**	**100.0**	**£0.70**

Table 28 shows that fewer than 1% of respondents incurred any other costs and these averaged £2.00 per person. Almost 3% of attenders (10 respondents) stated that they would, on average, earn £23.56 less as a consequence of bringing their child to the clinic. The former translates into an average 'other' cost of £0.02 per attendance, and the latter into average lost earnings of £0.68 per attendance, adding up to about £0.70 per attendance. Adding this to the average travel cost incurred gives an average parental cost of about £0.78 per attendance.

However, as shown in *Table 29*, 93.3% of attenders (321 respondents) did not perceive that they had incurred any costs or lost any income as a result of bringing their child for a CHS check. The questionnaires showed that 93.6% of respondents (322) came directly from home, with only three coming from work. The estimated average

TABLE 29 *Distribution of costs and lost income amongst attenders*

	Number	%	Average cost/ loss incurred
No costs/loss stated	321	93.3	–
Travel costs only	11	3.2	£2.20
Other costs only	1	0.3	£2.00
Lost income only	9	2.6	£23.56
Travel and other costs	1	0.3	£4.20
Travel costs and lost income	0	0.0	–
Other costs and lost income	1	0.3	£25.56
Travel and other costs and lost income	0	0.0	–
Total	**344**	**100.0**	**£0.78**

distance travelled was approximately 1 mile, with an average travel time of 14.13 minutes (ranging from 1 minute to 99 minutes).

Costs of attending returns to health visitor/GP and referrals

Table 21 shows that approximately 16% of CHS checks result in a return visit or further referral. The discussion in this chapter of costs incurred by parents suggests that travel and other costs of attending these subsequent appointments is low, but that a small number of parents may incur a significant loss of earnings.

Most audiologists, orthoptists and speech therapists work in community-based settings (and indeed many speech therapists make home visits), so parental costs of attending appointments with these specialists are unlikely to be high, unless there is a loss of income, as parents and children will typically attend a local clinic.

Costs of attending an outpatient appointment in an acute hospital are likely to be higher than those associated with attending a community-based clinic, because of the greater distances involved. However, some outpatient clinics are held in GP surgeries or health centres. Very few children are referred directly to consultant specialists as a result of a CHS check, and so this additional cost will only be borne by a very small number of parents (*Table 22* shows that less than 1% of checks result in a referral to a paediatrician, and these are generally community-based rather than hospital-based). In view of the small number involved, these have not been costed.

Summary

- The majority of parents either walked (62.5%) or travelled in their own car (30.8%) to attend the CHS check and did not perceive that they had incurred any costs.
- The 3.5% of attenders using a bus, train or taxi incurred an average cost of £2.23.
- Less than 1% of attenders incurred an average additional cost of £2.00 (e.g. for a child-minder) and almost 3% would earn an average of £23.56 less as a consequence of attending.
- The average cost of attendance was approximately £0.78 (i.e. £0.08 for travel, £0.02 for other costs and £0.68 of lost earnings), although such costs were incurred by relatively few attenders (i.e. by less than 7%).
- Costs of attending referrals to other specialists were expected to be low for most parents because most of the contacts would occur in community-based settings (or the child's home) rather than in acute hospitals.

Conclusions

The results from the questionnaire show that most parents do not perceive that they incur any costs when taking their children to CHS checks. This is partly because over three-fifths walked to the clinic, but none of the 30% of respondents using their own car attached a cost to this. Marginal car costs would be low in any case because of the short distances typically travelled. Furthermore, visits for CHS checks may be combined with other routine activities (e.g. collecting a child from school, doing the shopping), and are therefore not seen as discrete journeys. Although the questionnaires did not distinguish between parents living in urban and rural areas, the above point may be particularly relevant for people living in rural areas, who may be less likely than their urban counterparts to make a car journey only to attend a CHS check. So although home visits by the health visitors to carry out CHS checks may be expected to reduce the pecuniary costs for the parents, these may not result in 'prevented' journeys for parents. Further research is needed to identify whether there are differences in the parental costs of attending CHS checks in urban and rural areas.

Only a few respondents lost any income as a consequence of attending, although their estimated loss was almost £25 on average.

The costs to parents of attending referrals to other specialists are also likely to be low, because many of these referrals are held in local community-based clinics rather than with specialists based in acute hospitals.

Chapter 7

Conclusions and recommendations

Conclusions relating to the methods

The primary objective of this study was to provide a detailed economic cost analysis of different models of organisation of the CHS system. The study measures the costs associated with the various methods of delivering CHS, including how costs vary with the location of service delivery, timing and staff skill-mix. It also provides estimates of the costs of the recommended components of each CHS check, the costs of follow-up, and the costs borne by parents. The study's findings are intended to complement other research on the effectiveness of the specific check components and/or the effectiveness of CHS as an integral part of child health services.

The two-stage methodology used closely mirrors that outlined in the original invitation to tender. A questionnaire was designed to identify different models of delivery (e.g. numbers of checks, ages at which checks are provided, locations of each check, content of each check) across Health Authorities. Nine broad models of delivery were identified. The data indicated a considerable degree of uniformity in the timing and content of each check, but also revealed differences in delivery of the HDT (Check 2) and vision and eyesight check (Check 4). A 10% sample of Health Authorities (i.e. 11 Health Authorities) was selected to provide more detailed information, from which the cost estimates were derived. Five subsites were identified to capture activity in GP-led clinics and Trust-led clinics. As suggested in the brief, researchers attended clinics at each subsite to record the times allocated to the different component parts of each check. The researchers also briefed the staff involved in the observed clinic on recording time data relating to CHS activity over the following 3 months. These data provided the basis for the calculations of the overall costs associated with the various models of delivering CHS checks.

Because one of the aims of the costing exercise was to provide information on the costs of individual components of the CHS programme, in order to inform policy about possible changes in models of organisation, it was decided that the focus of the study should be on identifying the opportunity costs of variable inputs. Therefore the focus was on the salary costs and on-costs of the staff involved in delivering CHS checks. The scale of CHS activity is such that any changes in the organisation or content of programmes are unlikely to have a significant impact on fixed costs (such as the costs of land, premises or equipment). All overhead costs are therefore excluded from the reported analysis, although allowances for overheads (generally approximately 25%) and a component to cover the costs associated with gaining the relevant qualifications (ranging from approximately 25% for health visitors to 50–66% for doctors) are also identified and can be added on if necessary.

The adopted methods excluded any effectiveness measures. This makes it impossible to draw many conclusions. The fact that one model of delivering a particular check or component costs considerably less than another is only meaningful when considered alongside information about the effectiveness of each approach. However, the study as funded was a cost study only.

The criteria used to select the 11 sites for in-depth study were arbitrary, but were chosen to try to ensure that the sample was representative in terms of geography, rurality and ethnicity. Other criteria would have resulted in different sites being selected, but they too would probably have revealed considerable variations in the actual delivery of the checks. This also applies to the selection of subsites, but given that staff had to record time data on their CHS-related activity over a 3-month period, it was important to ensure that staff at the subsites were committed to contributing to the study.

The extent to which different elements of each CHS check were undertaken simultaneously (e.g. physical checks and health education) only became apparent when the researchers tried to time each component. This indicated that CHS is not a discrete activity, as components were often undertaken simultaneously and other health-related activities were sometimes delivered at the same time (e.g. immunisations). Omitting one or more components of a check would be unlikely to have a significant impact on the overall time

required to undertake the check (and therefore its associated cost). Although the simultaneous performance of some components made it difficult to obtain accurate data for every component, the data did indicate that for most children relatively little time is associated with each specific component. The time data also revealed that doctors tend to spend less time on health education topics than health visitors, which is an important conclusion if CHS checks are seen as being an important vehicle for providing parents with relevant knowledge (rather than being a way of identifying any physical problems so that rapid action can be taken).

Conclusions arising from the analysis

Analysis of total costs

Analysis of the data on CHS-related activity collected over 3 months from the selected subsites show that there are significant cost differences between GP-led and Trust-led checks, but not between northern and southern or urban and rural Health Authorities/Trusts. Areas with high ethnic populations do not have higher costs (e.g. as a result of using interpreters). GP-led checks were more expensive than Trust-led checks for Checks 1 and 2, despite a higher proportion of Trust-led checks for Check 1 being undertaken by a doctor alone. This may be because GPs are more expensive than community medical officers (who typically provide the doctor input into Trust-led clinics).

The overall position is reversed for Check 3, where Trust-led checks are more expensive, possibly because of the higher proportion of (more expensive) home-based checks associated with the Trust-led activity. However, no significant overall cost differences occur for Check 4, despite the higher proportion of home-based checks associated with Trust-led activity.

The data reveal considerable diversity in the delivery of the four checks across the selected subsites, and also some divergence in staffing from the recommendations of *Health for all children*.[1] For example, although *Health for all children*[1] suggests that the health visitor is the most appropriate professional to carry out Check 3, doctors contribute to about one-sixth (16.9%) of GP-led checks and a quarter (25.5%) of Trust-led checks.

The data also show that the costs of home-based checks (which are undertaken for between a quarter and two-thirds of Checks 3 and 4) are higher than those undertaken in clinics. However, this conclusion is based only on a consideration of the staff time (including travel time) involved, and does not include any costs associated with capital overheads. Although the opportunity cost associated with using clinic space that otherwise would have been empty is low, home-based checks may make financial sense if clinic space is scarce (even after including petrol-related costs).

The cost data on HDTs (Check 2) suggest that very little 'dedicated' time is devoted to the test if it is undertaken during the same visit as the other components of the check.

The cost data for Check 4 suggest that doctors and health visitors are not spending any additional time during the check assessing vision in those places where children do not routinely see an orthoptist on a separate occasion as part of this check.

The cost data indicate that the staff cost component of CHS checks is approximately £7.50–£9.00. However, based on the discussion on page 3, these figures could be increased by about 25% (i.e. to approximately £9.40–11.25) to account for costs associated with overheads and capital overheads, if these are felt to be a relevant consideration. If costs associated with gaining professional qualifications are also considered, models of delivery including doctors become relatively more expensive than those excluding doctors, because of the high costs of their initial medical education.

Costs of the components of the CHS checks

The observers recorded a wide variety of times for some of the components, especially for the two later checks (when some children may have been less cooperative). Their recorded data generally showed that, on average, very few components cost more than £1 to undertake, indicating that omitting some elements would be unlikely to have a significant impact on the overall time required for each check. Furthermore, those undertaking the checks often discussed parental concerns and provided health education at the same time as performing the physical checks.

When sufficient observations were available for both doctors and health visitors, the overall conclusion is that, although health visitors may take longer to perform the various checks, they are generally cheaper. However, no conclusions on their comparative effectiveness (and therefore cost-effectiveness) can be drawn.

The observers also noted considerable differences in the ways some checks were undertaken and in the extent to which the parent was asked for information about the child. This was especially notable for the HDT at Check 2 and the vision screening at Check 4. Many children had their hearing assessed without receiving a full HDT in an appropriate environment. The effectiveness of the alternative approaches could be considered further, to determine the most appropriate way to assess these aspects. If a test is undertaken relatively quickly but inaccurately the time has been used inappropriately. However, if the less rigorous approaches provide acceptable outcomes then time and resources are being wasted performing full HDTs (unless a problem is suspected). These conclusions also apply to the eyesight tests.

Costs of follow-up activity

Relatively few referrals to specialists result from the routine CHS checks, although a few children are referred to audiologists, orthoptists and speech therapists. Very few are referred directly to specialist consultants.

About 1 in 13 children are requested to return. Four-fifths of these requests are generated by health visitors, and about half of these return visits are to see the health visitor. These requests to return add to the overall costs of the checks performed by health visitors. Checks led by doctors result in far fewer requests to return. It is not known why the requests to return or referrals were made, or whether they were appropriate.

Costs incurred by parents

Most parents do not perceive that they incur any costs taking their children to CHS checks. This is partly because over three-fifths walked to the clinic, but none of the 30% of respondents using their own car attached a cost to this. Only a few lost any income as a result of attending, although their estimated loss was almost £25 on average. The costs to parents of attending referrals to other specialists are also likely to be low, because many of these will be held in local community-based clinics rather than with specialists based in acute hospitals.

