

## **SUPPLEMENTARY INFORMATION**

### **SUPPLEMENTARY INFORMATION 1: MICRO-COSTING OF THE SOSA PROGRAMME**

**Aim:** To estimate the cost per family of the SOSA programme

**Objectives:**

- 1) Capture staff activity regarding development and delivery of SOSA programme
- 2) Identify unit prices for staff activity
- 3) Estimate total cost of the different components of the SOSA programme over delivery
- 4) Estimate a cost per family based upon the number of families living within SOSA wards

## **METHODS**

### **Study design and strategy**

Micro-costing of SOSA programme as delivered within SOSA programme wards between October 2017 and September 2020, using a NHS and local health authority perspective. All unit prices were estimated in 2019-2020 prices. Costs were split into two categories: development costs, and day to day running costs (those associated with the SOSA programme on a daily basis). Development costs represented the resources required to create and refine the materials and resources required for the SOSA programme. Day-to-day running costs involved quantifying those resources which were involved with the delivery of the SOSA programme on a daily basis, e.g. staff time spent offering home safety advice. All staff activity required unit prices for time spent on the SOSA programme, and this was estimated by multiplying time by the hourly rate of the staff member in question (see Table SI1A for unit prices).

Table S11A: Unit prices for SOSA programme activity, 2019/2020 prices, GBP

Item	Hourly rate (£/2019-2020 price year)	Notes / Source
<b>Academic development &amp; Central Administration</b>		
Research & Teaching Level 3	20.03	University of Nottingham Mid Point
Research & Teaching Level 4	25.01	University of Nottingham Mid Point
Research & Teaching Level 5	33.78	University of Nottingham Mid Point
Research & Teaching Level 6	42.93	University of Nottingham Mid Point
Research & Teaching Level 7	53.48	University of Nottingham Mid Point
External consultant	31.25	
<b>Health visitors</b>		
Band 2 administrator	9.03	Mid-point band 2, NHS Agenda for Change
Band 4 community Nurse	30	Unit costs of Health & Social Care
Band 5 community nurse	39	Unit costs of Health & Social Care
Band 6 community nurse	49	Unit costs of Health & Social Care
<b>Family mentors</b>		
Family mentor	9.93	Based upon 37 hour working week, £19,105 annual salary, Framework
Administrator	8.84	Based upon 37 hour working week, £17,000 annual salary, Framework
<b>Children centres</b>		
Level 1 staff	10	
Level 2 staff	12.50	
<b>Other staff</b>		
Interpreter	42.50	
Public health manager	68	Band 8a Nurse, Unit costs of Health & Social Care
Health visitor manager	68	Band 8a Nurse, Unit costs of Health & Social Care
Community service manager	29.71	NCC Level K1
F2 Doctor	35	Unit costs of Health & Social Care

#### Costing development of SOSA programme

The SOSA programme was developed through consultation with interested parties (health visitors, children centre staff, and parents) through a series of workshops. Therefore, development costs were divided into three areas: 1) workshop preparation, 2) workshop delivery, 3) SOSA programme design and development based upon workshop results. For the workshops, all attendances were reimbursed for parking (two-hour workshop, zone 1 parking Nottingham, £7.20), and mileage, based upon University of Nottingham (UoN) reimbursement rates (45p per mile). As details of parents were not kept, it was assumed these individuals had zero cost and were excluded from the analysis.

A record of attendance was not kept for three workshops, and hence an average cost across the other workshops was applied. The cost of workshop preparation, workshop delivery, and SOSA programme design and development were estimated by multiplying time spent on each activity by the hourly salary of the staff member involved.

*SOSA programme running costs associated with children centres, family mentors, health visitors, and providing interpreters*

For day to day running costs, activity was split into six categories: children centre activity, family mentor activity, health visitor activity, provision of interpreters, provider training, and UoN administration. Information regarding activity related to children centres, family mentors, health visitors, and interpreters were estimated where possible on a per ward basis, to allow for any variation of SOSA delivery that might occur across wards. For health visitors, activity was divided across SW, MSM, infant and toddler reviews (ITR), and post-accident reviews. For children centres, activity was focused on SW and MSM. For family mentors, activity was around MSM, and advice at home visits as part of the family mentor manual. The cost per SW, MSM, and other activity were estimated on a per each occurrence basis (e.g. cost per SW), at a ward level where possible. If a ward was missing information on activity, then an average cost across the other wards was used as an estimate.

For children centres, the cost per ward per quarter was estimated using the following equation:

$$\begin{aligned} \text{Cost Children Centre Ward per quarter} \\ = (\text{Number}_{SW \text{ per quarter}} \times \text{Cost}_{CCSW}) + (\text{Number}_{MSM \text{ per quarter}} \times \text{Cost}_{CCMSM}) \end{aligned}$$

Where  $\text{Cost}_{CCSW}$  represents the cost of children centre safety week activity, and  $\text{Cost}_{CCMSM}$  represents the cost of children centre monthly safety message activity.

For family mentors, the cost per ward per quarter was estimated using the following equation:

$$\begin{aligned} \text{Cost Family Mentor Ward per quarter} \\ = (\text{Number}_{MSM \text{ per quarter}} \times \text{Cost}_{FMMSM}) + (\text{Number}_{GHSA} \times \text{Cost}_{GHSA}) \end{aligned}$$

Where  $\text{Cost}_{FMMSM}$  represents the cost of family mentor monthly safety message activity,  $\text{Number}_{GHSA}$  represents the number of visits where a family mentor provides homes safety advice as part of the family mentor manual, and  $\text{Cost}_{GHSA}$  represents the cost of providing general home safety advice as part of the manual based upon per ward estimates of visits made by family mentors per quarter.

For health visitors, the cost per ward per quarter was estimated using the following equation:

$$\begin{aligned} \text{Cost Health Visitor Ward per quarter} \\ = (\text{Number}_{SW \text{ per quarter}} \times \text{Cost}_{HVSWS}) + (\text{Number}_{MSM \text{ per quarter}} \times \text{Cost}_{HVMSM}) \\ + (\text{Admin}_{ITR} + (\text{Number}_{ITR} \times \text{Cost}_{ITR})) \end{aligned}$$

Where  $\text{Cost}_{HVSWS}$  represents the cost of health visitor safety week activity,  $\text{Cost}_{HVMSM}$  represents the cost of health visitor monthly safety message activity,  $\text{Admin}_{ITR}$  represents the cost of administration for infant and toddler reviews per quarter, and  $\text{Cost}_{ITR}$  represents the cost of home safety related infant and toddler reviews.,

Unfortunately, data on the use of interpreters amongst family mentors and health visitors was unavailable. However, direct communication with a manager of family mentors for one ward gave an indication as to an approximate proportion of visits that required an interpreter. This proportion was as applied to family mentor visits, and for health visitor activity relating to infant and toddler reviews, and post-accident home visits. The cost of interpreters was estimated on a per ward basis per quarter using the following equation:

$$\begin{aligned} \text{Cost Interpreters per quarter} &= (\text{Prop}_I \times \text{Number}_{GHS\text{A per quarter}} \times \text{Cost}_I) \\ &+ (\text{Prop}_I \times \text{Number}_{ITR\text{ per quarter}} \times \text{Cost}_I) + (\text{Prop}_I \times \text{Number}_{PA\text{ per quarter}} \\ &\times \text{Cost}_I) \end{aligned}$$

Where  $\text{Prop}_I$  represents the proportion of visits which require an interpreter,  $\text{Cost}_I$  represents the hourly rate for an interpreter,  $\text{Number}_{GHS\text{A per quarter}}$  represents the number of visits where a family mentor provides homes safety advice as part of the family mentor manual,  $\text{Number}_{ITR\text{ per quarter}}$  represents the number of infant and toddler reviews carried out by health visitors, and  $\text{Number}_{PA\text{ per quarter}}$  represents the number of post-accident home visits carried out by health visitors.

