Unity Insights

Definition Health - LifeBox

Final evaluation report - Extract

June 2023

Kent Surrey Sussex Academic Health Science Network

Kent Surrey Sussex Academic Health Science Network (KSS AHSN) is one of fifteen AHSNs working to transform lives through innovation.

NHS

The NHS consists of various organisations working together to provide a variety of health and care services for patients and carers.

Office for Life Sciences

The Office for Life Sciences (OLS) is a government organisation promoting research, innovation, and the use of technology to improve health and care.

DEFINITION HEALTH

Definition Health are a company that specialise in the digitisation of the patient care pathway within the health and care sector.

SBRI

The Small Business Research Initiative (SBRI) is a programme supported by NHS England to address the needs of the healthcare sector through the promotion of innovation.

Executive summary

Context

The surgical pathway can be demanding and resource intensive. Inefficiencies within the pathway could be contributing to a backlog of appointments, postponements, and surgery cancellations, which may negatively impact patient outcomes.

LifeBox aims to improve the efficiency of the surgical pathway by using digital healthcare questionnaires (HQ) as part of the pre-operative assessment (POA).

Funding, to evaluate the potential impact of LifeBox at Royal Surrey County Hospital (RSCH) within the pre-operative setting, was provided by the Small Business Research Initiative (SBRI) and Kent Surrey Sussex Academic Health Science Network (KSS AHSN), with Definition Health subcontracting the evaluation elements to Unity Insights as an independent third-party. This evaluation was conducted using a mixed methods approach that included qualitative, quantitative and health economic analysis.

Key results

Approximately 7,712 episodes were created on the LifeBox platform during the intervention period (April 2022 to December 2022). The majority of the patients using the solution were aged 55 years and over with an average of 12.4% of patients being digitally assisted.

LifeBox implementation resulted in a decrease in 60-minute POAs and ‘did not attends’ (DNA) by 34.2% and 5.8%, respectively. There was an increase in the frequency of 30-minute and telephone POAs of 19% and 15.2%, respectively. Clinical staff provided feedback suggesting that approximately 20 hours of nurse time per week was no longer required for administrative tasks and there seemed to be a 30-minute reduction in waiting room times.

LifeBox could release approximately 0.29 of a full-time equivalent (FTE) band 6 nurse, whilst maintaining adequate patient throughput within the pre-operative pathway.

Results from the staff surveys suggest that LifeBox could be generally perceived as acceptable and credible by all staffing groups; however, the solution may be better suited to pre-assessment nurses and pre-assessment administration staff.

Results from the patient surveys indicated that LifeBox could be acceptable and credible to patients; however, some provisions, in addition to digitally assisting patients, may need to occur to make the solution more acceptable to older age groups. LifeBox can be accessed via a range of different devices and at multiple points during the pre-operative pathway which renders the solution as generally accessible to patients. These findings are further validated by the activity findings (in other words, the general increase in activity through the platform indicates that users find the solution acceptable, credible, and accessible).

The potential net present values for the cost-benefit analysis (CBA) over the financial five-year period (2022/23 - 2026/27) across uptakes and geographies were:

- **Scenario 1 (implementation at RSCH; 12,132 patients considered):** £428k[1]
- **Scenario 2 (implementation across NHS Surrey Heartlands ICS; 43,624 patients considered across 8 sites):** £1,937k

The potential benefit cost ratios (BCR) over the five-year period (2022/23 - 2026/27) were:

- **Scenario 1:** £1.40 returned for every £1 invested.
- **Scenario 2:** £1.50 returned for every £1 invested.

The potential return on investment (ROI)[2] over the five-year period (2022/23 - 2026/27) were:

- **Scenario 1:** 39%; indicating a positive return on investment.
- **Scenario 2:** 48%; indicating a positive return on investment.

The main benefits of LifeBox include efficiency benefits for clinicians involved in the pre-operative pathway, with the largest health economic benefit being the reduction in 60-minute POAs.

Additional benefits reviewed included potential environmental impacts due to reduced paper usage and travel over the five-year period (2022/23 - 2026/27) for Scenario 1:

- £27k or 103 tCO2e in travel.
- £1k or 5 tCO2e in paper.

These impacts contribute towards the net zero ambition of the NHS (i.e., achieving net-zero by 2045) by supporting climate conscious clinical innovations and continuing to support patient care.