Overall conclusions arising from the analysis

The overall conclusions are:

- Despite common policies (e.g. for a Health Authority), CHS checks (and their components) vary widely in their actual delivery.
- Because components are often undertaken simultaneously, it is difficult to identify any significant time savings from omitting any of the individual elements (apart from the HDT and vision tests on separate occasions).
- Data on the effectiveness of CHS checks in meeting their broad objectives and on the specific components in meeting their objectives are needed to complement the cost data – cheap delivery may or may not be cost-effective.
- There appears to be great variation in the coverage of relevant health education topics.
- Because of the wide diversity observed in practice, a register of the costed time inputs, which could be updated as salaries change, has not been prepared.

Recommendations for further research

The above discussion suggests a number of possible areas for further research, including:

- Identifying the objectives of CHS (e.g. health promotion, detection of child abuse) to determine whether the CHS programme is the most (cost-)effective way of meeting these objectives.
- The comparative (cost-)effectiveness of the different ways in which hearing is assessed (ranging from asking the parents to performing HDTs in appropriate surroundings).
- The comparative (cost-)effectiveness of the different ways in which vision and eyesight are assessed.
- The comparative effectiveness of checks undertaken by doctors and health visitors (e.g. why do health visitors generate so many more requests to return than doctors?).
- The outcomes of the referrals to specialists arising from the CHS checks – were the referrals appropriate?
- The numbers of problems subsequently diagnosed and requiring specialist input despite CHS checks (e.g. via GP visits, playgroups/nurseries and primary schools).
- The views of parents – what do they want from the checks, and how can their needs be met most appropriately (e.g. for their first and subsequent children)?
- Are there differences in the costs of attending CHS checks for parents from urban and rural areas?

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The views expressed in this report are those of the authors, who are also responsible for any errors.

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Appendix 1

Delivery of CHS

The third edition of *Health for all children*[1] summarises the core surveillance programme for individual children. The recommendations for the four checks considered in this study are reproduced below. They form the basis of the research in this study.

CHS Check 1 (6–8 weeks)

According to *Health for all children*[1]:

> "This examination should be undertaken by a member of the primary health care team responsible for the child's surveillance. It is usually done by a doctor; the presence of a health visitor facilitates the sharing and follow-up of any anxieties, particularly with regard to feeding problems, depression etc. A health visitor could learn to undertake this examination and carry out the specified checks, but we are not aware of any detailed reports on the benefits and disadvantages of this arrangement.
>
> "The examination may be undertaken at the same visit as the first immunisation and/or postnatal check of the mother; this is a matter for individual teams to decide. It consists of (emphases in original):
>
> "Check history and ask about parental concerns. Physical examination, weight and head circumference. Measure length if indicated. Check for CDH and, if in doubt, refer **urgently**. If testes not descended, arrange referral. Prolonged jaundice should have been found earlier – if found at this review, refer immediately. Enquire particularly about concerns regarding vision and hearing. Inspect eyes. Do not attempt hearing test. If a high-risk hearing screening service is provided, check again whether baby in high-risk category for hearing loss and refer if necessary. Discuss immunisation; record whether or not there is any contra-indication; signed consent is **not** essential, but should be obtained at this visit if thought desirable by individual practitioners or required by locally agreed protocols. Address any outstanding topics not covered from the list suggested for health education for the first 2 weeks."[*]

The suggested topics for health education at 6–8 weeks are:

> "Immunisation; feeding, nutrition; weaning (explain about doorstep milk and iron deficiency); reinforce sudden infant death syndrome advice; smoking, postnatal depression; dangers of fires, falls, overheating and scalds; recognition of illness in babies and what to do; how to use NHS facilities effectively."

CHS Check 2 (6–9 months)

Health for all children[1] states that:

> "This examination can be undertaken by the doctor and health visitor together, or it can be regarded as primarily the health visitor's responsibility. There is no reason why the health visitor should not learn to check the hips.
>
> "The age of 6–9 months was selected because this is the ideal time for the distraction test of hearing. However, this should be done in protected time and there is no specific reason why the other aspects of this review should be done within this age band. For example, it could be carried out at the same time as the MMR vaccine (13 months). However, we stress that, as far as we are aware, this possibility has not been investigated in practice.
>
> "Enquire about parental concerns regarding health and development. Ask specifically about vision and hearing. Check weight if parents request or if indicated. Measure length if indicated. Look for evidence of CDH. Observe visual behaviour and look for squint. Carry out distraction test of hearing or other procedures as agreed with FHSA. NB: **Two** adequately trained staff are required for this test."

The following health education topics are listed:

> "Accident prevention: choking; scalds and burns; falls; drowning risk in bath; anticipate increasing mobility, i.e. safety gates, guards, etc. Nutrition: emphasise

[*] *Health for all children*[1] suggests that the following health education topics should be covered during the first 2 weeks, although it states that some may be deferred until the 6–8-week examination and review. Nutrition and breastfeeding (including peer support); check need for further dose of vitamin K and whether it has been supplied and/or given; parental smoking; accident prevention – bathing, scalding by feeds, fires. Immunisation – this should include determining if the baby is eligible for BCG (a vaccine made from bacillus Calmette–Guérin) and if so whether it has been given, and also whether the baby will need follow-up doses of hepatitis B vaccine. Reasons for and results of phenylketonuria and thyroid test (and discuss haemoglobinopathy if indicated) – remind parents to request results of these tests and ensure they are noted in the record. Significance of prolonged jaundice. Depression is common – how to cope and obtain help.

problem of iron deficiency and how to prevent it. Smoking. Review of transport in cars. Dental prophylaxis. Development needs. Sunburn."

CHS Check 3 (18–24 months)

Health for all children[1] states that:

"This review is probably more usefully carried out as close to 24 months as possible, since some aspects, notably height and language acquisition, are more readily assessed in the slightly older child. It does not involve any specific medical or screening procedures,

and is concerned primarily with parent guidance and education. It is often carried out at the family home and it is suggested that the health visitor is the most appropriate person to take responsibility for this examination. The place where this is done, and the amount of time devoted to this review in each case, should be decided on the basis of the primary health care team's overall knowledge of the child and family. The content of the review is as follows:

"Enquire about parental concerns, particularly regarding behaviour, vision and hearing. Confirm that child is walking with normal gait. Explain why comprehension (understanding when spoken to) and interest in social communication are more important at this age than speech production. Absence or small number of words at this age is not cause for serious concern. Formal tests of language are not recommended as a routine but may be used by appropriately trained individuals if in doubt or to demonstrate points to a parent. Parents should be counselled and follow-up arranged if there is any reason for concern or if the parent wishes. Do not attempt formal screening tests of vision or hearing. Arrange detailed assessment if in doubt. Remember high prevalence of iron deficiency anaemia at this age. Carry out haemoglobin estimation if local policy. Measure height (NB: If this review is carried out by telephone or post, as suggested by some health visitors when the parent is experienced and has no worries, it is important to ensure that height and gait are checked on an opportunistic basis. It is in any case good practice to measure height whenever a child visits the surgery or clinic)."

Topics for health education at this stage are:

"Accident prevention: falls from heights including windows; drowning; poisoning; road safety. Smoking. Developmental needs; language and play. Benefits of mixing with other children – playgroup etc. Avoidance and management of behaviour problems."

CHS Check 4 (39–42 months)

According to *Health for all children*[1]:

"The aims are to ensure that the child is physically fit and that there are no medical disorders or defects which may interfere with education, to ensure that the immunisations are up to date, and to determine whether there are any problems with development, language or behaviour which may have educational implications.

"For many families, this review will be very brief. The majority of children with significant development problems have already been identified by this age and the proportion will increase if nursery education becomes the norm. A particular effort may be needed to review children who are not in any nursery facility, attend a child-minder, and are persistent non-attenders for immunisation etc. It is among this group that one is most likely to find children with potentially serious developmental problems which might otherwise be overlooked.

"We recommend that (a) each primary health care team should decide whether this review should be performed by a doctor or a health visitor, since it no longer contains any screening procedure which calls for physical examination skills, and (b) flexibility and judgement should be exercised in deciding how much time to devote to this review for each family, depending on the team's knowledge of the child, frequency of other contacts, etc.

"Part or all of the review can be done in combination with the pre-school booster."

The review consists of:

"Enquiry and discussion about vision, squint, hearing, behaviour, language acquisition and development. Be aware of the agreed indications for referral, particularly with respect to speech and language problems. If there are any concerns, discuss with the parent whether the child is likely to have any special educational problems or needs and arrange further action as appropriate. Ensure that the specialist paediatric services are informed if there is **any** anxiety about a child's education potential. Measure height and plot on chart. Weigh if indicated. Check for testicular descent only if there is no previous note in the personal child health record. Carry out physical examination if indicated, for example because of any physical complaint or if child appears not to have had any recent medical assessment for some other reason (e.g. newly arrived in UK). If concerned about possible hearing impairment, perform hearing test **if** adequately trained and equipped; otherwise refer. Vision screening is of doubtful value unless performed by a trained person, usually an orthoptist. It is **not** recommended that doctors or health visitors should do this."

The recommended topics for health education are:

"Accidents: fires, roads, drowning. Begin to teach road safety. Preparation for school. Nutrition and dental care."

Appendix 2

Questionnaire sent to consultant community paediatricians

Code: [ ][ ][ ][ ]
(For internal use only)

YORK HEALTH ECONOMICS CONSORTIUM

NHS Executive Study of Child Health Surveillance

Please complete the questionnaire as fully as possible without spending too much time on it - we would rather that you returned it with one or two 'Don't Knows' than not return it at all because you could not find the answers to some of the questions!

Please tick or delete as appropriate

Name of Respondent: .....

Position: .....

Name of Trust: .....

The following questions relate to your CHS contract with

.....*Health Authority*

1. Do you hold a contract for CHS services with any other Health Authority/ies? YES / NO

If YES: With which other Health Authority/ies ?:.....

2. Do you have a written CHS policy/guidelines? YES / NO

If YES: *please send a copy with this questionnaire*

Copy of current local CHS policy enclosed: YES / NO

If NO: Please describe the CHS examinations that are taken for children of various ages, and by whom they are performed, on a separate sheet of paper.

Description of local service enclosed: YES / NO

3. Please complete the following Table (as far as possible):
(please also indicate if you undertake routine checks at different ages from those shown here)

		6 - 8 week	6 - 9 mths	18 - 24 mths	39 - 42 mths
i)	What percentage of CHS checks are performed by:				
	PHCT	.....%	.....%	.....%	.....%
	The Trust	.....%	.....%	.....%	.....%
ii)	Who is recommended to perform the check? (please tick):				
	Doctor	.....	.....	.....	.....
	Health visitor	.....	.....	.....	.....
	Other (specify)				
	.....	.....	.....	.....	.....
iii)	*For those CHS checks provided by the Trust*, what percentage of checks are carried out in:				
	Community Settings	.....%	.....%	.....%	.....%
	Hospital Settings	.....%	.....%	.....%	.....%
	Child's Home	.....%	.....%	.....%	.....%
	By Telephone	.....%	.....%	.....%	.....%
	Other (specify)				
	.....	.....%	.....%	.....%	.....%
iv)	*For those CHS checks provided by the Trust*, when a doctor is recommended, what percentage of the checks are undertaken by the following grades of doctor?				
	CMO	.....%	.....%	.....%	.....%
	SMO	.....%	.....%	.....%	.....%
	PMO	.....%	.....%	.....%	.....%
	Consultant Community Paediatrician	.....%	.....%	.....%	.....%

4. Is there a routine pre-school CHS check for children aged over 3 years, or is it local policy to undertake this check when children start school?

Routine pre-school check / School check only

What is the local school entry medical policy (please tick as appropriate)?

All children seen by a doctor: .....

All children seen by a nurse (referrals to doctor if indicated): .....

Selected children seen by a nurse (referrals to doctor if indicated): .....

Other (please describe briefly): .....

.....

.....

.....

5. Is any *routine* orthoptic screening provided by community orthoptists?

YES / NO

If YES: Please briefly describe which screening is provided this way, and whether it is performed during the same visit as the other CHS checks:

.....

.....

.....

If NO: If an eyesight or hearing problems/concerns are identified during a CHS check, to whom would the child *initially* be referred for a specialist opinion?

Eyesight: Community Orthoptist / Consultant Ophthalmologist

Hearing: Community Audiology Clinic / Consultant Otolaryngologist

Comments:.....