#### *SOSA programme running costs associated with provider training and UoN administration*

For each provider training session, the total cost was estimated by multiplying the length of time at the session by the number of attendees by their salary, as well as the number and level of instructors at the session. All costs were then grouped into a financial quarter.

Costs of UoN administration were collected directly by the trial team. These included staff time for printing of resources for MSM, SW, and home safety checklists (HSCs) as used in infant and toddler reviews, the printing of materials itself, and the postage required to send materials to relevant teams. MSM and SW were costed on a per individual occurrence and were then multiplied by the number of SWs and MSMs per quarter to estimate a total cost per quarter. HSCs were costed on a quarterly basis.

#### *Estimating the total and the per family SOSA programme cost*

For health visitor activity, family mentor activity, and children centre activity, costs per ward per financial quarter were summed together to give a total cost per activity per financial quarter. Then, to estimate the total cost of the SOSA programme, for each financial quarter, the costs of the individual aspects of the SOSA programme were summed together using the following equation:

$$\text{Cost}_{Qi} = \text{CHV}_{Qi} + \text{CFM}_{Qi} + \text{CC}_{Qi} + \text{CT}_{Qi} + \text{CA}_{Qi} + \text{CI}_{Qi}$$

Where  $Qi$  represents the financial quarter in question,  $\text{CHV}$  represents the total cost of health visitor activity in that financial quarter,  $\text{CFM}$  represents the total cost of family mentor activity in that financial quarter,  $\text{CC}$  represents the total cost of children centre activity in that financial quarter,  $\text{CT}$  represents the cost of training (if conducted) in that financial quarter,  $\text{CA}$  represents the cost of UoN administration in the financial quarter, and  $\text{CI}$  represents the cost of interpreters that financial quarter. The total cost of the SOSA programme was then estimated by summing the cost per financial quarter:

$$Total\ cost_{SOSA} = \sum_{i=0}^i Cost_{Qi}$$

To estimate the cost per family of the SOSA programme, the cost per family per quarter was estimated first:

$$Cost\ per\ family_{Qi} = \frac{Cost_{Qi}}{Families_{Qi}}$$

Where  $Qi$  represents an individual financial quarter, and  $Families_{Qi}$  represents the total number of families registered in SOSA wards in that financial quarter. The number of families in SOSA wards was estimated from caseload reports of family mentors for each SOSA ward. The total cost per family of the SOSA programme was then estimated by summing the cost per family per financial quarter:

$$Total\ cost\ per\ family_{SOSA} = \sum_{i=0}^i Cost\ per\ family_{Qi}$$

For the main analysis, only day-to-day running costs were included. However, for a secondary analysis development costs were added as a sunk cost, with the cost per family estimated by dividing the development costs by the number of families in the first quarter. All costs were initially estimated without discounting, but discounting was added at 3.5% per annum as recommended by UK specific guidelines [1], on a quarterly basis. All costs were assumed to occur at the end of the financial quarter, except for development costs as these were assumed to occur at time equal to zero.

## RESULTS

### Costing the SOSA programme – Development of Programme

The total cost of developing the SOSA programme was £12,275.00. Three workshops had no information regarding attendance (workshops 2, 3, and 4). Therefore, these workshops were costed by taking the average of the costed workshops (£622.13) and applying this to each of the three workshops. This meant that the total cost of the SOSA programme development workshops was £4,354.88. Tables SI1B, SI1C, and SI1D provide a detailed breakdown of costs.

*Table SI1B: Cost of SOSA development workshop preparation (GBP (£), 2019-2020 prices, undiscounted)*

Item	Level	Time (hrs)	Cost (£)
Preparing workshop plan and activities	Research & Teaching Level 7	21	1,123.08
Booking room, inviting participants, printing activity sheets	Research & Teaching Level 4	21	525.21
Writing up workshop notes and circulating to participants	Research & Teaching Level 4	14	350.14
Total cost of workshop preparation			1,998.43

Table S11C: Cost of SOSA development workshops where attendance was recorded (GBP (£), 2019-2020 prices, undiscounted)

Staff level / item	Workshop 1				Workshop 5				Workshop 6				Workshop 7			
	Number attending	Staff cost (£)	Mileage reimbursement (£)	Parking reimbursement (£)	Number attending	Staff cost (£)	Mileage reimbursement (£)	Parking reimbursement (£)	Number attending	Staff cost (£)	Mileage reimbursement (£)	Parking reimbursement (£)	Number attending	Staff cost (£)	Mileage reimbursement (£)	Parking reimbursement (£)
Research & Teaching Level 4	1	50.02	2.70	7.20					1	50.02	2.70	7.20				
Research & Teaching Level 5																
Research & Teaching Level 6	1	85.86	2.70	7.20									1	85.86	2.70	7.20
Research & Teaching Level 7	1	106.96	2.70	7.20	1	106.96	2.70	7.20	1	106.96	2.70	7.20	1	106.96	2.70	7.20
External consultant									1	250.00	50.40	7.20	1	250.00	50.40	7.20
Band 4 community (nursery) nurse	1	60.00	1.35	7.20	1	60	3.15	7.20								
Band 6 community (health visitor) nurse	2	196	4.50						1	98.00	0.90	7.20	1	98.00	0.90	7.20
Level 2 children centre staff									2	39.72	5.85	14.40	1	19.86	1.80	7.20
Public health manager	1	136.00	1.35	7.20												
Health visitor manager	1	136.00	1.35	7.20												
Community service manager	1	59.42	4.05	7.20												
F2 Doctor	1	70.00	2.70	7.20												
<b>Total cost of workshop</b>			<b>995.66</b>				<b>187.21</b>				<b>650.45</b>				<b>655.18</b>	

*Table S11D: Cost of subsequent SOSA programme development based upon results of workshops (GBP (£), 2019-2020 prices, undiscounted)*

Item	Level	Time (hrs)	Cost (£)
Guidelines for child health reviews	Research & Teaching Level 7	3	160.44
Guidelines for post-accident contacts	Research & Teaching Level 7	3	160.44
Home safety checklist for infants	Research & Teaching Level 7	6	320.88
Home safety checklist for toddlers	Research & Teaching Level 7	6	320.88
Production of monthly safety message resources	Research & Teaching Level 4	150	3,751.50
Refinement of monthly safety message resources	Research & Teaching Level 7	7.5	401.10
	Research & Teaching Level 6	7.5	321.98
	External consultant	7.5	234.38
Production of safety week resources	Research & Teaching Level 4	10	250.10
<b>Total cost of SOSA programme development</b>			<b>5,921.69</b>

#### **Costing the SOSA programme – Training providers**

A total of 14 training sessions on the SOSA programme were provided (the six-hour sessions were two three-hour sessions in morning and afternoon), with 84 health visitors, 77 family mentors, and 4 children centre staff attending training. The total cost of provider training over the SOSA project was £16,811.70. Table S11E provides a breakdown of costs by session.