Caveats

Site readiness: Whilst the evaluation was being conducted, RSCH were switching electronic medical health records system from APAS to CERNER. This contributed to timeline delays, data accessibility difficulties, and key information technology and information governance team members at the site. This may have contributed the inability to implement LifeBox within the post-operative pathway during evaluation timelines. As such, post-operative data was not collected, and these findings could not be included as part of this report.

Comparator group: MyPreOp was used during the baseline period; however, not all patients were required to utilise the platform (in other words, mix between the use of a digital solution and the standard pre-operative pathway which resulted in almost 100% of patients attending a 60-minute POA). This has resulted in a comparison between different patient proportions that were utilising a digital solution during the baseline and intervention period.

Unmodelled benefits: Some potential benefits were not modelled as part of this evaluation, such as the possible improvements to co-morbidity coding,

increased patient throughput and the potential post-operative benefits.

Recommendations

The following broad recommendations to build on and improve the position of LifeBox within the industry could include:

- **Strategic**: To improve patient throughput while reducing costs, the most appropriate mix of POA appointments should be assessed. Notably, the comparator, scale of implementation and workforce composition at sites should heavily affect the distribution of the mix of POA appointments.
- **Impact narrative:** As part of future implementations and scale-up, further investigations into LifeBox's economic impact relative to other comparable platforms (and/or a pathway that is devoid of any POA solutions) should be conducted to understand different mix options of POA appointments. Furthermore, examining the impact of LifeBox on different specialties to account for different touchpoint requirements to improve patient experience could prove insightful for a more tailored approach.
- **Data collection:** To build on the robustness of some of the forecasted health economic scenarios derived from assumptions (Scenario 2), further data should be collected from multiple pilot sites, including patient experience.
- **Functional**: The HQ may be better tailored to patients, making LifeBox a preferred solution against other competitors, by focusing on areas such as reducing the length of the HQ or managing patient expectations around the length of the HQ, enabling edits to previous responses, providing definitions for medical terminology, and applying logic rules.

1.1. Health economics results

Cost-benefit analysis

Scenario 1

The modelled benefits, total costs, net present values (NPVs), and benefit-cost ratios (BCRs) for Scenario 1 (12,132 patients) are presented in Table 1. Across the financial five-year period (2022/23 – 2026/27), Scenario 1 predicted a positive forecasted NPV totalling £428k and a return on investment (ROI) of 39%. The BCR is 1.3 in the first year and increased to 1.4 in subsequent years, with a total five-year BCR of 1.4 across all forecasted years (2022/23 – 2026/27).

The largest benefit stream was the reduction in 60-minute POA appointments, generating a saving of £769k and accounting for around 50% of the total benefit over five years. Approximately 67% (£1,027k) of benefits consisted of NHS non-cash releasing benefits, 24% (£368k) of societal benefits, and 9% (£132k) of NHS cash-releasing benefits.

Table 1: Scenario 1 health economic outcomes within the current LifeBox implementation at RSCH forecasted across 2022/22 - 2026/27. Figures represent the mean outcome. NPV values are presented with both a mean outcome and range figures (in brackets). The Monte Carlo simulation, generating the sensitivity ranges, has been conducted independently for each year and the total five-year NPV.