.....

.....

6. Is a Hearing Distraction Test (ie using two staff in an appropriate setting) *routinely* performed at 6 - 9 months?

YES / NO

If YES: Is it performed at the same time as the other CHS checks?

YES / NO

7. Is it a Trust policy to have combined clinics (ie for CHS and, for example, family planning)?

YES /NO

If YES: with what other clinics is CHS combined?

.....

.....

8. What links, if any, are there between the local CHS programme and the local Vaccination and Immunisation programme?

.....

.....

9. What percentage of children for whom your Trust is responsible (ie *including* those checked by GPs) are from ethnic minority backgrounds?

.....%

Are any additional resources / staff (eg link staff and interpreters) used to provide their CHS checks?

YES / NO

If YES: What additional resources / staff are used?

.....

.....

.....

.....

10. What information do GPs routinely provide to the Trust regarding CHS checks?

.....

.....

Are these records computerised? YES / NO

11. Does the Trust have a risk management policy?

YES / NO

Does the Trust allocate any of its budget to cover potential litigation costs?

YES / NO

If YES: Would this cover any CHS-related litigation claims against GPs?

YES / NO

12. If there are any unusual features of your CHS programme, please note them below (continue on a separate sheet if necessary):

.....

.....

.....

.....

.....

.....

.....

.....

.....

Thank You For Your Help
Please Return this Form in the Freepost Envelope by

FRIDAY 31 JANUARY 1997

M:\WPWIN60\DJS\CHSQUEST.TXT ydp 8/1/97

Appendix 3

Data collection sheets used by site observers

CHILD HEALTH SURVEILLANCE CHECKLIST: 6 - 8 Week Check

Name of Clinic/Practice: **Date of Visit:**

Identification Code:

Staff Present (enter code):	
Doctor:	
Health Visitor:	
Clinic Nurse:	
ANO (specify):	

Start Time:
End Time:

		Done by (tick): Dr	HV	Nurse	ANO	Record Time Taken (seconds)	Comment
With Immunisation	Y / N					-	
History of Parental concerns	Y / N					-	
Physical Examination							
Weight							
Head Circumference							
Length							
CHD							
Testes descent							
Prolonged Jaundice							
Hearing							
Vision							
Others:							
Discuss Immunisation						-	
Signed Consent						-	
Any Others:						-	
Topics For Health Education*							
Immunisation						-	
Feeding:						-	
Nutrition						-	
Weaning (Explain doorstep milk& iron deficiency)						-	
Sudden Infant Death Syndrome advice						-	
Smoking						-	
Postnatal Depression						-	
Dangers of Fires:						-	
Falls						-	
Overheating						-	
Scalds						-	
Recognition of illness in babies & what to do						-	
How to use NHS facilities effectively						-	
Others:						-	

* *record only total time spent on Health Education*

TOTAL TIME SPENT (minutes):	
Physical Examination	
Topics for Health Education	

TOTAL "DIRECT" CLINIC TIME (minutes):	
Child/Parent	
Doctor	
Health Visitor	
Clinic Nurse	
Other	
(for medical staff: direct time = time in face-to-face contact)	

Details if Follow-up Visit or Referral Required:

CHILD HEALTH SURVEILLANCE CHECKLIST: 6 - 9 Month Check

Name of Clinic/Practice: **Date of Visit:**

Identification Code:

Staff Present (enter code):	
Doctor:	
Health Visitor:	
Clinic Nurse:	
ANO (specify):	

Start Time:
End Time:

		Done by (tick): Dr	HV	Nurse	ANO	Record Time Taken (seconds)	Comment
With Immunisation	Y / N					-	
History of parental concerns:	Y / N					-	
Health and Development						-	
Physical Examination							
Weight							
Head Circumference							
Length							
CHD							
Testes descent							
Hearing							
Vision - look for squint							
Others:							
Distraction Test (time and describe)							
Topics For Health Education*							
Accident Prevention:						-	
Choking						-	
Scalds and burns						-	
Falls						-	
Drowning risk in the bath						-	
Anticipate increasing mobility						-	
Safety guards						-	
Nutrition:						-	
Iron deficiency and how to prevent it						-	
Smoking						-	
Transport in Cars						-	
Dental Prophylaxis						-	
Developmental Needs						-	
Sunburn						-	
Others:						-	

* *record only total time spent on Health Education*

TOTAL TIME SPENT (minutes):	
Physical Examination	
Topics for Health Education	

TOTAL "DIRECT" CLINIC TIME (minutes):	
Child/Parent	
Doctor	
Health Visitor	
Clinic Nurse	
Other	
(for medical staff: direct time = time in face-to-face contact)	

Details if Follow-up Visit or Referral Required:

CHILD HEALTH SURVEILLANCE CHECKLIST: 18 - 24 Month Check

Name of Clinic/Practice:

Date of Visit:

Identification Code:

Staff Present (enter code):	
Doctor:	
Health Visitor:	
Clinic Nurse:	
ANO (specify):	

Start Time:
End Time:

	Done by (tick):				Record Time	Comment
	Dr	HV	Nurse	ANO	Taken (seconds)	
With Immunisation Y / N					-	
History of Parental concerns: Y / N					-	
Behaviour					-	
Vision					-	
Hearing					-	
Physical Examination						
Walking with normal gait						
Explain comprehension and social communication						
Language						
Iron Deficient Anaemia						
Haemoglobin estimation						
Height						
Others:						
Topics For Health Education*						
Accident Prevention:					-	
Falls from windows					-	
Drowning					-	
Poisoning					-	
Road safety					-	
Smoking					-	
Developmental Needs:					-	
Language and play					-	
Benefits of mixing with other children					-	
Avoidance and management of behaviour problem					-	
Others:					-	
					-	
					-	
					-	
					-	

** record only total time spent on Health Education*

TOTAL TIME SPENT (minutes):	
Physical Examination	
Topics for Health Education	

TOTAL "DIRECT" CLINIC TIME (minutes):	
Child/Parent	
Doctor	
Health Visitor	
Clinic Nurse	
Other	
(for medical staff: direct time = time in face-to-face contact)	

Details if Follow-up Visit or Referral Required:

CHILD HEALTH SURVEILLANCE CHECKLIST: 39 - 42 Month Check

Name of Clinic/Practice:

Date of Visit:

Identification Code:

Staff Present (enter code):	
Doctor:	
Health Visitor:	
Clinic Nurse:	
ANO (specify):	

Start Time:
End Time:

	Done by (tick):				Record Time	Comment
	Dr	HV	Nurse	ANO	Taken (seconds)	
With Immunisation: Y / N					-	
Parental concerns: Y / N					-	
Behaviour					-	
Hearing					-	
Vision - squint					-	
Language acquisition					-	
Development					-	
Physical Examination						
Height & Plot						
Weight						
Testicular descent - if no previous record						
Other:						
Topics For Health Education*						
Accidents:					-	
Fires					-	
Roads					-	
Drowning					-	
Begin to teach road safety					-	
Preparation for School					-	
Nutrition					-	
Dental Care					-	
Others:					-	
					-	
					-	
					-	
					-	

** record only total time spent on Health Education*

TOTAL TIME SPENT (minutes):	
Physical Examination	
Topics for Health Education	

TOTAL "DIRECT" CLINIC TIME (minutes):	
Child/Parent	
Doctor	
Health Visitor	
Clinic Nurse	
Other	
(for medical staff: direct time = time in face-to-face contact)	

Details if Follow-up Visit or Referral Required:

Appendix 4

Parental questionnaire on costs of attendance

Child Health Surveillance

Parental Questionnaire

Please ask as many as possible of the parents attending the CHS Clinic the following questions, and record their answers below
Please tick, circle or enter numbers as relevant - [x] indicates next question

DATE: **CLINIC LOCATION:** **IDENTIFIER NUMBER:**

1. Where did you travel from to get to the clinic today?

Home.....*[2]* Elsewhere (specify).....*[2]*

2. How did you get to the clinic today?

Walk.....*[4]* Bus.....*[3b]* Taxi .....*[3a]* Own/Family Car.....*[4]*

Other Person's Car.....*[3b]* Bicycle.....*[4]* Other (specify).....*[?]*

3 ***a)*** *Ask only if they travelled by bus or taxi (or train):*
How much did it cost you (in total) to travel here (if by bus, check if single or return fare):

Taxi fare £.....*[4]* Bus fare (single) £.....*[4]*

Bus fare (return) £.....*[4]*

b) *Ask only if they travelled in someone else's car:*
Did you pay them anything for this? NO / YES (ask and enter amount)£.....*[4]*

4. How long did it take you to get here? .....minutes ***[5 or 6]***

Ask only if they came from elsewhere (see Question 1):
How long will it take you to get home from here? .....minutes ***[5 or 6]***
(enter X if they are not returning home from the clinic)

5. *Ask only if they came in own/family car (see Question 2):*
How many miles was the journey? .....miles

Did you have to pay for parking? NO / YES (ask and enter amount) £.....*[6]*

6. Did you have to take time off work (ie paid employment) to attend this clinic? NO ***[7]*** / YES

If YES: Will you earn less money this week because of this? NO ***[7]*** / YES

If YES: (Approximately) how much less money? £.....*[7]*

7. Have you had to make any other payments (eg to a childminder) to enable you to attend this clinic?

NO ***[end with thanks]*** / YES

If YES: ask for what and amount of payment £..... for ..... ***[end with thanks]***

Appendix 5

Sheets used for data collection by staff at sites

Child Health Surveillance Project

Instructions for Completing and Returning the Three-Month Records and Timesheets

It is crucial that everyone who contributed to the CHS Clinic observed by the YHEC representative completes detailed records of their time spent on routine CHS-related activity during the subsequent 3 months (13 weeks). Each person will be given a personal identifier by the YHEC representative, and should use this on their forms.

This information will be treated in strictest confidence by the YHEC researchers, and under no circumstances will be divulged to your employer, manager or colleagues.

There are three different forms for you to complete, and these are on different coloured paper (although the Green Forms are only relevant to those undertaking non-Clinic CHS checks). At the end of each month you should return your forms to YHEC in the provided Freepost envelopes to arrive at YHEC no later than:

April data: by Tuesday 6 May 1997
May data: by Tuesday 3 June 1997
June data: by Friday 3 July 1997
July data: by Tuesday 5 August 1997 (unless advised otherwise)

THE PINK FORMS

One of these should be completed *every time* that you are involved in a **CHS Clinic**, *using a new form for each Clinic*. You should enter the date and location, plus the initials and grade/type of staff (eg GP; CMO; G Grade HV) of everyone else involved in the clinic. If there is a receptionist who is dedicated to the Clinic alone, please record their time too. *If one or more of these staff are also completing these records for YHEC, their times for the Clinic should be recorded only by the Health Visitor* (to prevent double-counting of checks and activity).

"Time" has been sub-divided into three categories:

- **Direct Time** is that spent in *face-to-face* contact with the specific child/parent (even though you may not be actively participating for the entire period);
- **Indirect Time** is *child-specific time* which is spent on non-face-to-face activities such as record-keeping and administration;
- **Other Time** is that which relates to CHS activity but cannot be attributed to a specific child, such as your travel time to a CHS Clinic or time in CHS-related meetings. Any "down-time" due to Did Not Arrives (DNAs) should be recorded here.

All of your CHS work should fall into one of these!

YORK HEALTH ECONOMICS CONSORTIUM THE UNIVERSITY of York

Please note that we require information on requirements for both **Follow-up visits and Referrals** (to be entered in the right-hand side column):

- **Follow-up** occurs when, as a consequence of a particular screening test, **a return visit** is arranged (eg asking the child to attend the Clinic for another check/further observation in a month's time);
- A **Referral to a Specialist** occurs when, as a consequence of a particular screening test, it is recommended that the child is seen by a more specialised person (eg a Community Audiologist; an ENT Consultant; a Consultant Paediatrician).

We will also need to track **when and where** these Follow-ups and Referrals occur (in order to determine their costs), so please ensure that it is possible for you to identify these children (eg you may wish to list all Referrals for Follow-up on a separate sheet of paper).

THE GREEN FORMS

These should be used to record details of **any other non-Clinic CHS checks** that you undertake (eg during a visit to the child's home; checks conducted by telephone). The time definitions are similar to those for the Pink Forms, *except* you should record time spent on child-specific travel as Indirect Time (not as Other Time).