Table SI1E: Cost of provider training for delivery of SOSA programme (GBP (£), 2019-2020 prices, undiscounted)

Date of training	Number of presenters	Level of presenters	Number of health visitors	Number of family mentors	Number of children centre staff	Time (hrs)	Cost (£)
06/09/2017	2	Research & Teaching Level 6 / External consultant	7	6	0	6	1,715.32
07/09/2017	2	Research & Teaching Level 6 / External consultant	18	27	0	6	3,957.91
13/09/2017	2	Research & Teaching Level 6 / External consultant	15	0	0	6	2,712.58
20/09/2017	2	Research & Teaching Level 7 / External consultant	13	10	0	6	2,779.78
27/09/2017	2	Research & Teaching Level 6 / External consultant	14	0	3	3	2,549.29
25/04/2018	2	Research & Teaching Level 7 / External consultant	6	0	1	3	1,329.94
07/11/2018	2	Research & Teaching Level 6 / External consultant	5	0	0	1.5	681.90
24/04/2019	1	Research & Teaching Level 6	0	13	0	2	344.04
26/09/2019	1	Research & Teaching Level 6	0	10	0	2	284.46
08/01/2020	1	Research & Teaching Level 6	0	11	0	3	456.48

### Costing the SOSA programme – Day to day running

#### Costing Health Visitor Activity

Health visitor activity was collected through direct contact with the health visiting teams at three wards, with one ward not responding. For that particular ward an average costs based upon activity within other programme wards were applied for this ward. Activity was split into safety weeks, monthly safety messages, infant and toddler reviews, and home visits. Details and assumptions for costing health visitor activity can be found in Table SI1F. Although the SOSA programme also included changes to post-accident visits, the fidelity of the programme identified that health visitors did not use SOSA materials in these, and hence these were removed from the cost of the programme. The total cost for health visitor activity during the SOSA programme was £35,106.93, including infant and toddler reviews. A breakdown by ward can be found in Table SI1G.

Table S11F: Ward specific details and assumptions for costing health visitor activity

Item	Ward 1				Ward 2				Ward 3				Ward 4*			
	Time (mins)	Staff level	Number of staff	Cost (£)	Time (mins)	Staff level	Number of staff	Cost (£)	Time (mins)	Staff level	Number of staff	Cost (£)	Cost (£)			
<b>Safety week activity by centre</b>																
Sorting through and organising material	10/5/5 <sup>1</sup>	Band Administrator / Band 4 nurse / Band 5 nurse <sup>1</sup>	2	2/1/1 <sup>1</sup>	9.59 <sup>1</sup>	20	Band administrator	2	1	3.01	90	Band administrators	2	2	27.09	
Distributing material to relevant staff	20	Band administrator	2	2	6.02						60	Band administrator	2	2	18.06	
Displaying of materials						17.5	Band 6 Nurse	1	14.29		5	Band administrator	2	1	0.75	
Ad-hoc discussion with families (1 to 1)	10/10 <sup>2</sup>	Band 4 nurse / Band 6 nurse <sup>2</sup>	4	4/10 <sup>2</sup>	131.67 <sup>2</sup>						12.5/12.5 <sup>3</sup>	Band 4 nurse / Band 6 nurse <sup>3</sup>	1/1 <sup>3</sup>	1	32.92 <sup>3</sup>	
Discussion of material with individuals at baby clinics	5/5 <sup>4</sup>	Band 4 nurse / Band 6 nurse <sup>4</sup>	1	1/1 <sup>4</sup>	32.92 <sup>4</sup>	2.5 <sup>5</sup>	Band Administrator / Band 4 Nurse / Band 6 Nurse <sup>5</sup>	2	1/1/1 <sup>5</sup>	67.30 <sup>5</sup>						
Distribution of materials to families											5/5 <sup>6</sup>	Band 4 Nurse / Band 6 Nurse <sup>6</sup>	1/1	6	29.08 <sup>6</sup>	
<b>Total cost per safety week (£)</b>					<b>180.20</b>				<b>84.65</b>						<b>107.90</b>	<b>124.24</b>
<b>Monthly safety messages activity by centre</b>																
Sorting through and organising materials	10	Band administrator	2	2	3.01	17.5	Band administrator	2	1	2.63	30	Band administrator	2	2	9.03	
Distributing material to relevant staff	20	Band administrator	2	2	6.02	60	Band administrator	2	1	9.03	30	Band administrator	2	2	9.03	
Ad-hoc discussion with families (1 to 1)	10/10	Band 4 nurse / Band 6 nurse <sup>7</sup>	4	4/10	526.67						10/10	Band 4 nurse / Band 6 nurse <sup>10</sup>	1	1	65.83	
Discussion of materials with individuals at baby clinics	5/5	Band 4 nurse / Band 6 nurse <sup>8</sup>	1	1/1	131.67	1.5	Band Administrator / Band 4 Nurse / Band 6 Nurse <sup>9</sup>	2	1/1	132.26	7.5/7.5	Band 4 nurse / Band 6 nurse <sup>11</sup>	1	1	79.00	
<b>Total cost per monthly safety message (£)</b>					<b>667.36</b>				<b>143.92</b>						<b>162.89</b>	<b>324.73</b>
<b>Infant and toddler checklist use</b>																
Distribution of infant & toddler checklists <sup>12</sup>	20	Band administrator	2	2	6.02	5	Band administrator	2	1	0.75	20	Band administrator	2	2	6.02	4.26
9-12 month review	0 <sup>13</sup>	Band 4 Nurse / Band 5 Nurse / Band 6 Nurse	1	1	0	0.1786 <sup>14</sup>	Band 4 Nurse / Band 5 Nurse / Band 6 Nurse <sup>15</sup>	1	1	0.09	0.4286 <sup>16</sup>	Band 4 Nurse	1	1	0.21	0.10
2-2.5 year review	0 <sup>13</sup>	Band 4 Nurse / Band 5 Nurse / Band 6 Nurse	1	1	0	1.1786 <sup>14</sup>	Band 4 Nurse / Band 5 Nurse / Band 6 Nurse <sup>15</sup>	1	1	0.59	0.9286 <sup>16</sup>	Band 4 Nurse	1	1	0.46	0.35
* Data for ward 4 was not available, so have assumed an average across the other three wards																

<sup>1</sup> 10 mins by administrators, 5 mins each by nurses
<sup>2</sup> Based upon 10 visits per week, so 2.5 visits per band 4 nurse and 1 visit per band 6 nurse
<sup>3</sup> 2 clinics per week, one staff member of each level at each clinic
<sup>4</sup> 5 clinics a week, one staff member of each level at each clinic
<sup>5</sup> 1 staff member of each level at main clinic, 1 level 6 at secondary clinic, 10 infants at main clinic and 15 infants at secondary clinic, 1 each clinic per week
<sup>6</sup> One relevant visit per week for Band 6, 10 relevant visits per week for Band 4
<sup>7</sup> 4 Band 4 Nurses, 10 visits per month each, 10 Band 6 Nurses, 4 visits a month each
<sup>8</sup> 1 Band 4 and 1 Band 6 Nurse, 20 clinics per month
<sup>9</sup> 1 staff member of each level at main clinic, 1 level 6 at secondary clinic, 10 infants at main clinic and 15 infants at secondary clinic, 4 of each clinic per month
<sup>10</sup> 10 visits per month, 5 each of Band 4 and Band 6 Nurses
<sup>11</sup> 16 clinics per month, 1 Band 4 or Band 6 at each, 8 for each band
<sup>12</sup> These costs are applied quarterly rather than per review
<sup>13</sup> Health practitioner questionnaire responses from health visitors in ward 1 suggested no change in length of reviews spent on home safety
<sup>14</sup> Health practitioner questionnaire responses from health visitors in ward 2 suggested that on average, health visitors spent an additional 0.1786 of a minute at the 9-12 month review and 1.1786 mins at the 2-2.5 year review discussing home safety compared to controls
<sup>15</sup> 98.92% of reviews are Band 4, 1.01% of reviews are Band 5, 0.07% are Band 6
<sup>16</sup> Health practitioner questionnaire responses from health visitors in ward 3 suggested that on average, health visitors spent an additional 0.4286 of a minute at the 9-12 month review and 0.9286 of a minute at the 2-2.5 year review discussing home safety compared to controls.