LifeBox - scenario 1 - implementation at RSCH (£ represented as net present value in 2022 figures)	2022/23	2023/24	2024/25	2025/26	2026/27	5-year (2022/23 - 2026/27)
Benefits						
1.1.Reduction in 60-minute POA appointments	£161k	£157k	£154k	£150k	£147k	£769k
1.2. Reduction in DNAs	£27k	£26k	£26k	£25k	£25k	£130k
1.3. Reduction in time required for admin tasks	£27k	£26k	£25k	£25k	£24k	£127k
1.4. Reduction in inactive patient time	£22k	£23k	£22k	£21k	£21k	£108k
1.5. Reduction in POA solution costs	£6k	£5k	£5k	£5k	£5k	£26k
1.6. Reduction in greenhouse gas (GHG) emissions due to a decrease in patient travel	£6k	£6k	£6k	£5k	£5k	£27k
1.7. Reduction in patient travel costs	£47k	£48k	£47k	£45k	£44k	£231k
1.8. Reduction in greenhouse gas (GHG) emissions due to a decreased use of paper	<£1k	<£1k	<£1k	<£1k	<£1k	£1k
1.9. Reduction in paper and printing costs	£22k	£22k	£21k	£21k	£20k	£106k
Total Benefits	£316k	£315k	£307k	£298k	£291k	£1,527k
Costs						
1.1. LifeBox solution cost per patient	£33k	£32k	£31k	£30k	£29k	£155k
1.2. Cost of 30-minute POA appointments	£74k	£72k	£71k	£69k	£68k	£354k
1.3. Cost of telephone POA appointments	£118k	£115k	£113k	£110k	£108k	£565k
1.4. Training costs - nurses	£1k	<£1k	<£1k	<£1k	<£1k	£2k
1.5. Training costs - anaesthetist	£15k	£2k	£2k	£2k	£2k	£22k
1.6. Training costs - admin	<£1k	<£1k	<£1k	<£1k	<£1k	£1k
Total Costs	**£242k**	**£222k**	**£217k**	**£212k**	**£206k**	**£1,099k**
NPV						
Total NPV	**£74k** *(£62k to £89k)*	**£93k** *(£81k to £107k)*	**£90k** *(£78k to £104k)*	**£87k** *(£75k to £100k)*	**£84k** *(£73k to £97k)*	**£428k** *(£372k to £494k)*
Total BCR	**1.3**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**
*The figures above have been rounded to the nearest whole pound for presentation and as such totals may not sum						

The sensitivity analysis (performed using @Risk; Figure 1) assessed how various sources of uncertainty within the model contribute to the model's overall uncertainty. Over a five-year period

(2022/23 – 2026/27), the sensitivity analysis for Scenario 1 indicated that the modelled NPV varied between £372k and £494k at the 90% confidence interval, with a mean expected outcome of £432k. The outcomes presented in Table 1, however, are the most likely outcome for this model[7].

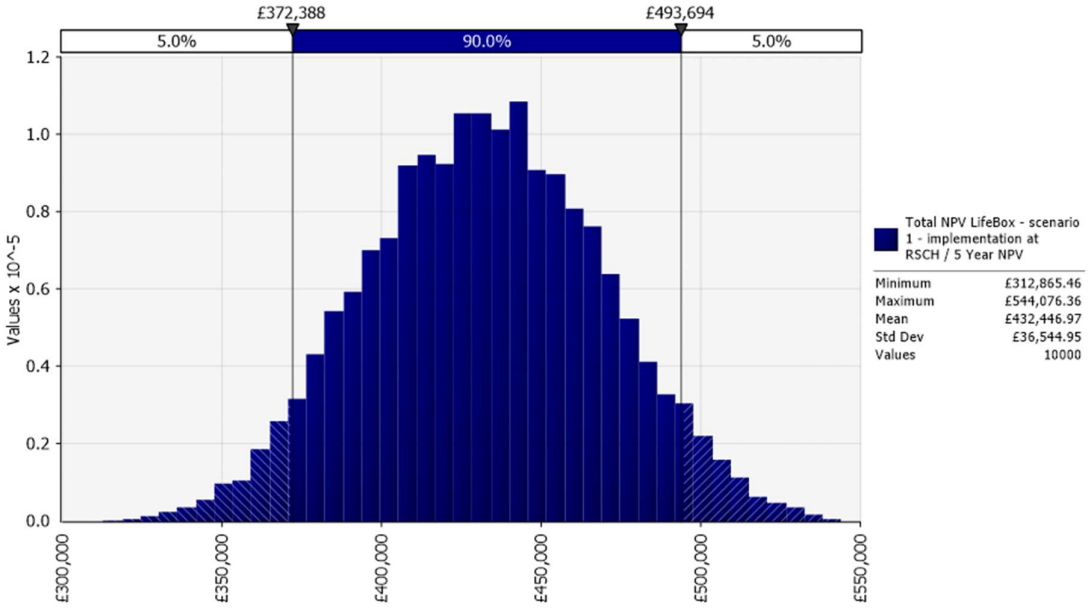

Figure 1. Scenario 1 sensitivity analysis results.

Analysis using tornado charts (Figure 2) showed that a variation to the proportion difference in 60-minute POA appointments had the greatest effects on the mean NPV.

[7] The sensitivity analysis mean does not exactly match the tabulated means due to certain assumptions having a distribution that is not triangular.