If you undertake more than 20 such CHS checks during a month, please use an additional green sheet - we will be able to identify it as such from the dates.

You should record information on Follow-ups and Referrals in the same way as on the Pink Forms.

You need to keep a record of any time spent in meetings related to your CHS activity - if this time is not child-specific, you should record it as "Other Time" at the end of the Green Forms.

THE YELLOW FORMS

These forms are intended to provide a **summary record of the time** that you spend on CHS-related activity each month. Please complete them on a daily and/or weekly basis - we can add up the monthly totals for you if you want! As stated above, this information will be treated *in the strictest confidence*, but is essential as a check to ensure that we have a comprehensive record of the time that you spend on CHS work. Furthermore, you may find it interesting from a personal perspective to see your time broken-down in this way!

Thank you for taking the trouble to complete and return these forms. We apologise if we appear to be over-pedantic, but it is vital that we collect accurate, valid and consistent data. We really do appreciate your help and co-operation!

If you have any problems or queries relating to completing these forms, please contact either Diana Sanderson (Senior Research Fellow) or Dianne Wright (Project Assistant) at YHEC on 01904 433620.

York Health Economics Consortium - Child Health Surveillance Project

THIS FORM SHOULD ONLY BE USED TO RECORD INFORMATION ON CHS CHECKS NOT UNDERTAKEN IN A CHS CLINIC

Please enter all times to the nearest minute

Staff Identifier:.....

Please use one (or more) of these forms each month

Initials and Grade/Type of Other Staff:.....

	Date	Test undertaken (tick):				Location	Health Visitor:		Other staff:		Referral or Follow-up Required
		6 - 8 weeks	6 - 9 months	18 - 24 months	39 - 42 months		Direct Time	Indirect Time	Direct Time	Indirect Time	(name; position; Trust)
1											
2											
3											
4											
5											
6											
7											
8											

Total Direct Time (1 - 8):
(ie time spent in face-to-face contact with the child/parent)

Total Indirect Time (1 - 8):
(ie child-specific time spent on administration, record-keeping etc)

Total Other Time (1 - 8):
(ie non-child-specific CHS activity associated with these children)

continue over if necessary/...

Continuation/...

	Date	Test undertaken (tick):				Location	Health Visitor:		Other staff:		Referral or Follow-up Required
		6 - 8 weeks	6 - 9 months	18 - 24 months	39 - 42 months		Direct Time	Indirect Time	Direct Time	Indirect Time	(name; position; Trust)
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

Total Direct Time (9 - 20):
(ie time spent in face-to-face contact with the child/parent)

Total Indirect Time (9 - 20):
(ie child-specific time spent on administration, record-keeping etc)

Total Other Time (9 - 20):
(ie non-child-specific CHS activity associated with these children)

At the end of each month please return these forms, plus your forms for checks done in CHS Clinics (pink) and your monthly summary timesheet (yellow), to YHEC in the Freepost envelope provided.

York Health Economics Consortium - Child Health Surveillance Project

THIS FORM SHOULD ONLY BE USED TO RECORD INFORMATION FROM CHS CLINICS

Name of Trust / GP Practice:..... Staff Identifier:.....

Date of Clinic:..... Location of Clinic:.....

Initials and Grade/Type of Staff Contributing to the Clinic: Doctor:..... Health Visitor:..... Clinic Nurse:..... Other (specify):.....

Please use one form per clinic ***Please enter all times to the nearest minute***

	Test undertaken (tick):				Doctor:		Health Visitor:		Clinic Nurse:		Other staff		Referral or Follow-up Required
	6 - 8 weeks	6 - 9 months	18 - 24 months	39 - 42 months	Direct Time	Indirect Time	Direct Time	Indirect Time	Direct Time	Indirect Time	Direct Time	Indirect Time	(name; position; Trust)
1													
2													
3													
4													
5													
6													
7													
8													

Total Direct Time (1 - 8):
(ie time spent in face-to-face contact with the child/parent)

Total Indirect Time (1 - 8):
(ie child-specific time spent on administration, record-keeping etc)

Total Other Time (complete once per clinic):
(ie non-child-specific related to CHS clinic, such as travel to clinic)

continue over if necessary/...

Continuation/...

	Test undertaken (tick):				Doctor:		Health Visitor:		Clinic Nurse:		Other staff		Referral or Follow-up Required
	6 - 8 weeks	6 - 9 months	18 - 24 months	39 - 42 months	Direct Time	Indirect Time	Direct Time	Indirect Time	Direct Time	Indirect Time	Direct Time	Indirect Time	(name; position; Trust)
9													
10													
11													
12													
13													
14													
15													
16													

Total Direct Time (1 - 8):
(ie time spent in face-to-face contact with the child/parent)

Total Indirect Time (1 - 8):
(ie child-specific time spent on administration, record-keeping etc)

Total Other Time (complete once per clinic):
(ie non-child-specific related to CHS clinic, such as travel to clinic)

At the end of each month please return these forms, plus any forms for non-Clinic CHS checks (green) and your monthly summary timesheet (yellow), to YHEC in the Freepost envelope provided.

Staff Identifier:.....

York Health Economics Consortium

Child Health Surveillance Project

Summary Timesheet for April 1997

Please record daily and/or weekly totals and return to YHEC by Tuesday 6 May in the Freepost envelope
Please enter hours to the nearest 15 minutes

Day	Date	Number of CHS Checks	Total Direct CHS Hours	Total Indirect CHS Hours	Total Other CHS Hours	TOTAL ALL CHS HOURS
Tuesday	1					
Wednesday	2					
Thursday	3					
Friday	4					
Saturday	5					
Total for Part-Week						
Monday	7					
Tuesday	8					
Wednesday	9					
Thursday	10					
Friday	11					
Saturday	12					
Total for Week						
Monday	14					
Tuesday	15					
Wednesday	16					
Thursday	17					
Friday	18					
Saturday	19					
Total for Week						
Monday	21					
Tuesday	22					
Wednesday	23					
Thursday	24					
Friday	25					
Saturday	26					
Total for Week						
Monday	28					
Tuesday	29					
Wednesday	30					
Total for Part-Week						
TOTAL FOR MONTH						

Appendix 6

Statistical analysis

The statistical methods used in this study were determined by the size of the sample. Much of the analysis undertaken here involves testing to see whether or not there is a significant (or meaningful) difference between pairs of means. For example, is the average cost of Check 1 the same in the north and the south? Does a health visitor undertaking a particular check in a clinic setting cost the same as a health visitor undertaking the same check in the child's home? Answering such questions involves setting up the null hypothesis that there is no difference between the two means and comparing this with the alternative hypothesis that there is a difference between them. Various statistical techniques – such as *t*-tests and *F*-values – can be used to determine whether the null hypothesis should be rejected. However, as the sample size increases, the likelihood of rejecting the null hypothesis increases. Because of the size of the sample, statistical results are reported here in terms of confidence intervals.

However, using confidence intervals does not necessarily provide clear-cut answers. The statistical analysis provides evidence, which then needs to be interpreted. The interpretation remains subjective, because the user needs to determine, given the evidence, whether they believe the difference to be meaningful or not. In the following tables the 'decision' refers to a presumption about differences in sample means. The decision indicates a presumption that the null hypothesis (no difference in means) is either rejected or not rejected on the basis of the statistical evidence.

Asymptotically-based 95% confidence intervals have been calculated for all of the pairwise comparisons where samples are large enough (25 or more) in each group. When the sample is very small (7 or less), no statistical inferences have been drawn. In such situations it is only possible to describe the data. For example, an average cost of £12.73 for a health visitor and assistant undertaking a home visit is much more than an average cost of £7.60 for undertaking the same check in a clinic setting. However, if one or both samples are small, the difference cannot be verified statistically.

TABLE 30 *Significance testing for differences in mean costs for Check 1*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
North	406	7.2694	4.315	0.214	1.26	0.033	–5.65	714	0.000	–5.74	697.06	0.000	–2.356	Reject
South	310	9.0254	3.847	0.219									–1.156	
Urban	311	7.2245	4.383	0.249	1.22	0.059	–4.55	714	0.000	–4.49	630.78	0.000	–2.245	Reject
Rural	405	8.6479	3.964	0.197									–1.002	
Trust-led	230	6.2364	3.856	0.254	1.13	0.283	–8.20	714	0.000	–8.39	475.68	0.000	–2.254	Reject
GP-led	486	8.8783	4.103	0.183									–0.026	
Ethnic	173	7.5133	5.315	0.404	1.98	0.000	–1.86	714	0.640	–1.56	229.97	0.119	–1.534	Not reject
Non-ethnic	543	8.1941	3.779	0.162									–0.173	

SE, standard error; CI, confidence interval

TABLE 31 *Significance testing for differences in mean costs for Check 2*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
North	678	7.8905	4.878	0.187	1.51	0.000	2.33	1152	0.020	2.42	1127.41	0.016	0.119	Reject
South	476	7.2594	3.967	0.182									1.143	
Urban	467	8.0199	4.183	0.194	1.29	0.003	2.41	1152	0.016	2.47	1077.37	0.014	0.134	Reject
Rural	680	7.3653	4.742	0.181									1.175	
Trust-led	342	6.9983	4.850	0.262	1.23	0.020	–3.08	1152	0.002	–2.96	585.18	0.003	–1.494	Reject
GP-led	805	7.8963	4.369	0.153									–0.302	
Ethnic	228	8.0789	4.037	0.267	1.32	0.010	1.67	1152	0.095	1.82	388.77	0.070	–2.044	Reject
Non-ethnic	926	7.5197	4.643	0.153									–0.837	

TABLE 32 *Significance testing for differences in mean costs for Check 3*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
North	469	7.9090	3.613	0.167	1.09	0.427	0.92	777	0.358	0.93	680.57	0.354	–0.268	Not reject
South	306	7.6699	3.466	0.197									0.746	
Urban	331	8.0538	3.462	0.190	1.09	0.403	1.62	777	0.105	1.63	727.39	0.103	0.040	Reject
Rural	448	7.6365	0.616	0.171									0.795	
Trust-led	274	8.5537	3.453	0.209	1.06	0.615	4.33	777	0.000	4.36	573.54	0.000	0.629	Reject
GP-led	505	7.4124	3.549	0.158									1.654	
Ethnic	113	8.1937	2.644	0.249	1.94	0.000	1.23	777	0.219	1.55	194.42	0.123	–0.118	Not reject
Non-ethnic	666	7.7494	3.685	0.143									1.006	

TABLE 33 *Significance testing for differences in mean costs for Check 4*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
North	504	9.0271	4.601	0.205	2.10	0.000	3.69	823	0.000	4.00	817.88	0.000	0.552	Reject
South	321	7.9443	3.172	0.177									1.614	
Urban	348	8.8647	3.850	0.206	1.26	0.021	1.54	823	0.125	1.56	791.32	0.118	–0.113	Not reject
Rural	477	8.4170	4.327	0.198									1.008	
Trust-led	250	8.8070	4.176	0.264	1.03	0.784	1.03	823	0.304	1.02	467.81	0.306	–0.419	Not reject
GP-led	575	8.5081	4.119	0.172									0.814	
Ethnic	92	8.5312	3.453	0.360	1.49	0.180	–0.18	823	0.855	–0.21	127.68	0.831	–0.853	Not reject
Non-ethnic	733	8.6152	4.216	0.156									0.685	

TABLE 34 *Cost comparisons of models of delivery for Check 1 for GP-led checks*

Variable	No. of cases	Mean	SD	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
						t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
Dr (1)	92	7.17	2.95	1.31	0.177	–8.04	209	0.000	–8.18	205.85	0.000	–4.426	Reject
Dr and HV (3)	119	10.74	3.38									–2.714	
Dr and HV (3)	119	10.74	3.38	1.31	0.150	–0.81	233	0.418	–0.81	227.30	0.419	–1.320	Not reject
Dr, HV and ANO (6)	116	11.13	3.87									0.540	
HV clinic (2)	61	3.78	1.96	2.10	0.034	–10.04	78	0.000	–8.29	23.59	0.000	–6.896	Reject
HV home (8)	19	9.55	2.83									–4.644	
HV clinic (2)	61	3.78	1.96	4.05	0.000	–9.19	123	0.000	–9.33	93.27	0.000	–6.233	Reject
HV and ANO (5)	64	8.93	3.94									–4.067	

