# *Learning Together*; part 2: training costs and health gain - a cost analysis

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What is already known about this subject

* The interaction of service and education is complex and contested
* Cost analysis of complex education interventions for clinicians is underreported

What this study adds

* A cost analysis of workplace based learning can be achieved
* Cost analysis can be related to process of care and health outcomes

What research in the future could add?

* A greater understanding of the true costs and savings of workplace learning
* A greater understanding of the direct and indirect health benefits to patients of shared learning
* How service and education might be better arranged for education and health outcomes

Keywords: general practice, paediatrics, learning together, children, health outcomes, cost.

**Summary**

*Learning Together* is a complex educational intervention aimed at improving health outcomes for children and young people. [[[1]](#endnote-1)] There is an additional cost as two doctors are seeing patients together for a longer appointment than a standard GP appointment. Our approach combines the impact of the training clinics on activity in South London 2014-15 with health gain using NICE guidance and standards to allow comparison of training options.

Methods: Activity data was collected from Training Practices hosting *Learning Together*. A computer based model was developed to analyse the costs of the *Learning Together* intervention compared to usual training in a partial economic evaluation. The results of the model were used to value the health gain required to make the intervention cost effective.

Results: Data were returned for 363 patients booked into 61 clinics across 16 Training Practices. *Learning Together* clinics resulted in an increase in costs of £37 per clinic. Threshold analysis illustrated one child with a common illness like constipation needs to be well for 2 weeks, in one Practice hosting four training clinics for the clinics to be considered cost effective.

Conclusion: *Learning Together* is of minimal training cost. Our threshold analysis produced a rubric that can be used locally to test cost effectiveness at a Practice or Programme level.

**Introduction**

In *Learning Together* GP registrars [GPSTs] and Paediatric Registrars [SpRs] see children and young people together in a primary care setting. [2] For both doctors the usual activity displaced is training.

The interaction of training and service is reflected in the modelled costs. However, the main objective of *Learning Together* is to improve health outcomes for children and young people by developing clinical and collaborative skills. An aim of our economic evaluation was to understand the scale of health gain required for the intervention to be considered good value for money [[[2]](#endnote-2)].

The data collected in South London 2014-15 was used to evaluate:

1. The costs or savings to the service of:
   * *Learning Together* clinics compared to usual training
   * The change in follow-up health service use after the introduction of *Learning Together*.
2. How many children and young people with a childhood illness, e.g. constipation, would need improved health for *Learning Together* to be considered cost-effective compared to usual training?

We wish to make the debate between costs and health outcomes more transparent for decision makers to compare training options that improve the everyday health of children.

**Methods**

**Activity data South London 2014-15**

In *Learning Together* South London (2014-15) Registrars completed Learning Logs as part of the reflective learning process documenting:

* The appointment the clinic replaced: GP appointment, referral, emergency booked on the day, or other.
* What happened next: no follow up, follow up by GP, follow up in *Learning Together*, referral to specialist services.

**Economic Model: *Learning Together* compared to usual training**

An economic evaluation allows decision makers to determine if the additional benefits of a new intervention justify additional cost compared to usual care. We developed a computer-based partial economic evaluation comparing *Learning Together* to usual training [2] in a cost analysis. The 2014-15 Learning Logs were designed to collect information on what each appointment displaced. This data was used to populate the usual training arm, modelling what would have happened if Learning Together had not been in place (Figures 1, 2, and 3).

For the most part modelling usual training was a simple process. However, follow up options in the *Learning Together* arm do not exist in usual training. In the usual training arm, patients reported as “followed up in Learning Together” or as “ongoing email discussion with Paediatric Registrar” have been replaced with a GP follow up appointment, if the *Learning Together* appointment replaced a GP appointment.

Similarly, in *Learning Together* some direct referrals from Primary Care to specialist services would require referral via a paediatrician in everyday practice . Therefore, in the usual training arm an additional cost of a general paediatric appointment was added for these specialist referrals.

In the usual training arm, a proportion of patients modelled as having a general paediatric appointment would be expected to be followed up as outpatients. Based on clinical expertise it was estimated that two thirds of cases would be followed up in outpatients with the remaining followed-up by their GP; results were also calculated assuming 50% of follow-ups were in outpatients.

Figure 1 *Learning Together* arm

Figure 2 Usual training arm : GP appointments

Figure 3 Usual training arm: Paediatric outpatient

**Costs**

Only costs related to the NHS and Personal Social Services (PSS) were included in the analysis to reflect an NHS and PSS perspective. Published national unit costs in UK sterling for 2014-15 were applied to individual appointments [Appendix 1: Table 7] [[[3]](#endnote-3),11, 12].