Table S11G: Breakdown of cost of Health Visitor activity by ward over the length of the SOSA programme (GBP (£), 2019-2020 prices, undiscounted)

Year	Quarter	Infant & Toddler Reviews				Monthly Safety Messages				Safety Weeks			
		Ward 1	Ward 2	Ward 3	Ward 4	Ward 1	Ward 2	Ward 3	Ward 4	Ward 1	Ward 2	Ward 3	Ward 4
2017-2018	3	6.02	30.70	53.63	14.38	342.06	143.92	162.89	216.29	0.00	0.00	0.00	0.00
2017-2018	4	6.02	40.43	59.38	12.87	684.12	287.84	325.79	432.58	98.87	84.61	107.90	97.13
2018-2019	1	6.02	33.31	58.84	12.03	1,026.18	431.76	488.68	648.87	98.87	84.61	107.90	97.13
2018-2019	2	6.02	41.20	61.74	16.15	1,368.24	575.69	651.57	865.17	98.87	84.61	107.90	97.13
2018-2019	3	6.02	32.11	48.84	20.47	1,368.24	575.69	651.57	865.17	98.87	84.61	107.90	97.13
2018-2019	4	6.02	36.38	54.09	19.37	1,026.18	431.76	488.68	648.87	98.87	84.61	107.90	97.13
2019-2020	1	6.02	35.79	42.49	11.48	1,026.18	431.76	488.68	648.87	98.87	84.61	107.90	97.13
2019-2020	2	6.02	33.19	61.92	39.55	1,026.18	431.76	488.68	648.87	98.87	84.61	107.90	97.13
2019-2020	3	6.02	22.42	58.31	26.57	1,026.18	431.76	488.68	648.87	98.87	84.61	107.90	97.13
2019-2020	4	6.02	28.90	32.91	36.26	1,026.18	431.76	488.68	648.87	98.87	84.61	107.90	97.13
2020-2021	1	6.02	17.81	32.88	22.55	1,026.18	431.76	488.68	648.87	0.00	0.00	0.00	0.00
2020-2021	2	6.02	29.42	45.27	33.72	1,026.18	431.76	488.68	648.87	0.00	0.00	0.00	0.00
<b>Total</b>		72.24	381.65	610.30	265.41	11,972.08	5,037.24	5,701.27	7,570.20	889.84	761.45	971.12	874.14

### *Costing Family Mentor Activity*

Family mentor activity was collected through direct contact with the family mentor teams at all four wards. Activity was split into monthly safety messages and general home safety advice delivered as part of the family mentor manual. Details and assumptions for costing family mentor activity can be found in Table SI1H. The total cost for family mentor activity during the SOSA programme was £123,581.39. A breakdown by ward can be found in Table SI1I.

Table S11H: Ward specific details and assumptions for costing family mentor activity

	Ward 1				Ward 2				Wards 3 & 4			
	Time taken (mins)	Level of staff	Number of staff	Cost (£)	Time taken (mins)	Level of staff	Number of staff	Cost (£)	Time taken (mins)	Level of staff	Number of staff	Cost (£)
<b>Monthly safety messages</b>												
Distributing MSM material to staff	5	Administrator	1	0.74	2	1	Administrator	0.29	2	Administrator	1	0.29
Distributing MSM material to families	1	Family mentor	14	2.32	5	15	Family mentor	12.41	3	Family mentor	33	16.38
Printing MSM material if required	10	Administrator	1	1.47	15	1	Administrator	2.21	15	Administrator	1	2.21
<b>Total cost of monthly safety messages</b>				<b>4.53</b>				<b>14.92</b>				<b>18.89</b>
General home safety advice through manual (per month)	45	Family mentor	14	1,126.06 <sup>1</sup>	30	Family mentor	15	446.85 <sup>3</sup>		Family mentor	33	1,441.84 <sup>2</sup>
<sup>1</sup> Based upon 27 visits per month per family mentor (378 in total), 40% of which will be home safety related (151)												
<sup>2</sup> Based upon 22 visits per month per family mentor (726 in total), 40% of which will be home safety related (290)												
<sup>3</sup> Based upon 15 visits per month per family mentor (225 in total), 40% of which will be home safety related (90)												

Table S11I: Breakdown of cost of family mentor activity by ward over the length of the SOSA programme (GBP (£), 2019-2020 prices, undiscounted)

Year	Quarter	Monthly Safety messages			Provision of home safety advice		
		Ward 1	Ward 2	Wards 3 & 4	Ward 1	Ward 2	Wards 3 & 4
2017-2018	3	4.53	14.92	18.89	3,663.79	1,626.15	4,896.71
2017-2018	4	9.05	29.83	37.78	3,663.79	1,626.15	4,896.71
2018-2019	1	13.58	44.75	56.67	3,663.79	1,626.15	4,896.71
2018-2019	2	18.11	59.67	75.56	3,663.79	1,626.15	4,896.71
2018-2019	3	18.11	59.67	75.56	3,663.79	1,626.15	4,896.71
2018-2019	4	13.58	44.75	56.67	3,663.79	1,626.15	4,896.71
2019-2020	1	13.58	44.75	56.67	3,663.79	1,626.15	4,896.71
2019-2020	2	13.58	44.75	56.67	3,663.79	1,626.15	4,896.71
2019-2020	3	13.58	44.75	56.67	3,663.79	1,626.15	4,896.71
2019-2020	4	13.58	44.75	56.67	3,663.79	1,626.15	4,896.71
2020-2021	1	13.58	44.75	56.67	3,663.79	1,626.15	4,896.71
2020-2021	2	13.58	44.75	56.67	3,663.79	1,626.15	4,896.71
	<b>Total</b>	<b>158.45</b>	<b>522.10</b>	<b>661.12</b>	<b>43,965.43</b>	<b>19,513.80</b>	<b>58,760.50</b>

### *Costing Children Centre Activity*

Children centre activity was collected through direct contact with the children centre manager, covering all four children centres within SOSA wards. Activity was split into monthly safety messages and safety weeks. Details and assumptions for costing children centre activity can be found in Table SI1J. The total cost for health visitor activity during the SOSA programme was £52,695, although there was a zero cost for the last two financial quarters for the SOSA programme due to the COVID-19 pandemic as all children centres were closed. A breakdown by financial year and quarter can be found in Table SI1K.