TABLE 35 *Cost comparisons of models of delivery for Check 1 for Trust-led checks*

Variable	No. of cases	Mean	SD	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
						t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
Dr (1)	100	4.88	1.62	2.66	0.001	–11.00	139	0.000	–9.33	55.11	0.000	–4.672	Reject
Dr and HV (3)	41	8.74	2.44									–3.048	
Dr and HV (3)	41	8.74	2.44	6.08	0.003	1.50	51	0.139	2.29	45.43	0.027	–0.337	Not reject
Dr, HV and ANO (6)	12	7.65	0.99									2.537	
HV clinic (2)	11	5.75	4.05	1.58	0.444	0.49	58	0.628	0.56	17.88	0.581	–2.395	Not reject
HV and ANO (5)	49	4.95	5.09									3.995	

TABLE 36 *Cost comparisons of models of delivery for Check 2 for GP-led checks*

Variable	No. of cases	Mean	SD	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
						t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
HV (2) Dr and HV (3)	199 62	6.12 11.38	3.47 4.16	1.44	0.067	–9.91	259	0.000	–9.01	89.05	0.000	–6.402 –4.118	Reject
HV (2) Dr and HV (5)	199 370	6.12 7.21	3.47 3.37	1.07	0.602	–3.65	567	0.000	–3.62	394.44	0.000	–1.682 –0.498	Reject
HV clinic (2) HV home (8)	199 66	6.12 9.30	3.47 4.28	1.52	0.030	–6.07	263	0.000	–5.47	94.96	0.000	–4.320 –2.040	Reject
HV and ANO clinic (5) HV and ANO home (9)	370 16	7.21 8.60	3.36 7.02	4.36	0.000	–1.50	384	0.130	–0.79	15.30	0.444	–3.206 –2.525	Reject
HV home (8) HV and ANO home (9)	66 16	9.30 8.60	4.28 7.02	2.69	0.006	0.51	80	0.609	0.38	17.79	0.706	–1.990 3.390	Not reject
Dr and HV (3) HV home (8)	62 66	11.38 9.30	4.16 4.28	1.06	0.823	2.78	126	0.006	2.78	125.85	0.006	0.618 3.542	Reject
Dr and HV (3) Dr, HV and ANO (6)	62 70	11.38 13.72	4.16 4.34	1.09	0.744	–3.16	130	0.002	–3.16	129.15	0.002	–3.791 –0.889	Reject
Dr (1) HV (2)	29 199	3.77 6.12	1.50 3.47	5.39	0.000	–3.59	226	0.000	–6.30	82.06	0.000	–3.078 –1.622	Reject
Dr (1) Dr and HV (3)	29 62	3.77 11.38	1.50 4.16	7.73	0.000	–9.53	89	0.000	–12.73	85.20	0.000	–8.781 –6.439	Reject

TABLE 37 *Cost comparisons of models of delivery for Check 2 for Trust-led checks*

Variable	No. of cases	Mean	SD	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
						t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
HV (2) HV and ANO (5)	35 99	4.27 6.68	3.71 6.49	3.07	0.000	–2.08	132	0.040	–2.66	104.93	0.009	–4.184 –0.637	Reject
HV clinic (2) HV home (8)	35 44	4.27 7.68	3.71 3.47	1.14	0.678	–4.20	77	0.000	–4.17	70.76	0.000	–5.011 –1.809	Reject
HV and ANO clinic (5) HV and ANO home (9)	99 69	6.68 9.97	6.49 4.13	2.47	0.000	–3.71	166	0.000	–4.01	164.77	0.000	–4.898 –1.682	Reject
HV home (8) HV and ANO home (9)	44 69	7.68 9.97	3.47 4.13	1.41	0.225	–3.06	111	0.003	–3.18	102.71	0.002	–3.705 –0.875	Reject
Dr and HV (3) HV home (8)	25 44	8.32 7.68	2.01 3.47	3.00	0.005	0.85	67	0.398	0.98	66.96	0.331	0.836 2.116	Not reject
Dr and HV (3) Dr, HV and ANO (6)	25 7	8.32 7.83	3.01 1.79	1.25	0.842	0.58	30	0.565	0.62	10.61	0.548	–1.235 2.215	Not reject
Dr (1) HV (2)	61 35	4.44 4.27	2.01 3.70	3.42	0.000	0.28	94	0.783	0.24	45.63	0.813	–1.156 –1.496	Not reject
Dr (1) Dr and HV (3)	61 25	4.44 8.32	2.01 2.01	1.00	1.000	–8.17	84	0.000	–8.17	44.71	0.000	–4.816 –2.944	Reject

TABLE 38 *Cost comparisons of models for Check 3 for GP-led checks*

Variable	No. of cases	Mean	SD	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
						t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
HV (2) Dr and HV (3)	156 18	6.33 7.39	2.25 2.29	1.04	0.845	–1.88	172	0.061	–1.86	20.97	0.077	0.045 –2.165	Not reject
HV clinic (2) HV home (8)	156 131	6.33 9.44	2.25 4.36	3.75	0.000	–7.78	285	0.000	–7.39	186.91	0.000	–3.936 –2.284	Reject
HV (2) HV and ANO (5)	156 117	6.33 6.43	2.25 2.06	1.19	0.315	–0.37	271	0.712	–0.37	280.46	0.709	–0.614 0.414	Not reject
HV and ANO clinic (5) HV and ANO home (9)	117 16	6.43 11.04	2.06 6.31	9.35	0.000	–6.01	131	0.000	–2.91	15.44	0.011	–6.114 –3.106	Reject
HV home (8) HV and ANO home (9)	131 16	9.45 11.04	4.36 6.31	2.09	0.028	–1.31	145	0.191	–0.99	16.80	0.338	–3.969 0.789	Not reject
Dr and HV (3) HV home (8)	18 131	7.37 9.45	2.29 4.36	3.62	0.004	–1.96	147	0.052	–3.11	36.90	0.004	–4.160 0.000	Borderline
Dr and HV (3) Dr, HV and ANO (6)	18 38	7.39 8.32	2.29 3.23	1.98	0.132	–1.11	54	0.274	–1.25	45.47	0.219	–2.572 0.712	Not reject

TABLE 39 *Cost comparisons of models of delivery for Check 3 for Trust-led checks*

Variable	No. of cases	Mean	SD	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
						t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
HV clinic (2) Dr and HV (3)	37 51	6.41 9.12	4.22 2.01	4.40	0.000	–4.02	86	0.000	–3.62	47.91	0.000	–4.117 –1.243	Reject
HV clinic (2) HV home (8)	37 87	6.41 8.71	4.22 2.77	2.33	0.002	–3.58	122	0.000	–3.04	49.67	0.004	–1.779 1.179	Not reject
HV (2) HV and ANO (5)	37 9	6.41 7.94	4.22 3.37	1.57	0.515	–1.01	44	0.319	–1.16	14.81	0.265	–4.499 1.439	Not reject
HV and ANO clinic (5) HV and ANO home (9)	9 71	7.94 9.99	3.37 3.80	1.27	0.767	–1.54	78	0.127	–1.69	10.76	0.119	–4.659 0.559	Not reject
HV home (8) HV and ANO home (9)	87 71	8.70 9.99	2.76 3.80	1.88	0.005	–2.40	156	0.015	–2.38	124.78	0.019	–2.347 –0.233	Reject
Dr and HV (3) HV home (8)	51 87	9.12 8.70	2.01 2.76	1.89	0.016	0.94	136	0.349	1.02	129.67	0.310	–0.380 1.220	Not reject
Dr and HV (3) Dr, HV and ANO (6)	51 14	9.12 5.26	2.01 2.84	2.00	0.082	5.78	63	0.000	4.76	16.74	0.000	2.551 5.169	Reject

TABLE 40 *Cost comparisons of models of delivery for Check 4 for GP-led checks*

Variable	No. of cases	Mean	SD	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
						t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
HV (2) Dr and HV (3)	174 55	6.37 14.78	2.41 3.96	2.69	0.000	–19.01	227	0.000	–14.89	67.13	0.000	–9.516 –7.304	Reject
HV clinic (2) HV home (8)	174 146	6.37 9.60	2.41 3.34	1.91	0.000	–10.00	318	0.000	–9.73	258.36	0.000	–3.879 –2.581	Reject
HV (2) HV and ANO (5)	174 123	6.37 7.60	2.41 3.09	1.65	0.003	–3.85	295	0.000	–3.69	220.64	0.000	–1.883 –0.577	Reject
HV and ANO clinic (5) HV and ANO home (9)	123 5	7.60 12.73	3.09 2.98	1.08	1.000	–3.64	126	0.000	–3.77	4.36	0.017	NA	(Reject)
HV home (8) HV and ANO home (9)	146 5	9.59 12.73	3.34 2.98	1.26	0.939	–2.07	149	0.040	–2.31	4.35	0.077	NA	(Reject)
Dr and HV (3) HV home (8)	55 146	14.78 9.59	3.96 3.34	1.41	0.114	9.31	199	0.000	8.62	84.53	0.000	4.016 6.368	Reject
Dr and HV (3) Dr, HV and ANO (6)	55 25	14.78 13.40	3.96 3.95	1.01	1.000	1.44	78	0.153	1.45	46.61	0.155	–0.489 3.249	Not reject
Dr (1) HV (2)	42 174	4.67 6.37	1.88 2.41	1.65	0.062	–4.27	214	0.000	–4.96	77.17	0.000	–4.372 –3.028	Reject
Dr (1) Dr and HV (3)	42 55	4.67 14.78	1.88 3.96	4.43	0.000	–15.27	95	0.000	–16.63	81.27	0.000	–11.301 –8.919	Reject

NA, not applicable

TABLE 41 *Cost comparisons of models of delivery for Check 4 for Trust-led checks*

Variable	No. of cases	Mean	SD	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
						t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
HV (2) Dr and HV (3)	83 7	6.38 12.25	2.42 7.12	8.67	0.000	–5.00	88	0.000	–2.17	6.12	0.072	NA	(Reject)
HV (2) HV home (8)	83 42	6.38 10.41	2.42 4.31	3.18	0.000	–6.71	123	0.000	–5.64	54.40	0.000	–5.434 –2.626	Reject
HV (2) HV and ANO (5)	83 11	6.38 11.32	2.42 1.88	1.65	0.389	–6.51	92	0.000	–7.89	14.71	0.000	–6.427 –3.453	Reject
HV and ANO clinic (5) HV and ANO home (9)	11 67	11.32 10.14	1.88 4.86	6.68	0.003	0.79	76	0.434	1.43	37.18	0.161	–1.748 4.108	Not reject
HV home (8) HV and ANO home (9)	42 67	10.41 10.14	4.31 4.86	1.27	0.413	0.30	107	0.768	0.30	94.92	0.762	–1.446 1.986	Not reject
Dr and HV (3) HV home (8)	7 42	12.25 10.41	7.12 4.31	2.73	0.051	0.95	47	0.349	0.66	6.75	0.529	NA	(Reject)
Dr (1) HV (2)	36 83	8.69 6.38	2.60 2.42	1.17	0.551	4.68	117	0.000	4.54	62.08	0.000	1.314 3.306	Reject
Dr (1) Dr and HV (3)	36 7	8.69 12.25	2.62 7.12	7.40	0.000	–2.37	41	0.023	–1.31	6.32	0.237	NA	(Reject)

TABLE 42 *Cost comparisons for Model 1, Check 1*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	92	7.1679	2.954	0.308	3.31	0.000	–6.73	190	0.000	–6.58	138.70	0.000	–2.972	Reject
Trust-led	100	4.8784	1.622	0.162									–1.067	

TABLE 43 *Cost comparisons for Model 2, Check 1*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	61	3.7774	1.957	0.251	4.28	0.000	2.54	70	0.013	1.58	10.86	0.142	0.450	Reject
Trust-led	11	5.7492	4.048	1.221									3.493	

TABLE 44 *Cost comparisons for Model 3, Check 1*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	119	10.7442	3.381	0.310	1.92	0.020	–3.49	158	0.001	–4.08	96.25	0.000	–2.967	Reject
Trust-led	41	8.7400	2.438	0.381									–1.042	