*Learning Together* clinic overhead costs were assumed to be equivalent to a normal GP trainee clinical session of 14 appointments. For each *Learning Together* clinic the overhead costs, direct care staff costs and GP salaries are represented as the equivalent of 14 appointments with a GP. Average GP salary costs are published, these are higher than an average GP trainee salary and therefore a conservative estimate of an appointment cost [11]. These costs were applied to both arms of the model. The additional cost for the SpR to attend is represented by the salary cost, by grade, for a session [Appendix 1: Table 8] to reflect time in this training.

GPSTs and SpRs are supervised as part of usual training. It was assumed and agreed with the clinical leads that similar supervision time would be provided for *Learning Together.*  Similarly, the registrars were expected to disseminate their learning to practice staff at existing lunchtime meetings. Therefore additional supervision time has not been included in the costs. It was also assumed that preparation for clinical sessions was equal for all alternatives.

**Value of Health Outcomes**

*Learning Together* resulted in improved guidance adherence in four common childhood conditions. [2] While this is a good proxy for improved health outcomes the preferred measure used for the NHS is the quality-adjusted life year (QALY)[[[4]](#endnote-4)]. This measure allows us to consider both quality of life and the length of life a patient gains as a result of an intervention.

QALYs were identified from NICE guidance for constipation in children as an example [[[5]](#endnote-5)]. The health gain for a constipation patient moving from experiencing symptoms to being well managed was 0.006 QALYs over a 2 week period (Table 1).

When a parameter is unknown threshold analysis can be used to identify the value of that parameter at which the analysis favours an intervention [[[6]](#endnote-6)]. The cost-effectiveness of *Learning Together* compared to usual training has been explored using threshold analysis to identify a value for health outcomes (QALYs). The result illustrates how much health gain is needed for a series of four *Learning Together* clinics to be considered cost-effective at the NICE threshold for cost-effectiveness of £20,000 per QALY gained.

Table 1: Utility values for constipation health states [6]

|  |  |  |
| --- | --- | --- |
| **Health State** | **QALYs for 1 year** | **QALYs for 2 weeks** |
| Experiencing symptoms of constipation | 0.74 | 0.0285 |
| Suffering from constipation but being well managed on medication | 0.9 | 0.0346  ***Steve***  *2016-07-31 21:57:38*  --------------------------------------------  Is this a comparable group - do children experience every day - has this been evaluated - seems a bit leap of faith |
| *QALY gain* | *0.16* | *0.006* |

**Results**

**Activity data South London 2014-15**

In 2014-15 21 *Learning Together* pairs ran 75 clinics in 19 GP training practices. Data were returned for 61 clinics (81%) across 16 training practices for 363 patients (Table 2). The majority of appointments replaced routine primary care (67%).

118 patients were booked into a *Learning Together* clinic instead of being referred and 94 of these patients were then not referred to outpatients or attended A&E [[[7]](#endnote-7)].

Table 2: *Learning Together* appointments booked and what they replaced

|  |  |
| --- | --- |
| **Patients and appointments** | **N** |
| Total patients booked into *Learning Together* clinics | 363 |
| Total patients attended *Learning Together* clinics | 353 |
| **What Learning Together replaced** |  |
| GP appointments replaced | 152 |
| Referrals replaced | 118 |
| Walk-in GP appointments replaced  ***Steve***  *2016-07-31 22:39:53*  --------------------------------------------  Is this a nurse practitioner or GP appointment | 78 |
| Other appointments replaced | 15 |
| *Total appointments replaced* | *363* |

**Table 3: *Learning Together* follow-up appointments shown by appointment replaced\***

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | ***Appointment replaced by Learning Together clinic*** | | | | | | **Referral** | **GP** | **Walk-in** | **Other** | **TOTAL** |   ***What happened after the Learning Together appointment*** | | | | | |
| No follow up | 17 | 54 | 57 | 3 | 131 |
| GP follow up | 60 | 69 | 16 | 5 | 150 |
| Follow up in *Learning Together* | 4 | 2 | 0 | 1 | 7 |
| Ongoing email | *2* | 1 | 0 | 0 | 3 |
| Referral to general paediatrician | 8 | 5 | 1 | 1 | 15 |
| Referral to specialist paediatrician: urology, rheumatology, endocrinology, cardiology, neurology, gastroenterology, respiratory, sleep clinic, dermatology, ENT, orthopaedics | 15 | 1 | 2 | 4 | 22 |
| Referral to other paediatric services: physiotherapy, podiatry, allergy, dietician, SLT, counselling | 9 | 4 | 1 | 0 | 14 |
| Community Paediatrics | 1 | 2 | 0 | 0 | 3 |
| Health visitor | *1* | 3 | 0 | 0 | 4 |
| Social services, SEN | 0 | 2 | 1 | 0 | 3 |
| A&E | 1 | 1 | 0 | 0 | 2 |
| *Total* | *118* | *144* | *78* | *14* | *354* |