Table S11J: Assumptions for costing children centre activity

Activity	Time taken	Number of staff involved*	Total cost per centre (£)	Total cost across all centres** (£)
<b>Safety week activities</b>				
Organising material	300	2	112.5	450
Printing of material	120	2	45	180
Displaying of material	120	1	22.5	90
Ad hoc discussion with families during group sessions	300	2	112.5	450
Ad hoc discussion with families (1 to 1)	300	2	112.5	450
Distributing materials to families	300	3	168.75	675
Clearing material away	120	2	45	180
Distributing emailed to staff	60	1	11.25	45
<b>Total cost per safety week</b>				<b>2,520</b>
<b>Monthly Safety Messages</b>				
Organising material	120	1	22.5	90
Printing of material	120	1	22.5	90
Displaying of material	120	1	22.5	90
Ad hoc discussion with families during group sessions	180	2	67.5	270
Ad hoc discussion with families (1 to 1)	120	1	22.5	90
Distributing materials to families	120	2	45	180
Clearing material away	120	2	45	180
Distributing emailed to staff	60	1	11.25	45
<b>Total cost per monthly safety message</b>				<b>1,035</b>
* Have assumed an average of level 1 and level 2 staff				
** 4 centres in total				

Table S11K: Breakdown of cost of children centre activity by ward over the length of the SOSA programme (GBP (£), 2019-2020 prices, undiscounted)

Year	Quarter	Monthly safety messages				Safety weeks			
		Ward 1	Ward 2	Ward 3	Ward 4	Ward 1	Ward 2	Ward 3	Ward 4
2017-2018	3	258.75	258.75	258.75	258.75	0.00	0.00	0.00	0.00
2017-2018	4	517.50	517.50	517.50	517.50	630.00	630.00	630.00	630.00
2018-2019	1	776.25	776.25	776.25	776.25	630.00	630.00	630.00	630.00
2018-2019	2	1,035.00	1,035.00	1,035.00	1,035.00	630.00	630.00	630.00	630.00
2018-2019	3	1,035.00	1,035.00	1,035.00	1,035.00	630.00	630.00	630.00	630.00
2018-2019	4	776.25	776.25	776.25	776.25	630.00	630.00	630.00	630.00
2019-2020	1	776.25	776.25	776.25	776.25	630.00	630.00	630.00	630.00
2019-2020	2	776.25	776.25	776.25	776.25	630.00	630.00	630.00	630.00
2019-2020	3	776.25	776.25	776.25	776.25	630.00	630.00	630.00	630.00
2019-2020	4	776.25	776.25	776.25	776.25	630.00	630.00	630.00	630.00
2020-2021	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2020-2021	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	<b>7,503.75</b>	<b>7,503.75</b>	<b>7,503.75</b>	<b>7,503.75</b>	<b>5,670.00</b>	<b>5,670.00</b>	<b>5,670.00</b>	<b>5,670.00</b>



### Costing of Interpreters

Data on the use of interpreters on a quarterly basis was unavailable. However, direct communication with a manager of Family Mentors from one ward indicated that between July and November 2019, 28 visits required an interpreter, approximately 5.6 visits per month. In that particular ward, it was estimated that Family Mentors conducted 378 per month, therefore interpreters were only needed in 1.48% of these. This was applied to Family Mentor visits in other wards, and for Health Visitor activity relating to Infant and Toddler Reviews. The total cost for the provision of interpreters was £4,839.42. A breakdown of costs by ward can be found in Table SI1L.

*Table SI1L: Breakdown of cost for the provision of interpreters by ward over the length of the SOSA programme (GBP (£), 2019-2020 prices, undiscounted)*

Year	Quarter	Ward 1	Ward 2	Wards 3 & 4
2017-2018	3	95.20	95.83	209.29
2017-2018	4	95.20	96.03	210.23
2018-2019	1	95.20	95.88	210.76
2018-2019	2	95.20	96.05	214.22
2018-2019	3	95.20	95.86	211.07
2018-2019	4	95.20	95.95	210.97
2019-2020	1	95.20	95.93	206.14
2019-2020	2	95.20	95.88	222.62
2019-2020	3	95.20	95.65	215.38
2019-2020	4	95.20	95.79	211.91
2020-2021	1	95.20	95.56	208.97
2020-2021	2	95.20	95.80	215.27
	<b>Total</b>	<b>1,142.40</b>	<b>1,150.19</b>	<b>2,546.83</b>

### Costing of Central Administration of SOSA

Central administration was provided by the study team at the University of Nottingham (UoN), and were collected directly by the study team. These included staff time for printing of resources for MSM, SW, and HSCs, the printing of materials itself, and the postage required to send materials to relevant teams. MSM and SW were costed on a per individual occurrence, whereas HSC were costed on a quarterly basis. Assumptions regarding central administration costs can be found in Table SI1M, while a breakdown per quarter for central administration costs can be found in Table SI1N. The total cost of central administration was £8,989.19.

Table S11M: Assumptions regarding costing central administration

Item	Level	Time (mins)	Cost (£)
<i>Safety weeks</i>			
Staff time printing and mailing	Research & Teaching Level 4	60	25.01
Printing of resources			74.20
Postage of resources			2.90
<b>Total cost per safety week</b>			<b>102.11</b>
<i>Monthly safety messages</i>			
Staff time printing and mailing	Research & Teaching Level 4	120	50.02
Printing of resources			74.20
Postage of resources			2.90
<b>Total cost per monthly safety message</b>			<b>127.12</b>
<i>Home safety checklists</i>			
Staff time printing and mailing	Research & Teaching Level 3	300	120.18
Printing checklists			64
CAPT sheet			53.10
RoSPA height charts			32.47
Postage of checklists			32
<b>Total cost for home safety checklists per quarter</b>			<b>301.75</b>

Table S11N: Breakdown of central administration costs over the length of the SOSA programme (GBP (£), 2019-2020 prices, undiscounted)

Year	Quarter	Monthly safety messages	Safety weeks	Checklists for infant & toddler reviews
2017-2018	3	127.12	0.00	301.75
2017-2018	4	254.24	102.11	301.75
2018-2019	1	381.36	102.11	301.75
2018-2019	2	508.48	102.11	301.75
2018-2019	3	508.48	102.11	301.75
2018-2019	4	381.36	102.11	301.75
2019-2020	1	381.36	102.11	301.75
2019-2020	2	381.36	102.11	301.75
2019-2020	3	381.36	102.11	301.75
2019-2020	4	381.36	102.11	301.75
2020-2021	1	381.36	0.00	301.75
2020-2021	2	381.36	0.00	301.75
	Total	4,449.20	918.99	3,621.00

### Total cost of SOSA programme

The total undiscounted cost of the SOSA programme was £228,314.84 excluding development costs, and £240,589.84 including development costs. Out of the total cost (excluding development costs), the proportion of costs by staff were as follows: 48% was on family mentor activity, 23% was on children centre activity, 15% was on health visitor activity (including Infant & Toddler reviews), 7% was on training, 4% on central administration, and 2% on interpretation. The total cost per financial quarter and breakdown by activity can be found in Table S110.

Table S110: Total undiscounted costs of SOSA programme by activity, financial year and quarter. 2019/2020 prices. GBP (£).

Financial year	Quarter	Total cost per activity						Total cost (£)
		Training	Central Admin	Health Visitor	Family Mentor	Children Centre	Interpretation	
2017-2018	3	13,714.88	428.87	969.89	9,082.58	1,035.00	400.32	25,631.54
2017-2018	4	0.00	658.10	2,237.54	9,120.91	4,590.00	401.46	17,008.01
2018-2019	1	1,329.94	785.22	3,094.20	9,159.24	5,625.00	401.84	20,395.45
2018-2019	2	0.00	912.34	3,974.27	9,197.58	6,660.00	405.47	21,149.66
2018-2019	3	681.90	912.34	3,956.61	9,197.58	6,660.00	402.13	21,810.56
2018-2019	4	0.00	785.22	3,099.86	9,159.24	5,625.00	402.11	19,071.44
2019-2020	1	344.04	785.22	3,079.77	9,159.24	5,625.00	397.27	19,390.55
2019-2020	2	284.46	785.22	3,124.67	9,159.24	5,625.00	413.69	19,392.29
2019-2020	3	0.00	785.22	3,097.32	9,159.24	5,625.00	406.23	19,073.01
2019-2020	4	456.48	785.22	3,088.10	9,159.24	5,625.00	402.90	19,516.95
2020-2021	1	0.00	683.11	2,674.76	9,159.24	0.00	399.73	12,916.84
2020-2021	2	0.00	683.11	2,709.93	9,159.24	0.00	406.27	12,958.55
<b>Total cost (£)</b>		<b>16,811.70</b>	<b>8,989.19</b>	<b>35,106.93</b>	<b>109,872.59</b>	<b>52,695.00</b>	<b>4,839.42</b>	<b>228,314.84</b>