TABLE 45 *Cost comparisons for Model 4, Check 1*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	15	6.8320	1.206	0.311	24.86	0.000	2.57	28	0.016	2.57	15.12	0.021	0.962	Reject
Trust-led	15	10.8967	6.011	1.552									7.167	

TABLE 46 *Cost comparisons for Model 5, Check 1*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	64	8.9305	3.940	0.493	1.67	0.057	–4.69	111	0.000	–4.53	88.07	0.000	–5.701	Reject
Trust-led	49	4.9497	5.087	0.727									–2.260	

TABLE 47 *Cost comparisons for Model 6, Check 1*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	116	11.1282	3.865	0.359	15.29	0.000	–3.09	126	0.002	–7.58	59.15	0.000	–5.681	Reject
Trust-led	12	7.6523	0.989	0.285									–1.271	

TABLE 48 *Cost comparisons for Model 2, Check 2 (HDT with check)*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	44	6.2228	2.285	0.345	1.25	0.527	–5.38	74	0.000	–5.48	70.75	0.000	–3.716	Reject
Trust-led	32	3.4865	2.048	0.362									–1.757	

TABLE 49 *Cost comparisons for Model 3, Check 2 (HDT with check)*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	21	16.0191	2.227	0.486	1.16	0.746	–9.74	33	0.000	–9.59	26.55	0.000	–9.326	Reject
Trust-led	14	8.3094	2.396	0.640									–6.093	

TABLE 50 *Cost comparisons for Model 5, Check 2 (HDT with check)*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	180	6.8212	2.601	0.194	1.05	0.807	–5.28	214	0.000	–5.20	49.26	0.000	–3.468	Reject
Trust-led	36	4.3027	2.664	0.444									–1.569	

TABLE 51 *Cost comparisons for Model 2, Check 3*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	156	6.3263	2.253	0.180	3.51	0.000	0.16	191	0.874	0.11	40.98	0.912	–1.326	Not reject
Trust-led	37	6.4060	4.222	0.694									1.486	

TABLE 52 *Cost comparisons for Model 3, Check 3*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	18	7.3854	2.294	0.541	1.30	0.464	3.03	67	0.004	2.84	26.82	0.008	0.537	Reject
Trust-led	51	9.1179	2.013	0.282									2.293	

TABLE 53 *Cost comparisons for Model 5, Check 3*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	117	6.4244	2.062	0.191	2.67	0.020	2.01	124	0.046	1.33	8.47	0.219	0.038	Reject
Trust-led	9	7.9358	3.367	1.122									2.985	

TABLE 54 *Cost comparisons for Model 6, Check 3*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	38	8.3236	3.228	0.524	1.29	0.641	–3.13	50	0.003	–3.32	26.20	0.003	–4.978	Reject
Trust-led	14	5.2620	2.844	0.760									–1.142	

TABLE 55 *Cost comparisons for Model 8, Check 3*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	131	9.4444	4.362	0.381	2.48	0.000	–1.41	216	0.160	–1.54	215.61	0.125	–1.690	Not reject
Trust-led	87	8.7010	2.768	0.297									0.203	

TABLE 56 *Cost comparisons for Model 9, Check 3*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	16	11.0447	6.305	1.576	2.76	0.004	–0.88	85	0.381	–0.65	17.53	0.526	–3.420	Not reject
Trust-led	71	9.9850	3.797	0.451									1.300	

TABLE 57 *Cost comparisons for Model 1, Check 4*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	42	4.6702	1.881	0.290	1.93	0.043	7.87	76	0.000	7.68	62.43	0.000	2.996	Reject
Trust-led	36	8.6928	2.616	0.436									5.049	

TABLE 58 *Cost comparisons for Model 2, Check 4*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	174	6.3727	2.413	0.183	1.00	0.970	0.02	255	0.987	0.02	161.27	0.987	–0.626	Not reject
Trust-led	83	6.3780	2.417	0.265									0.637	

TABLE 59 *Cost comparisons for Model 5, Check 4*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	123	7.6032	3.095	0.279	2.71	0.084	3.90	132	0.000	5.88	15.36	0.000	1.846	Reject
Trust-led	11	11.3151	1.880	0.567									5.578	

TABLE 60 *Cost comparisons for Model 8, Check 4*

Variable	No. of cases	Mean	SD	SE	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
							t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
GP-led	146	9.5982	3.339	0.276	1.67	0.030	1.30	186	0.194	1.13	55.91	0.262	0.596	Not reject
Trust-led	42	10.4135	4.309	0.665									2.227	

Appendix 7

Description of different models of delivery observed at site visits

Some general observations about models of delivery

The three researchers who undertook the site visits made a number of observations from their experiences. Apart from the obvious increase in time from involving a translator in areas with a high proportion of children from ethnic minorities, they did not believe that it was possible to identify significant differences between the services being delivered in urban and rural areas, in the north and south, and in areas with or without significant ethnic populations.

There were, however, some differences between clinics led by Trusts and by GPs. A general impression was that the doctors in Trust clinics had more time to devote to the clinic, and where they shared the work with a health visitor there tended to be a clearer demarcation between the doctor's responsibilities (for the physical component) and the health visitor's role. In GP clinics most or all of the physical parts of the checks were undertaken by health visitors. The observers also felt that Trust-run clinics tended to have much firmer clinical protocols for what should be included in the checks than were found at GP surgeries, and that these protocols were being regularly updated and adhered to closely.

However, many of the Trust clinics visited were in the process of being closed down, as more of the work is being undertaken in GP surgeries. It was often only in areas in which GPs had poor surgery accommodation or where there were many single-handed GPs who had not yet been CHS-trained that Trust clinics were still well attended. Therefore, Trust-led CHS checks were often coupled with routine well baby clinics run by health visitors or with acute clinics led by community medical officers.

Poor accommodation was a considerable constraint in many places for both types of clinics. Many Trust-led clinics were provided in poor quality, overcrowded health centres, but GP practice premises also often constrained the services that could be delivered. Health visitors frequently had to work in cramped and generally unsuitable premises with small waiting areas, especially in inner city areas (which were often based in Trust-owned health centres). Health visitors attached to GP practices often reported that they did not feel part of the practice's Primary Health Care Team, and said that, because they were not part of the directly employed practice team, they rarely received the administrative support that they required. Furthermore, their accommodation was often observed to be poor or even non-existent. Many of them felt undervalued in the work they were doing, and unappreciated and misunderstood by other members of the practice staff. Where there was good accommodation (both office and clinical), collaborative working, better communications and higher morale tended to be apparent. Deprived areas tended to have a higher level of home visiting, not only because residents were less likely to keep clinic appointments but also because GP accommodation was generally less satisfactory in these areas.

In some places it seemed that different team members did not know or understand what other members of the CHS team were doing with the same child, and it was suggested that some GPs seemed to resist finding out about the role of health visitors. Different people used the same piece of equipment (e.g. a brick on a string, a warbler with or without a sound meter) in a wide variety of different ways, and a given check (e.g. for CDH) may be carried out entirely differently by doctors and health visitors. Furthermore, it was observed that doctors rarely provided any health education and that many health visitors seemed to lack confidence in undertaking some of the physical examinations (e.g. for CDH).

One point that emerged very strongly concerned the use of computers, which varied considerably between the sites visited. None of the Trust sites used computers, whereas computers were used, at least to some extent, in all of the GP surgeries. At some sites the information about the checks was only recorded in the patient-held record, whereas at the other extreme a computer, the patient-held record, a health visitor record and a 'Lloyd George' or A4 patient record were

completed. One observer commented that up to 30% of health visitor time was spent writing records, and that most records are not jointly available to everyone involved in CHS – "if any area is ripe for saving large sums of money, this is it". Time spent by health visitors on record-keeping was exacerbated where they did not receive clerical support from their 'attached' practice.

Another observation was that health visitors often gave emotional and practical support, which was probably in the past provided by families and friends. One clinic for the 18–24-month check was described as appearing to "double up as a social outlet for mothers and toddlers" (although the checks were thorough and comprehensive).

The clinic organisation often depended on whether or not CHS activity was carried out in dedicated sessions. The ideal model may be age-specific clinics for CHS with appointment times, which may promote high attendance rates, although this may not always be feasible. If more than one person is involved, then the staff should work together to prevent duplication and/or omissions. One site used two health visitors working together to carry out the designated CHS programme at appointed sessions. One worked entirely with the child, and assessed all developmental aspects, whilst the other talked to the parent about developmental progress, health promotion and any other concerns. Therefore both parent and child had the undivided attention of a member of staff, and physical examinations requiring two people (e.g. HDTs) could be performed at the one visit.

Finally, it should be noted that many of the health visitors expressed concerns about the project brief, believing that, by focusing only on cost, the study would exclude any measures of outcome and effectiveness.

CHS Check 1 (6–8 weeks)

A wide variety of different models of delivery (both in policy and in reality) were apparent from the site visits. The only two common themes were that the check always took place in a clinic/surgery setting (apart from a very small proportion of checks that were carried out in the child's home for persistent non-attenders), and secondly that a doctor was always involved to some extent. It is very difficult to separate out the CHS check from immunisation, with the two activities often overlapping. At one subsite two doctors worked together (plus a health visitor and a clinic assistant), with one doctor providing the CHS check whilst the other performed the postnatal check on the mother. In several places it is local policy that this check is performed by a doctor only (either a Trust doctor or a GP), but in others up to four staff could be involved, including a doctor, a health visitor, a nurse and a nursing assistant or a clinic assistant. In areas with high ethnic populations a translator was sometimes also employed (although in one clinic the health visitor was bilingual).

Although *Health for all children*[1] states that this check need not involve a doctor, and could be satisfactorily performed by a health visitor, none of the areas or sites had adopted this as policy. However, in some places a health visitor undertook the majority of the check, with the doctor expected to perform the remaining parts (usually one or more of the physical checks, such as checking the heart or the hips) on some other occasion. Such *ad hoc* arrangements would appear to offer considerable scope for omitting to perform some parts of the check, although in some places this process of completing the check over two visits was more formalised.

Children attending a setting where the check involved two or more staff at the same visit encountered several different models of delivery. In some places the doctor led the check, with the health visitor working as an assistant. The doctor would perform the physical examination whilst the health visitor focused on the health education aspects. This approach avoided duplication and appeared to run very smoothly. Sometimes the baby was weighed and measured by a nurse or clinic assistant before seeing the doctor and health visitor. At the other end of the spectrum, the child was seen in different locations within the clinic/surgery by the different staff, which could be very time-consuming for the parent and child. It also offers the potential for duplication and for overlooking some parts of the check.

CHS Check 2 (6–9 months)

Most variations within this check were caused by the delivery of the HDT. This, at least in theory, requires two trained people to perform it, and in many places it was performed on a separate occasion. Variation occurred within as well as between areas. The helper was usually a nursing assistant, a healthcare support worker or a clerical

assistant, although in some instances the health visitor used the child's parent instead. One district used a parental questionnaire to identify any specific concerns regarding their child's hearing. Another had undertaken some local research that concluded that better/more reliable results were obtained for the HDT when it is carried out in the home setting, and at three of the sites in this district the health visitor undertook the rest of the check in the child's home during one visit and then returned on a separate occasion with an assistant to perform the HDT.

Although both GPs and community medical officers contribute to this check in some places, this was relatively rare. A health visitor was always involved at some stage of the process. It was interesting to note that in one Trust clinic the doctor did all of the checks apart from the HDT, which was performed at the same visit by a health visitor and a healthcare support worker. In other locations in the same district the doctor usually carried out the development checks (possibly supported by a health visitor) at one visit and the health visitor and an assistant performed the HDT on a separate occasion.

CHS Check 3 (18–24 months)

This check exhibited the least variation in its delivery. It was provided by a health visitor working on their own in the majority of places, although sometimes they worked with an assistant. In many places it was local policy to perform the check in the child's home. However, a few variants were observed. One Health Authority's policy stated that the check should be performed by either a doctor or a health visitor, although in three of the sites within the district the health visitor performed most of the check, with the child's GP checking the heart and/or hips on a separate occasion. This is despite *Health for all children*[1] not recommending any specific medical or screening procedures within this check.