**\***363 patients booked: 10 did not attend and had no follow-ups reported; one patient had two follow-up appointments reported.

**Economic Model: *Learning Together* compared to usual training**

The data used in the *Learning Together* and usual training arms are shown in Table 4. All 363 patients booked were included as costs are incurred when a patient does not attend.

Table 4: Model - base case: Appointments and follow-up data for both arms

|  |  |  |  |
| --- | --- | --- | --- |
|  | ***Learning Together* arm** | **Usual arm: appointment with GP (includes walk-ins and ‘other’ appointmentsa** | **Usual arm: appointment as outpatient** |
| TOTAL Patients booked | 363 | 245 | 118 |
| Discharge – no follow up | 131 | 114 | 17 |
| GP follow up | 150 | 94 | 24.67b |
| Follow up in *Learning Together* | 7 | 0 | 0 |
| Email correspondence | 3 | 0 | 0 |
| Referral to health visitor | 4 | 3 | 1 |
| Referral to general paediatricianc | 15 | 7 | 49.33b |
| Referral to specialist paediatrician service direct referralsd: dermatology, ENT, orthopaedics, | 10 | 2 | 8 |
| Referral to specialist paediatrician referred from general paediatricse: urology, rheumatology, endocrinology, cardiology, neurology, gastroenterology, respiratory, sleep clinic | 12 | 5 | 7 |
| Community Paediatrics | 3 | 2 | 1 |
| Referral to specialist paediatric services: physiotherapy, podiatry, allergy, dietician, SLT, counselling | 14 | 5 | 9 |
| A&E | 2 | 1 | 1 |
| Social services, SEN | 3 | 3 | 0 |

a: 4 of the 10 patients who did not attend had no appointment replaced recorded - assumed these were GP appointments in the usual training arm

b: Two thirds of follow-ups of outpatient attendances are assumed to be a general paediatrics appointment, the remainder GP appointments.

C: Costed as first attendance after a GP appointment., or as a follow-up attendance after Learning Together or an outpatient appointment

D: Referrals can be made directly from primary care

E: Referrals must be made from general paediatrics - an additional general paediatric appointment in usual training GP

**Cost Analysis**

Using the unit costs reported in Appendix 1, the cost difference between the 61 *Learning Together* clinics and usual training was £2,245, an additional £37 per *Learning Together* clinic (table 5). The additional cost of the *Learning Together* appointments with two doctors is the main driver for the cost difference. However, the cost of follow-up appointments is lower for the *Learning Together* arm (£18,905 compared to £25,494), due to fewer outpatient referrals.

Table 5: Cost analysis results: 61 *Learning Together* clinics compared to usual training

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Intervention** | **Cost of initial appointments** | **Cost of follow-up appointments** | **Total cost** | **Cost Difference** |
| Usual training | £38,257 | £25,494 | £63,751 |  |
| *Learning Together* | £47,091 | £18,905 | £65,996 | £2,245 |

If all specialist paediatric outpatient attendances required a first referral to a general paediatrician then the usual training arm becomes more expensive leading to a cost difference of £1,779, and an incremental cost per clinic of £29 [Appendix 2: table 9].

A cost driver in the usual training arm was the number of follow-ups. In the base case [Table 4] two thirds of follow-ups were to general paediatrics. If only 50% are followed-up as outpatient appointments and the rest followed-up with a GP then the cost in the usual training arm reduces to a cost difference of £3,913, an incremental cost per clinic of £64 [Appendix 2: Table 10].

**Threshold Analysis for Health Outcomes**

This threshold analysis (table 6) illustrates the minimum health gain required for 4 *Learning Together* clinics per year to be considered cost-effective is 0.007 QALYs using NICE’s threshold. This is equivalent to 1 child with constipation becoming well managed for 2 weeks. This health gain could be achieved in any child presenting in primary care, either in *Learning Together* or as a result of the GPs’ enhanced knowledge, skills and experience from *Learning Together*.