**Total cost of SOSA programme per family**

To evaluate the SOSA programme, three cohorts of children were recruited. Cohort one were recruited in October 2017, cohort two in April 2018, and cohort three in October 2018. Each Cohort was followed up for 24 months from recruitment, as the SOSA programme was designed for children up to age two years. For each cohort, the total cost for that quarter was discounted at 3.5% per annum, and divided by the total number of children registered across all four SOSA programme wards, estimating a cost per child per financial quarter. Then, the cost per child of the SOSA programme for each cohort was estimated by summing the cost per quarter over the two year follow-up. Then, the average cost was estimated across the three cohorts to estimate the cost per child of the SOSA programme. A breakdown by cohort can be found in Table S11P. The average cost per child across the three cohorts is £30.22 per child for the SOSA Intervention.

Table S110: Total discounted cost of the SOSA programme as attributed for each cohort. 2019/2020 prices. GBP (£).

Financial year	Quarter	Number of children	Cohort 1		Cohort 2		Cohort 3		Average discounted cost per child (£)
			Discounted total cost (£)	Discounted cost per child (£)	Discounted total cost (£)	Discounted cost per child (£)	Discounted total cost (£)	Discounted cost per child (£)	
2017-2018	3	5,069	25,412.04	5.01	N/A	N/A	N/A	N/A	
2017-2018	4	5,087	16,717.96	3.29	N/A	N/A	N/A	N/A	
2018-2019	1	5,109	19,875.95	3.89	20,220.79	3.96	N/A	N/A	
2018-2019	2	5,084	20,434.45	4.02	20,788.98	4.09	N/A	N/A	
2018-2019	3	5,036	20,892.54	4.15	21,255.02	4.22	21,623.78	4.29	
2018-2019	4	4,989	18,112.27	3.63	18,426.51	3.69	18,746.20	3.76	
2019-2020	1	4,936	18,257.63	3.70	18,574.39	3.76	18,896.65	3.83	
2019-2020	2	4,938	18,102.91	3.67	18,416.99	3.73	18,736.51	3.79	
2019-2020	3	4,877	N/A	N/A	17,958.65	3.68	18,270.22	3.75	
2019-2020	4	4,837	N/A	N/A	18,219.28	3.77	18,535.38	3.83	
2020-2021	1	4,790	N/A	N/A	N/A	N/A	12,162.16	2.54	
2020-2021	2	4,645	N/A	N/A	N/A	N/A	12,096.95	2.60	
<i>Total for each cohort over two years</i>			<i>157,805.77</i>	<i>31.35</i>	<i>153,860.61</i>	<i>30.90</i>	<i>139,067.85</i>	<i>28.40</i>	<i>30.22</i>

**SUPPLEMENTARY INFORMATION 2: UNIT PRICES FOR HEALTHCARE ACTIVITY,***Table S12A: Unit prices for healthcare activity, reported in Great British Pounds Sterling (GBP)*

<b>Item</b>	<b>Unit price (£)</b>	<b>Price year reported</b>	<b>2019/2020 prices (£)</b>	<b>Source</b>
General Practitioner Consultation	39	2019/2020	39	Unit costs of health and social care [2]
Emergency Department visit	166.05	2018/2019	169.72	NHS Reference costs [3]
Hospital admission	927.55	2012-2013	1025.81	Cooper et al [4]
Outpatient consultation	126.85	2018/2019	129.65	NHS Reference costs [3]
Urgent care/Walk in centre consultation	30.58	2000-2001	49.45	Salisbury et al [5]

### SUPPLEMENTARY INFORMATION 3: HOW UTILITY WEIGHTS WERE APPLIED TO ESTIMATE QUALITY-ADJUSTED LIFE YEARS

Based upon Brussoni et al [6], the following utility values were estimated. The baseline scores we used to represent one year without injury.

*Table S13A: Estimating weighted mean baseline utility scores and weighted utility score one month after injury*

	Number	Weighting	Baseline mean	One month post injury
Not admitted	174	N/A	0.97	0.90
Admitted 1-3 days	27	0.4655	0.94	0.76
Admitted 4+ days	31	0.5345	0.93	0.61
<b>Total</b>	<b>58</b>	<b>Weighted mean</b>	<b>0.9347</b>	<b>0.6798</b>

Children were split into those who had an admission and those who didn't. Those who had no admissions received baseline and injury values associated with "not admitted" from Table 1. Those who reported any admission received a weighted average for the "admitted" baseline and injury values in Table 1.

SOSA injury questionnaires were self-reported by parents, and collected at three monthly intervals, i.e. 3 months, 6 months, 9 months, 12 months, 15 months, 21 months, and 24 months. Therefore, if a child without any admissions had no injury in that 3-month period, they received a utility applied of 0.2425, while a child that had had an admission received a utility of 0.2337. Hence, if a child had no injuries over the 24 month follow-up period, they could earn a total of 1.9223 QALYs.

For a child who suffers an injury, data suggests that there is a QALY loss during the first month after an injury, but that four months post injury quality of life has returned to baseline levels. [7]. Hence 3 month utilities were converted into monthly utilities, and each month a healthy child would earn 0.0808 QALYs if they have not had any admissions, or 0.0779 QALYs if they reported having any admissions over the two years follow-up.

For children who didn't have any admissions, if they reported an injury, they would earn  $(0.9/12)=0.0750$  QALYs for the first month post injury. Assuming a linear return to baseline levels for months two and three up to month four, they would earn 0.0769 QALYs for month two, and 0.0789 for month three, giving a total for that three month period of 0.2308 QALYs. Because date of injury was not reported, we assumed that the injury occurred in the first month of the three month cycle, so that by month four post injury was the first month in the next cycle. For example, if an injury was reported in the 3 month questionnaire, then they would assume to be back in full health for the 6

month questionnaire. Utility lost was only awarded once during each questionnaire irrespective of the number of injuries that occurred in a three month period.

We applied an identical approach for children who did have an admission over the two-year follow up period, with them earning 0.0567 QALYs for the first month, 0.0637 for the second month, and 0.0708 for the third month, giving a total of 0.1912 for the three months where an injury was reported.

*Table SI3B: Total number of QALYs awarded depending on number of questionnaires reporting an injury occurrence (Note: no discounting applied)*

Number of questionnaires reporting an injury	Total QALYs over 24 month follow period	
	No admission	Any admission
No questionnaires reporting injuries	1.9400	1.8963
1 questionnaire with injury reported	1.9283	1.8268
2 questionnaires with injury reported	1.9167	1.7844
3 questionnaires with injury reported	1.9050	1.7419
4 questionnaires with injury reported	1.8933	1.6694
5 questionnaires with injury reported	1.8817	1.6570
6 questionnaires with injury reported	1.8700	1.6145
7 questionnaires with injury reported	1.8583	1.5720
8 questionnaires with injury reported	1.8476	1.5295

All QALYs were then discounted at 3.5% per annum.