CHS Check 4 (39–42 months)

Two distinguishing features of this check are the eyesight check (which can be delivered in a variety of ways) and the fact that some children may be uncooperative at this age. It was not performed at all in one Health Authority (although a check was undertaken at 3 years of age). In some places the pre-school booster was provided at the same time. The majority of these checks were provided by health visitors, usually working alone, but sometimes with an assistant (e.g. a nurse or a healthcare support worker/assistant), either in a surgery/clinic or in the child's home. Doctors were rarely involved, although at one site this check was done by a community medical officer supported by a nursing assistant, and in others doctors and health visitors both contributed.

Most of the observed variation centred on the eyesight check, with some places involving an orthoptist routinely, whilst others relied on the health visitor (or doctor) to perform this part of the check. In some places where this check is performed in a clinic/surgery, the child routinely sees an orthoptist during the visit. However, if the check is carried out in the child's home, the child may or may not be seen routinely by an orthoptist on another occasion. In one place the orthoptist visited local playgroups and nurseries, although this approach misses those children who do not attend these facilities. One place recommended parents took their children to see an optician at this age. In many places, however, only children referred because of specific concerns about their eyesight see an orthoptist.

The health visitors attached to one GP practice had a Behaviour Checklist that they had developed in conjunction with an educational psychologist. This was sent to parents when their children were 3 years old, and subsequently provided a useful basis for discussion.

Other points

One of the sites covered an army camp, whilst another included a Royal Air Force base. In both places slightly different procedures were adopted for CHS checks to try to capture as many children as possible. Even so, one child attending for the fourth check did not seem to have received any of the previous checks, and a number of physical problems were identified. Given that children with parents in the forces are likely to be highly mobile, and to be isolated from traditional family support, it may be necessary for staff to spend considerably longer with them (and their parents) than with other children with whom they have more regular contact.

Appendix 8

Models of delivery and associated costs by site

TABLE 61 *Check 1 – Trust-led (costs in £)*

	Total		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8		Model 9	
	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost
A	53	3.06	16	4.83	0	–	5	4.79	0	–	32	1.91	0	–	0	–	0	–	0	–
B	18	10.46	0	–	0	–	18	10.46	0	–	0	–	0	–	0	–	0	–	0	–
C	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
D	42	4.38	42	4.38	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
E	53	6.12	28	4.99	0	–	4	6.73	0	–	10	7.42	11	7.55	0	–	0	–	0	–
F	12	6.88	12	6.86	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
G	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
H	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
I	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
J	21	6.47	2	4.81	6	2.35	12	8.60	0	–	0	–	1	8.99	0	–	0	–	0	–
K	16	12.73	0	–	5	9.93	2	8.75	0	–	7	15.62	0	–	0	–	1	13.03	1	14.20
L	15	10.94	0	–	0	–	0	–	15	10.94	0	–	0	–	0	–	0	–	0	–

Key: *Model 1 = Dr only*
Model 2 = HV only
Model 3 = Dr and HV
Model 4 = Dr and ANO
Model 5 = HV and ANO
Model 6 = Dr, HV and ANO
Model 7 = Dr only (home visit)
Model 8 = HV only (home visit)
Model 9 = 2 people (usually HV and ANO/home visit)
A–L = Locations

TABLE 62 *Check 1 – GP-led (costs in £)*

	Total		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8		Model 9	
	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost
A	25	10.35	2	11.31	7	4.19	16	12.94	0	–	0	–	0	–	0	–	0	–	0	–
B	91	9.60	16	10.15	0	–	0	–	15	6.87	40	8.81	20	12.81	0	–	0	–	0	–
C	48	6.49	4	8.26	6	3.55	1	9.26	0	–	7	2.40	27	7.59	0	–	3	8.69	0	–
D	53	13.25	7	4.91	0	–	0	–	0	–	14	12.92	32	15.22	0	–	0	–	0	–
E	2	8.54	0	–	2	8.54	0	–	0	–	0	–	0	–	0	–	0	–	0	–
F	16	7.58	6	8.35	0	–	6	9.53	0	–	0	–	4	3.51	0	–	0	–	0	–
G	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
H	38	6.65	9	8.39	18	3.18	8	12.04	0	–	3	7.78	0	–	0	–	0	–	0	–
I	35	8.57	10	5.25	0	–	0	–	0	–	0	–	12	9.66	0	–	13	10.11	0	–
J	57	9.16	7	5.17	3	4.63	34	10.28	0	–	0	–	12	9.46	0	–	1	8.69	0	–
K	79	9.00	12	7.77	23	3.26	35	12.97	0	–	0	–	2	17.14	0	–	2	8.15	0	–
L	42	6.26	14	4.65	2	9.77	19	5.79	0	–	0	–	7	9.77	0	–	0	–	0	–

TABLE 63 *Check 2 – Trust-led (costs in £)*

	Total		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8		Model 9	
	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost
A	101	8.09	0	–	0	–	2	7.51	0	–	49	7.35	0	–	0	–	30	8.00	20	10.09
B	35	6.37	1	4.08	9	6.28	1	5.89	0	–	21	6.43	3	7.14	0	–	0	–	0	–
C	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
D	46	4.26	46	4.26	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
E	55	8.72	1	14.64	0	–	0	–	0	–	6	3.66	2	6.73	0	–	0	–	46	9.33
F	11	15.40	0	–	2	12.91	0	–	0	–	1	11.67	0	–	0	–	5	12.82	3	19.93
G	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
H	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
I	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
J	66	4.06	13	4.53	23	2.46	13	8.54	0	–	15	1.42	2	10.09	0	–	0	–	0	–
K	26	8.95	0	–	1	4.34	9	8.57	0	–	7	16.47	0	–	0	–	9	3.99	0	–
L	2	11.43	0	–	0	–	0	–	2	11.43	0	–	0	–	0	–	0	–	0	–

TABLE 64 *Check 2 – GP-led (costs in £)*

	Total		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8		Model 9	
	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost
A	31	7.22	0	–	18	6.30	5	9.73	0	–	4	7.04	0	–	0	–	4	8.42	0	–
B	149	7.31	0	–	26	7.10	0	–	0	–	105	7.43	5	7.83	0	–	3	9.19	10	5.81
C	75	5.95	0	–	21	7.54	1	9.71	0	–	30	3.87	4	11.49	0	–	17	6.13	2	6.79
D	50	12.30	10	4.70	0	–	0	–	0	–	13	12.18	27	15.16	0	–	0	–	0	–
E	87	8.30	0	–	13	5.05	0	–	0	–	69	8.09	0	–	0	–	3	15.06	2	26.26
F	25	7.55	0	–	6	4.70	0	–	0	–	16	8.75	0	–	0	–	3	6.87	0	–
G	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
H	110	3.80	13	2.99	63	3.65	7	6.77	0	–	17	3.04	0	–	0	–	8	4.59	2	6.95
I	22	11.99	0	–	0	–	0	–	0	–	0	–	0	–	0	–	22	11.99	0	–
J	94	7.72	3	5.73	14	3.91	25	10.18	0	–	29	4.26	23	12.00	0	–	0	–	0	–
K	103	9.81	11	5.72	21	16.06	0	–	59	6.67	10	18.52	0	–	0	–	2	15.75	0	–
L	66	11.22	3	2.53	27	12.21	3	3.47	0	–	28	11.87	1	16.71	0	–	4	13.41	0	–

TABLE 65 *Check 3 – Trust-led (costs in £)*

	Total		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8		Model 9	
	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost
A	72	8.35	0	–	0	–	1	5.49	0	–	6	6.67	0	–	0	–	47	7.84	18	10.41
B	67	8.22	3	4.28	1	10.57	49	9.24	0	–	0	–	14	5.29	0	–	0	–	0	–
C	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
D	9	12.55	0	–	9	12.55	0	–	0	–	0	–	0	–	0	–	0	–	0	–
E	51	8.99	0	–	0	–	0	–	0	–	1	7.50	0	–	0	–	1	10.86	49	8.98
F	10	15.48	0	–	0	–	0	–	0	–	1	11.95	0	–	0	–	5	11.73	4	21.05
G	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
H	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
I	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
J	35	5.28	0	–	23	3.60	1	8.69	0	–	0	–	0	–	0	–	10	8.79	0	–
K	29	9.67	0	–	4	8.14	0	–	0	–	1	12.28	0	–	0	–	24	9.82	0	–
L	2	9.03	0	–	0	–	0	–	2	9.03	0	–	0	–	0	–	0	–	0	–

TABLE 66 *Check 3 – GP–led (costs in £)*

	Total		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8		Model 9	
	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost
A	21	7.02	0	–	7	7.01	2	9.03	0	–	1	5.57	0	–	0	–	11	6.79	0	–
B	98	7.86	0	–	39	7.29	0	–	14	6.42	22	7.54	15	7.96	0	–	5	11.21	3	18.34
C	89	6.70	3	6.33	17	5.09	0	–	0	–	21	3.97	15	9.32	0	–	29	8.73	4	3.64
D	11	6.33	0	–	0	–	0	–	0	–	4	6.26	7	6.37	0	–	0	–	0	–
E	47	7.82	0	–	15	6.60	0	–	0	–	22	8.19	0	–	0	–	10	8.82	0	–
F	17	6.32	0	–	8	5.02	0	–	0	–	1	4.36	0	–	0	–	7	8.47	0	–
G	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
H	45	5.65	12	2.83	14	4.64	12	6.36	0	–	0	–	0	–	0	–	2	7.60	5	12.78
I	31	10.55	0	–	0	–	0	–	0	–	10	6.54	0	–	0	–	21	12.46	0	–
J	64	6.97	0	–	9	6.27	0	–	0	–	29	6.09	1	13.79	0	–	25	7.96	0	–
K	55	7.59	0	–	40	6.24	4	9.84	0	–	0	–	0	–	0	–	11	11.65	0	–
L	27	9.73	0	–	7	9.15	0	–	0	–	7	7.11	0	–	0	–	9	11.66	4	10.97

TABLE 67 *Check 4 – Trust-led (costs in £)*

	Total		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8		Model 9	
	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost
A	3	5.83	3	5.83	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
B	70	7.51	0	–	51	6.91	2	7.06	0	–	0	–	1	7.38	0	–	16	9.50	0	–
C	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
D	33	9.01	33	9.01	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
E	67	9.50	0	–	0	–	0	–	0	–	1	9.23	1	3.26	0	–	2	6.52	63	9.70
F	15	12.72	0	–	3	10.34	0	–	0	–	3	9.41	0	–	0	–	7	12.88	2	20.65
G	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
H	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
I	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
J	35	6.24	0	–	24	4.81	0	–	0	–	0	–	0	–	0	–	11	9.34	0	–
K	25	12.23	0	–	5	6.92	5	14.39	0	–	7	12.50	0	–	0	–	6	13.57	2	15.12
L	2	13.87	0	–	0	–	0	–	2	13.87	0	–	0	–	0	–	0	–	0	–

TABLE 68 *Check 4 – GP-led (costs in £)*

	Total		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8		Model 9	
	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost	No.	Average cost
A	54	8.41	12	6.78	17	5.02	14	13.30	0	–	0	–	0	–	0	–	11	9.20	0	–
B	96	8.32	0	–	34	7.39	0	–	5	7.83	39	7.34	5	14.16	0	–	8	10.94	5	12.78
C	102	8.81	3	5.13	17	4.57	10	11.30	0	–	9	4.47	14	12.46	0	–	14	9.76	0	–
D	2	10.14	0	–	0	–	0	–	0	–	2	10.14	0	–	0	–	0	–	0	–
E	76	8.52	0	–	12	6.41	0	–	0	–	36	7.64	0	–	0	–	28	10.54	0	–
F	16	6.53	0	–	10	6.69	0	–	0	–	3	6.35	1	3.26	0	–	2	7.60	0	–
G	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–
H	33	8.32	0	–	9	8.25	1	8.47	0	–	1	2.26	0	–	0	–	22	8.62	0	–
I	11	11.75	0	–	0	–	0	–	0	–	0	–	0	–	0	–	11	11.75	0	–
J	54	7.58	0	–	20	7.33	0	–	0	–	18	6.71	3	15.30	0	–	13	7.40	0	–
K	113	8.39	27	3.76	54	5.98	30	16.91	0	–	0	–	0	–	0	–	2	8.15	0	–
L	18	12.97	0	–	1	15.73	0	–	0	–	15	11.76	2	20.71	0	–	0	–	0	–