Table 6: Threshold analysis using £20,000 per QALY threshold for cost-effectiveness

|  |  |
| --- | --- |
| **Item** | **Result** |
| Total cost difference [Table 5] | £2,245 |
| Cost difference per clinic (61 clinics across the programme) | £37 |
| Incremental cost per year for 4 *Learning Together* clinics in a GP Training Practice (4 clinics) | £147 |
| QALY gain required for 4 *Learning Together* clinics per year for incremental cost effectiveness of £20,000 per QALY | 0.007 QALY |
| Health gain for a constipation patient moving from experiencing symptoms to being well managed on medication for 2 weeks [Table 1] | 0.006 QALY |
| N children with constipation experiencing symptoms needed to become well managed on medication for 2 weeks to equate to 0.007 health gain | 1.20 |

**Discussion**

We consider our methodological approach to be conservative. Our approach takes no account of the indirect benefits of the intervention on disseminated learning in teams. Nor does it take into account the ongoing benefit to patients as Registrars apply new practice to future care.

In 61 pilot training clinics across South London the additional cost to the service of this training intervention was £37 per clinic. This cost is controllable locally – a learning pair choose how many children to book at the referral threshold to explore clinical uncertainty in the clinics thereby *Learning Together* and avoiding referrals.

Cost is only an ingredient in our analysis and not an endpoint. However, local and regional implementers should note that where it can be shown that an intervention costs no more than the next best alternative, and leads to improved health outcomes of any magnitude, then it should be the training of choice.

Using the South London costs and savings we have also estimated the minimum health gain required to meet NICE’s threshold for the NHS. From a series of four clinics one child, for example with constipation, has to move to well managed symptoms on effective treatment for 2 weeks for the intervention to be considered cost-effective. We consider this a minimum change readily achievable as a result of *Learning Together*. A practical way of locally evaluating this intervention would be for a Registrar to follow up patients with a common childhood condition like constipation[[8]](#endnote-8), comparing health gain in children before and as a result of *Learning Together.*

We recognise there is uncertainty in the results of this partial economic analysis that models usual training from displaced appointments and published costs. We have been conservative and used an average GP cost to both arms rather than a trainee cost to avoid inflating a gain in favour of the intervention.

**Conclusion**

Examining the costs of education interventions against health outcomes is rare, and rarer still in the complex world of service and education. It merits attention as so much postgraduate education takes place in the workplace experientially, allied to patient care. In this article we have suggested such a cost analysis can be done, and its results add to the evaluation of the intervention. In the present case, *Learning Together* is of minimal cost, significant gain[[9]](#endnote-9), and may even save resources. Cost should not be regarded as a barrier to implementation of the model. Further evaluation should focus on follow up health related quality of life outcome data for patients in a few common childhood conditions.

**Acknowledgments**

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## Appendix 1: costs used in the analysis

Table 7 Unit costs of appointments

|  |  |  |  |
| --- | --- | --- | --- |
| **Appointment** | **Unit cost** |  | **Reference** |
| GP appointment in surgery | £44 | 11.7 minutes, including qualifications, direct care staff costs and overheads, based on an average income before tax of £101,900 per year, this is higher than the average GP trainee salary and so a conservative estimate of costs. | 11 |
| Paediatric general referral first attendance | £233 | Consultant led face-to-face attendance, paediatrics, first | 4 |
| Paediatric general referral – follow-up | £179 | Consultant led face-to-face attendance, paediatrics, follow-up | 4 |
| A&E attendance | £129 | Weighted average of emergency medicine, category 1-3 investigation with category 1-3 treatment. Since these data include expensive investigations and treatment which would not normally be required for care of common problems, this is likely to be an overestimate | 4 |
| Urology | £140 | Consultant led face-to-face attendance, paediatric urology, first | 4 |
| ENT | £109 | Consultant led face-to-face attendance, ear nose and throat, first | 4 |
| Orthopaedics | £137 | Consultant led face-to-face attendance, trauma and orthopaedics, first | 4 |
| Cardiology | £203 | Consultant led face-to-face attendance, cardiology, first | 4 |
| Endocrinology | £297 | Consultant led face-to-face attendance, endocrinology, first | 4 |
| Gastroenterology | £231 | Consultant led face-to-face attendance, gastroenterology, first | 4 |
| Neurology | £367 | Consultant led face-to-face attendance, neurology, first | 4 |
| Respiratory | £265 | Consultant led face-to-face attendance, respiratory, first | 4 |
| Rheumatology | £370 | Consultant led face-to-face attendance, rheumatology, first | 4 |
| Allergy Service | £287 | Consultant led face-to-face attendance, allergy service | 4 |
| Counselling | £197 | Non-consultant led face-to-face attendance, clinical psychologist | 4 |
| Podiatry | £46 | Non-consultant led face-to-face attendance, podiatry | 4 |
| Dietician | £86 | Non-consultant led face-to-face attendance, dietetics | 4 |
| Physiotherapy | £54 | Non-consultant led face-to-face attendance, physiotherapy | 4 |
| Health visitor | £54 | Health visitor - average cost of face-to-face contact | [[10]](#endnote-10) |
| Practice nurse | £15 | £56 per hour face-to-face, 15.5 mins surgery consultation | 11 |
| Social services | £59.25 | £79 per hour client contact, assumed 45 min initial appointment | 11 |
| Speech and language therapy | £42 | Grade 5, initial appointment 45mins | 11 |
| SEN | £42 | Assumed to be equal to a speech and language therapy appointment |  |
| Email correspondence | £24 | Assumed to be the equivalent salary costs of 50% of an appointment for a paediatric registrar and GP |  |