**SUPPLEMENTARY INFORMATION 4: RESULTS OF ONE-WAY SENSITIVITY ANALYSES**

*Figure S14A: Tornado plot for spread of ICER per additional home with the three key safety practices after variation in evaluation inputs – the wider the bar, the greater the change in the ICER and hence the more uncertainty created by varying that particular evaluation input.*

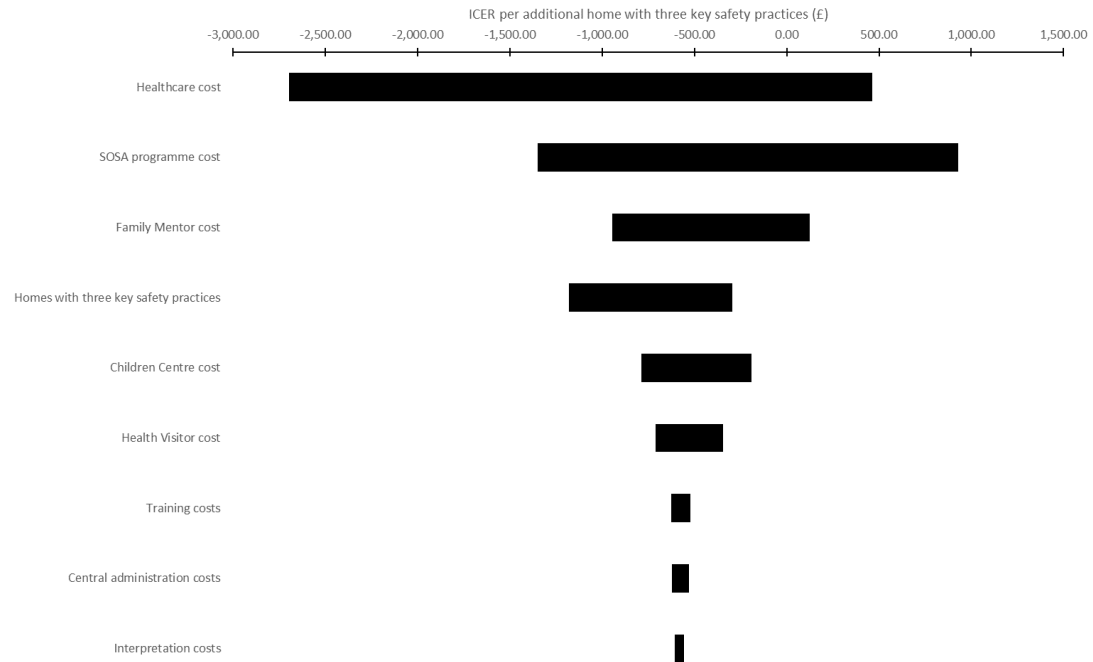


Figure S14B: Tornado plot for spread of ICER per injury avoided after variation in evaluation inputs – the wider the bar, the greater the change in the ICER and hence the more uncertainty created by varying that particular evaluation input.

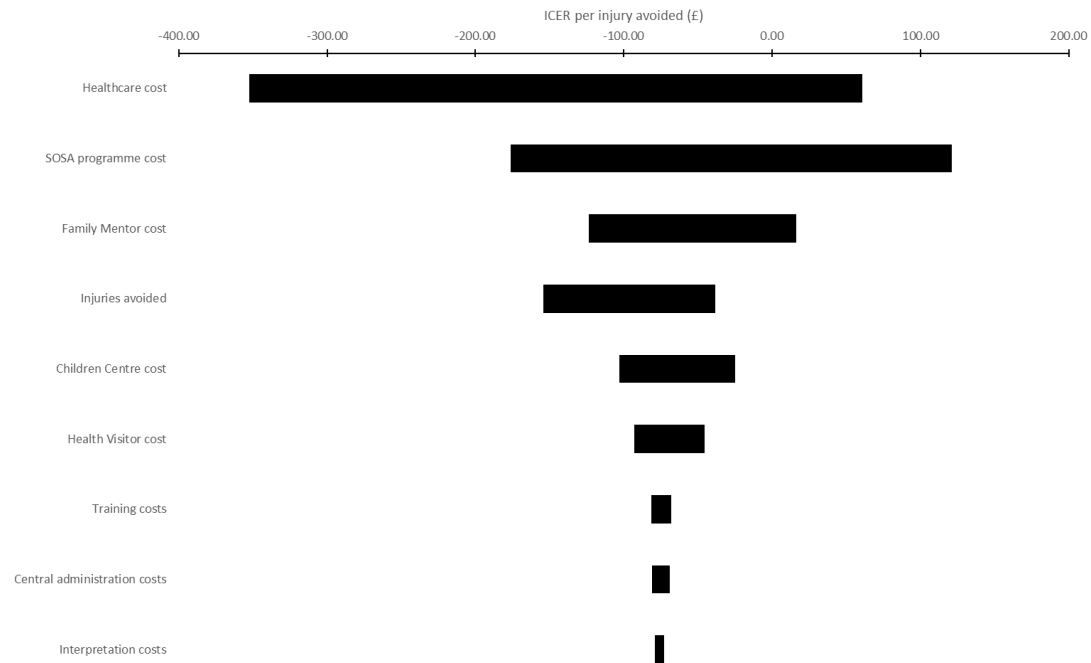
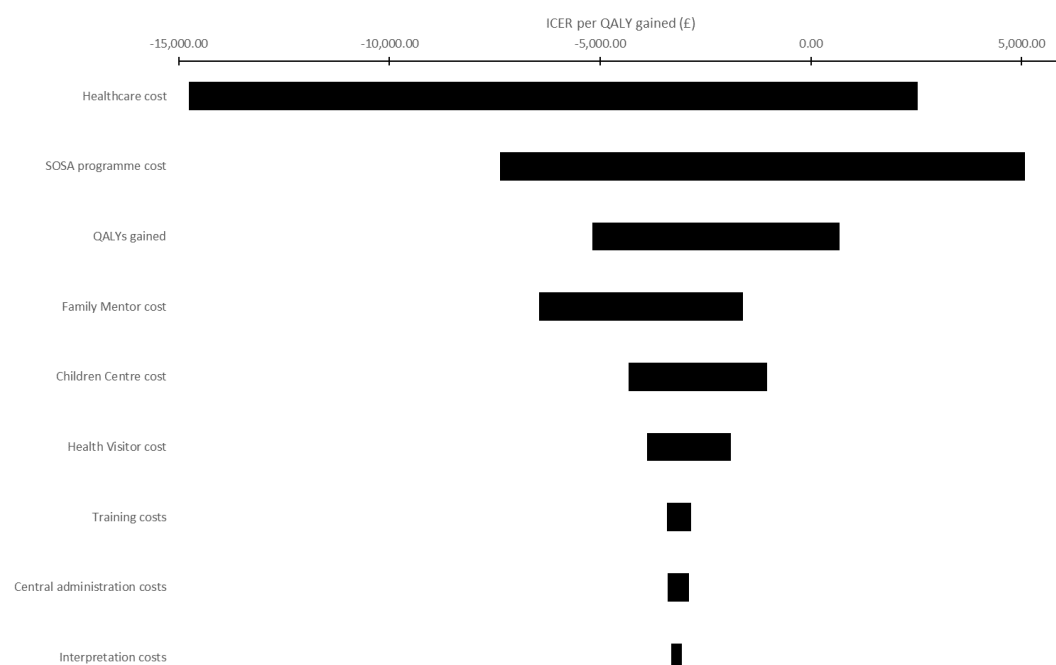


Figure S14C: Tornado plot for spread of ICER per QALY gained after variation in evaluation inputs – the wider the bar, the greater the change in the ICER and hence the more uncertainty created by varying that particular evaluation input.