Appendix 9

Additional analysis of data for Check 2

TABLE 69 *Cost comparisons for GP and Trust data for Check 2 according to delivery of HDT component*

Group	No. of cases	Mean cost (£)	SD	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
						t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
Trust-led clinics													
HDT with CHS check (includes cost of HDT component)	101	4.8171	2.773	3.56	0.000	–5.62	340	0.000	–7.11	322.21	0.00	–3.9479	Reject
HDT in separate clinic (excludes cost of HDT component)	241	7.9124	5.232									–2.2427	
GP-led clinics													
HDT with CHS check (includes cost of HDT component)	290	8.0221	4.345	1.02	0.866	0.61	810	0.541	0.61	601.77	0.54	–0.4300	Not reject
HDT in separate clinic (excludes cost of HDT component)	241	7.9124	5.232									–0.8212	

TABLE 70 *Cost comparisons for GP with Trust data for Check 2 according to delivery of HDT component*

Group	No. of cases	Mean cost (£)	SD	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
						t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
HDT carried out at a separate time either in clinic or home													
Trust-led	241	7.9124	5.232	1.42	0.001	0.24	761	0.813	0.22	401.43	0.825	–0.6741	Not reject
GP-led	522	7.8265	4.385									0.8459	
HDT carried out at the same time as the CHS check													
Trust-led	101	4.8171	2.773	2.46	0.000	–6.94	389	0.000	–8.53	274.67	0.000	–3.9400	Reject
GP-led	290	8.0221	4.345									–2.4700	

Appendix 10

Additional analysis of data for Check 4

TABLE 71 *Cost comparisons for combined GP and Trust data for children seen (on a separate occasion) and not seen by an orthoptist during Check 4*

Group	No. of cases	Mean cost (£)	SD	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
						t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
Seen by orthoptist	409	8.8165	4.682	0.232	1.67	0.000	0.72	756	0.472	0.73	749.16	0.463	–0.370	Not reject
Not seen by orthoptist	349	8.5945	3.626	0.194									0.814	

TABLE 72 *Cost comparisons for GP data for children seen (on a separate occasion) and not seen by an orthoptist during Check 4*

Group	No. of cases	Mean cost (£)	SD	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
						t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
Seen by orthoptist	238	8.9595	4.933	0.320	2.020	0.000	1.60	534	0.110	1.54	410.39	0.124	–0.159	Not reject
Not seen by orthoptist	298	8.3776	3.472	0.201									1.323	

TABLE 73 *Cost comparisons for Trust data for children seen (on a separate occasion) and not seen by an orthoptist during Check 4*

Group	No. of cases	Mean cost (£)	SD	*F*-value	Two-tail probability	Pooled variance estimate			Separate variance estimate			CI	Decision
						t-value	Degrees of freedom	Two-tail probability	*t*-value	Degrees of freedom	Two-tail probability		
Seen by orthoptist	171	8.6174	4.316	0.330	1.04	0.907	–1.81	220	0.071	–1.83	83.36	0.070	–2.576	Not reject
Not seen by orthoptist	51	9.8621	4.239	0.594									0.087	

Appendix 11

Additional analysis of requests to return and referral patterns

Tables 74–77 summarise the numbers of referrals/requests to return for each of the four CHS checks. The models of delivery described and discussed on pages 9–10 have been reduced to three variants – those led by a doctor without any health visitor input (models 1 and 4); those led by a health visitor without any doctor input (models 2, 5, 8 and 9); and those involving both a doctor and a health visitor (models 3 and 6). It should be noted that all of the observations from Check 1 have been placed in this third category, given the involvement of both doctors and health visitors in this check in all of the sample subsites. The figures in brackets in each column show the split between GP-led and Trust-led checks. A few children had two or three referrals as a consequence of a CHS check. The figures in the following tables show the aggregate of all referrals.

Table 78 summarises to whom referrals and requests to return are made for each check. Referrals can be considered to occur when the child has to see a community paediatrician, an orthoptist, an audiologist or a speech therapist. A request to return arises when the child has to visit the GP or health visitor again. The 'other' category consists of a small number of referrals to other consultant specialists (e.g. ENT, plastic surgeon, orthopaedics), but mainly consists of other members of the primary healthcare team or similar (e.g. asthma clinic, behaviour management, dental). Return visits to health visitors account for 48.5% of referrals and requests to return.

Table 79 summarises who is referring to whom. It shows, for example, that 51.2% of requests for returns to health visitors are made as a consequence of checks led by health visitors, with another 40% arising from joint doctor and health visitor checks. Therefore doctors rarely ask children to make a return visit to a health visitor. Indeed, referrals or requests to return arise relatively rarely from doctor-led checks, and 80.8% of referrals or requests to return are generated from checks led by health visitors.

TABLE 74 *Referrals and requests to return arising from Check 1 (for GP-led/Trust-led clinics)*

Referred to	Referred from Dr-led check	Referred from HV-led check	Referred from Dr and HV joint check	Total
Community paediatrician	–	–	10 (6/4)	10 (6/4)
GP	–	–	5 (3/2)	5 (3/2)
HV	–	–	11 (5/6)	11 (5/6)
Orthoptist	–	–	3 (2/1)	3 (2/1)
Audiologist	–	–	1 (0/1)	1 (0/1)
Speech therapist	–	–	0 (0/0)	0 (0/0)
Other	–	–	12 (12/0)	12 (12/0)
Total referrals	–	–	**42 (28/14)**	**42 (28/14)**
Total checks	–	–	**716 (486/230)**	**716 (486/230)**
Referrals as % of total	–	–	**5.9 (5.7/6.1)**	**5.9 (5.7/6.1)**

[*] *Figures in parentheses show the split between GP-led and Trust-led checks*

TABLE 75 *Referrals and requests to return arising from Check 2 (for GP-led/Trust-led clinics)*

Referred to	Referred from Dr-led check	Referred from HV-led check	Referred from Dr and HV joint check	Total
Community paediatrician	2 (0/2)	4 (2/2)	0 (0/0)	6 (2/4)
GP	2 (1/1)	18 (14/4)	3 (3/0)	23 (18/5)
HV	0 (0/0)	107 (59/48)	8 (5/3)	115 (64/51)
Orthoptist	0 (2/0)	14 (12/2)	0 (0/0)	16 (14/2)
Audiologist	0 (0/0)	27 (20/7)	2 (0/2)	29 (20/9)
Speech therapist	0 (0/0)	1 (0/1)	0 (0/0)	1 (0/1)
Other	0 (0/0)	6 (5/1)	0 (0/0)	6 (5/1)
Total referrals	**6 (3/3)**	**177 (112/65)**	**13 (8/5)**	**196 (123/73)**
Total checks	**92 (29/63)**	**898 (651/247)**	**164 (132/342)**	**1154 (812/342)**
Referrals as % of total	**6.5 (10.3/4.8)**	**19.7 (17.2/26.3)**	**7.9 (6.1/15.6)**	**17.0 (15.1/21.3)**

* *Figures in parentheses show the split between GP-led and Trust-led checks*

TABLE 76 *Referrals and requests to return arising from Check 3 (for GP-led/Trust-led clinics)*

Referred to	Referred from Dr-led check	Referred from HV-led check	Referred from Dr and HV joint check	Total
Community paediatrician	0 (0/0)	3 (1/2)	1 (0/1)	4 (1/3)
GP	4 (4/0)	13 (7/6)	6 (5/1)	23 (16/7)
HV	2 (1/1)	57 (36/21)	11 (7/4)	70 (44/26)
Orthoptist	1 (1/0)	9 (2/7)	1 (1/0)	11 (4/7)
Audiologist	0 (0/0)	4 (4/0)	1 (1/0)	5 (5/0)
Speech therapist	0 (0/0)	8 (4/4)	0 (0/0)	8 (4/4)
Other	1 (1/0)	7 (4/3)	0 (0/0)	8 (5/3)
Total referrals	**8 (7/1)**	**101 (58/43)**	**20 (14/6)**	**129 (79/50)**
Total checks	**34 (29/5)**	**624 (420/204)**	**121 (56/65)**	**779 (505/274)**
Referrals as % of total	**23.5 (24.1/20.0)**	**16.2 (13.8/21.1)**	**16.5 (25.0/9.2)**	**16.6 (15.6/18.2)**

* *Figures in parentheses show the split between GP-led and Trust-led checks*

TABLE 77 *Referrals and requests to return arising from Check 4 (for GP-led/Trust-led clinics)*

Referred to	Referred from Dr-led check	Referred from HV-led check	Referred from Dr and HV joint check	Total
Community paediatrician	1 (1/0)	8 (5/3)	1 (0/1)	10 (6/4)
GP	0 (0/0)	9 (6/3)	1 (1/0)	10 (7/3)
HV	2 (2/0)	69 (43/26)	6 (6/0)	77 (51/26)
Orthoptist	1 (1/0)	11 (9/2)	0 (0/0)	12 (10/2)
Audiologist	0 (0/0)	14 (8/6)	2 (1/1)	16 (9/7)
Speech therapist	0 (0/0)	42 (28/14)	2 (0/2)	44 (28/16)
Other	0 (0/0)	24 (9/15)	3 (3/0)	27 (12/15)
Total referrals	**4 (4/0)**	**177 (108/69)**	**15 (11/4)**	**196 (123/73)**
Total checks	**85 (47/38)**	**651 (448/203)**	**89 (80/9)**	**825 (575/250)**
Referrals as % of total	**4.7 (8.5/0.00)**	**27.2 (24.1/34.0)**	**16.9 (13.8/44.4)**	**23.8 (21.4/29.2)**

* *Figures in parentheses show the split between GP-led and Trust-led checks*

TABLE 78 *Referrals and requests to return by check*

Referral or return to:	Check 1		Check 2		Check 3		Check 4		Total	
	No.	% row % col	No.	% row % col	No.	% row % col	No.	% row % col	No.	% row % col
Community paediatrician	10	33.3 23.8	6	20.0 3.1	4	13.3 3.1	10	33.3 5.1	30	100.0 5.3
GP	5	8.2 11.9	23	37.7 11.7	23	37.7 17.8	10	16.4 5.1	61	100.0 10.8
HV	11	4.0 26.2	115	42.1 58.7	70	25.6 54.3	77	28.2 39.3	273	100.0 48.5
Orthoptist	3	7.1 7.1	16	38.1 8.2	11	26.2 8.5	12	28.6 6.1	42	100.0 7.5
Audiologist	1	2.0 2.4	29	56.7 14.8	5	9.8 3.9	16	31.4 8.2	51	100.0 9.1
Speech therapist	0	0.0 0.0	1	1.9 0.5	8	15.1 6.2	44	83.0 22.4	53	100.0 9.4
Other	12	22.6 28.6	6	11.3 3.1	8	15.1 6.2	27	50.9 13.8	53	100.0 9.4
Total	**42**	**7.5** **100.0**	**196**	**34.8** **100.0**	**129**	**22.9** **100.0**	**196**	**34.8** **100.0**	**563**	**100.0** **100.0**

TABLE 79 *Summary of who is referring or requesting return visits to whom*

Referral or return to:	Doctor-led		HV-led		Dr and HV-led		Total	
	No.	% row % col	No.	% row % col	No.	% row % col	No.	% row % col
Community paediatrician	3	10.0 16.7	15	50.0 3.3	12	40.0 13.3	30	100.0 5.3
GP	6	9.8 33.3	40	65.6 8.8	15	24.6 16.7	61	100.0 10.8
HV	4	1.5 22.2	233	85.3 51.2	36	13.2 40.0	273	100.0 48.5
Orthoptist	4	9.5 22.2	34	81.0 7.5	4	9.5 4.4	42	100.0 7.5
Audiologist	0	0.0 0.0	45	88.2 9.9	6	11.8 6.7	51	100.0 9.1
Speech therapist	0	0.0 0.0	51	96.2 11.2	2	3.8 2.2	53	100.0 9.4
Other	1	1.9 5.6	37	69.8 8.1	15	28.3 16.7	53	100.0 9.4
Total	**18**	**3.2** **100.0**	**455**	**80.8** **100.0**	**90**	**16.0** **100.0**	**563**	**100.0** **100.0**

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We look forward to hearing from you.

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