Table 8 SpR salary costs and costs of *Learning Together* clinics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Grade of SpR** | **Basic Salary** **[****[[11]](#endnote-11)]** | **Supplement (band 1A and 2B)[12]** | **30% uplift for employer on-costs (assumption)** | **Cost per sessiona** | **Cost per *Learning Together* sessionb** |
| **ST4** | £37,822 | £56,733 | £73,753 | £142 | £758 |
| **ST5** | £39,693 | £59,540 | £77,402 | £149 | £765 |
| **ST6** | £41,564 | £62,346 | £81,050 | £156 | £772 |
| **ST7** | £43,434 | £65,151 | £84,696 | £163 | £779 |
| **ST8** | £45,304 | £67,956 | £88,343 | £170 | £786 |

A - 10 sessions per week for clinics, administration and training, 52 weeks

B - SpR salary for a session plus 14 GP appointments

## Appendix 2: sensitivity analysis

Table 9 Sensitivity analysis: if all specialist paediatric outpatient attendances require a general paediatric referral

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Intervention** | **Cost of Initial appointments** | **Cost of follow-up appointments** | **Total cost** | **Cost Difference** |
| Usual training | £38,257 | £25,960 | £64,217 |  |
| *Learning Together* | £47,091 | £18,905 | £65,996 | £1,779 |

Table 10 Sensitivity analysis: 50% of general paediatric appointments are discharged and followed-up by the GP

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Intervention** | **Cost of Initial appointments** | **Cost of follow-up appointments** | **Total cost** | **Cost Difference** |
| Usual training | £38,257 | £23,826 | £62,083 |  |
| Learning Together | £47,091 | £18,905 | £65,996 | £3,913 |

1. <http://www.learningtogether.org.uk/> [accessed 24.5.16]

   2 Macaulay C, Spicer J, Riches W., and Lakhanpaul M. Learning Together 1: an educational model for training GPs and paediatricians: initial findings. [↑](#endnote-ref-1)
2. A full report of learning from South London is forthcoming [↑](#endnote-ref-2)
3. Department of Health. NHS reference costs 2014 to 2015. November 2015 [↑](#endnote-ref-3)
4. NICE. The guidelines manual. November 2012. [↑](#endnote-ref-4)
5. NICE CG99. Constipation in Children and Young People, May 2010. [↑](#endnote-ref-5)
6. Andronis L, Barton P, Bryan S. Sensitivity analysis in economic evaluation: an audit of NICE current practice and a review of its use and value in decision making. Health Technology Assessment 2009; Vol.13: No.29 [↑](#endnote-ref-6)
7. Of 118 patients booked into replace a referral, 22 were referred, saving 94 referrals. [↑](#endnote-ref-7)
8. See parallel article for CAFÉ question on health status in the child for Constipation, Asthma, Eczema and Febrile illness. REFERENCE TO BE ADDED AT PUBLICATION [↑](#endnote-ref-8)
9. See parallel article CAFE data on guidance adherence in four common childhood conditions. REFERENCE TO BE ADDED AT PUBLICATION [↑](#endnote-ref-9)
10. Curtis L and Burns A. Unit Costs of Health and Social Care 2015. Personal Social Services Research Unit, University of Kent [↑](#endnote-ref-10)
11. NHS employers. Pay and conditions Circular (M&D) 1/2015. March 2015 [↑](#endnote-ref-11)