**SUPPLEMENTARY INFORMATION 5: SCATTERPLOTS OF INCREMENTAL COST VERSES INCREMENTAL PRIMARY AND SECONDARY OUTCOMES**

Figure S15A: Scatterplot of incremental total cost and incremental number of homes with the three key safety practices, each dot represents a bootstrap replication while the yellow diamond represents the mean ICER

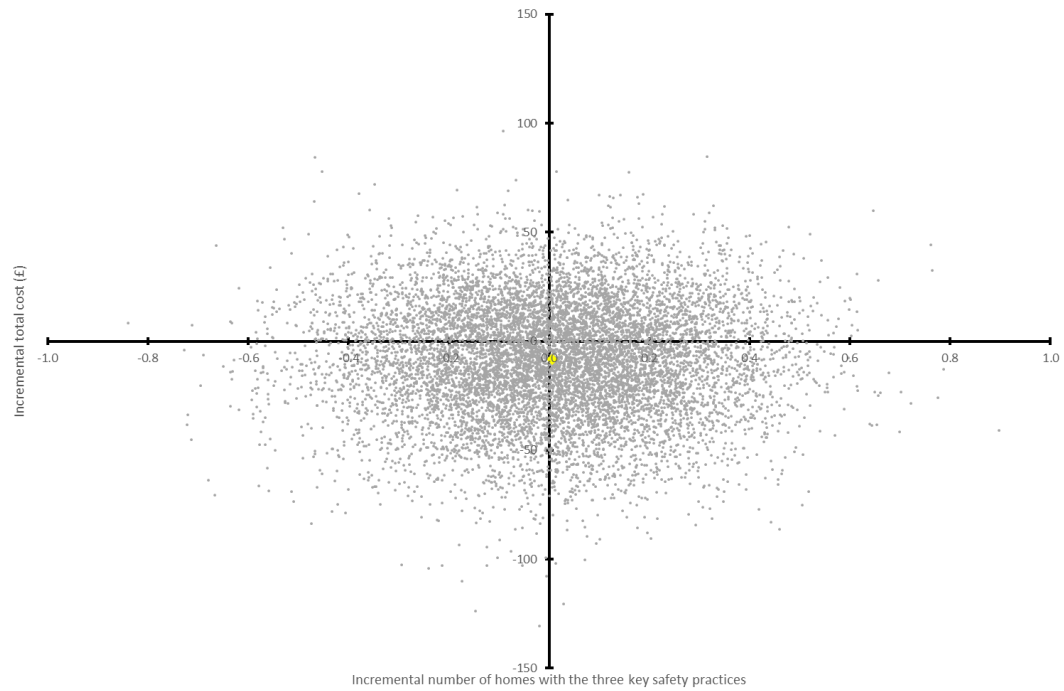


Figure S15B: Scatterplot of incremental total cost and incremental injuries avoided, each dot represents a bootstrap replication while the yellow diamond represents the mean ICER

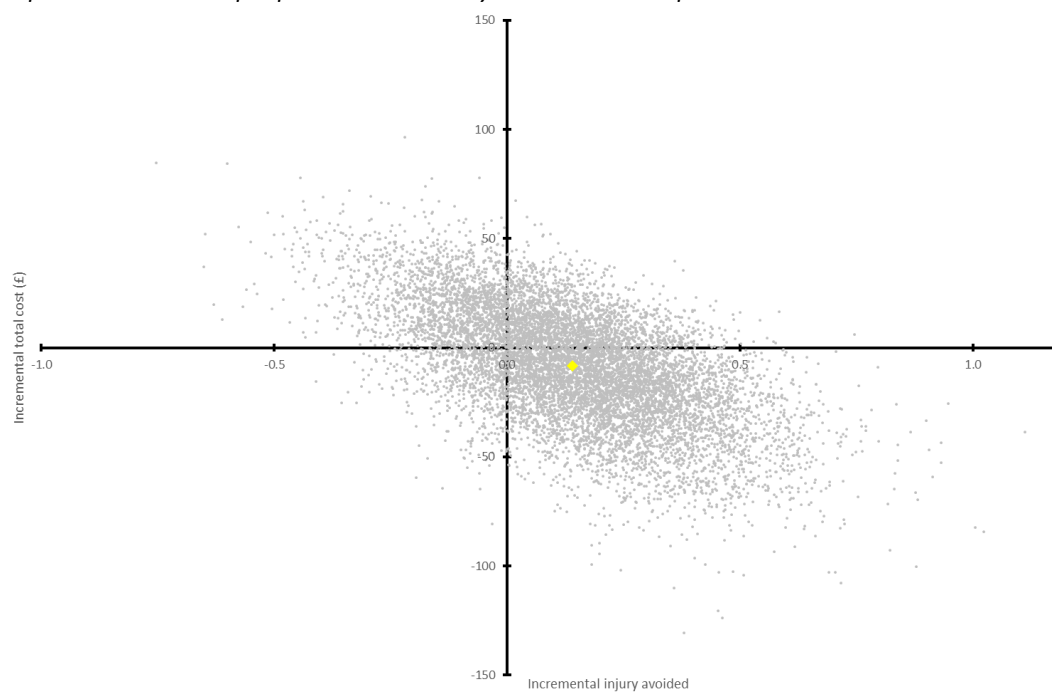
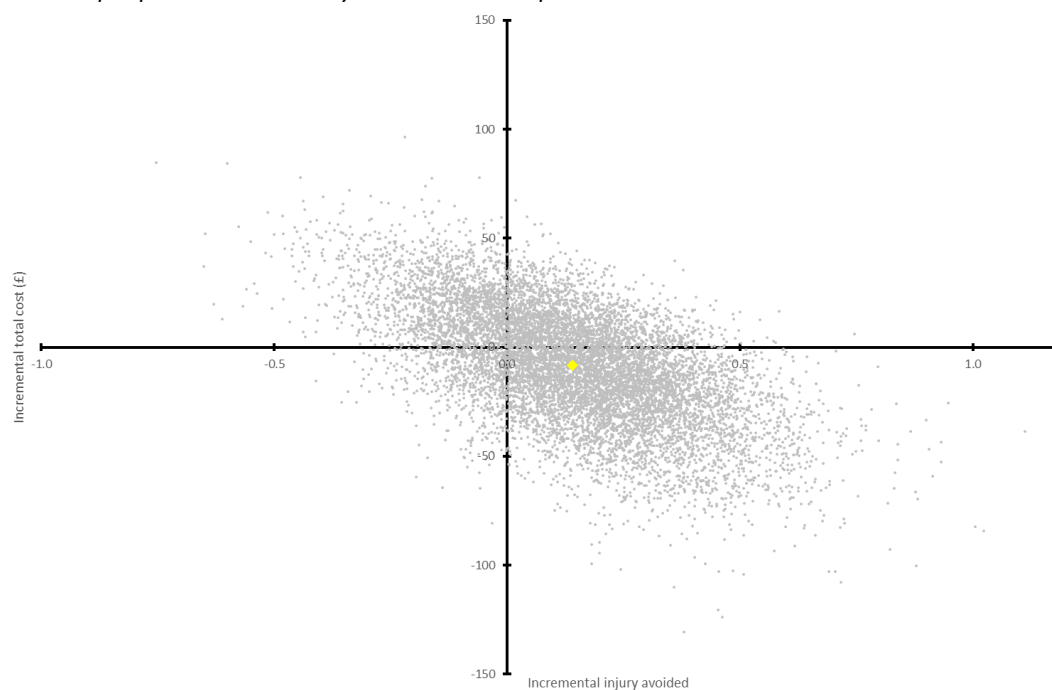


Figure S15C: Scatterplot of incremental total cost and incremental QALYs, each dot represents a bootstrap replication while the yellow diamond represents the mean ICER



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