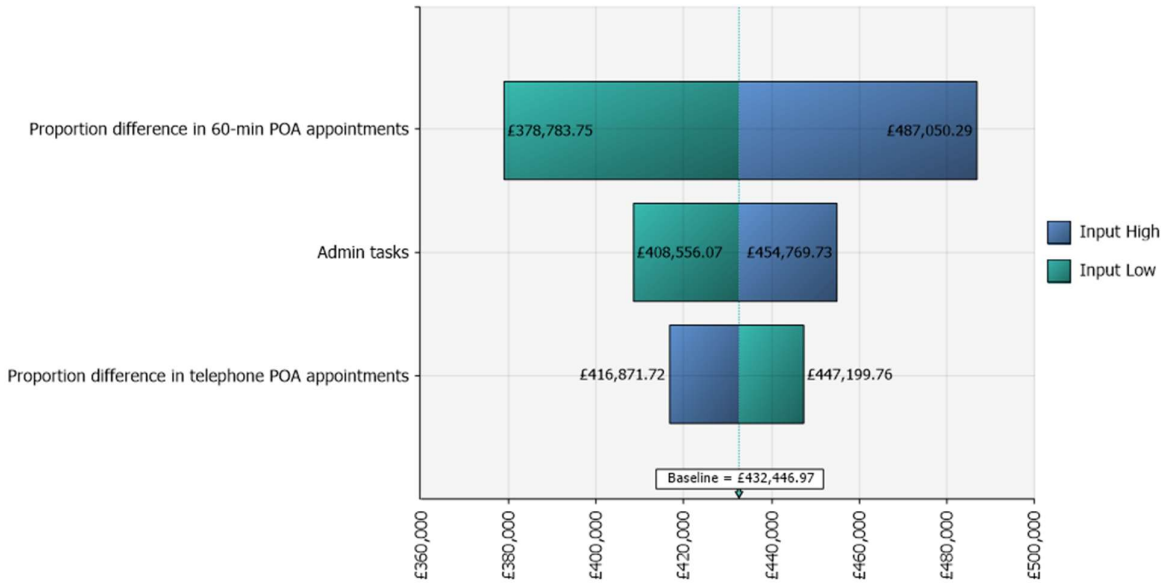

Figure 2. Tornado chart showing factors ranked by their effect on the output mean impact for Scenario 1. The key indicates the expected change in outcomes when each factor is changed according to the minimum and maximum within the stipulated sensitivity range. The baseline figure is representative of the output mean.

Scenario 2

The modelled benefits, total costs, NPVs, and BCRs for Scenario 2 (43,624 patients across 8 sites) are presented in Table 2. Across the financial five-year period (2022/23 – 2026/27), Scenario 2 predicted a positive forecasted NPV totalling £1,937k and an ROI of 48%. The BCR was 1.3 in the first year and increased to 1.5 in subsequent years, with a total five-year BCR of 1.5 across all forecasted years (2022/23 – 2026/27).

The largest benefit stream was the reduction in 60-minute POA appointments, generating a saving of £2,766k and accounted for around 46% of the total benefit over five years. Approximately 70% of benefits consisted of NHS non-cash releasing benefits (£4,257k), 22% of societal benefits (£1,324k), and 8% of NHS cash-releasing benefits (£473k).

Table 2: Scenario 2 health economic outcomes within the current LifeBox implementation at RSCH forecasted across NHS Surrey Heartlands ICS across 2022/22 - 2026/27. Figures represent the mean outcome. NPV values are presented with both a mean outcome and range figures (in brackets). The Monte Carlo simulation, generating the sensitivity ranges, has been conducted independently for each year and the total five-year NPV.

LifeBox - scenario 2 - implementation across NHS Surrey Heartlands ICB (£ represented as net present value in 2022 figures)	2022/23	2023/24	2024/25	2025/26	2026/27	5-year (2022/23 - 2026/27)
Benefits						
2.1.Reduction in 60-minute POA appointments	£577k	£565k	£554k	£541k	£529k	£2,766k
2.2. Reduction in DNAs	£97k	£95k	£93k	£91k	£89k	£466k
2.3. Reduction in time required for admin tasks	£215k	£209k	£204k	£198k	£193k	£1,018k
2.4. Reduction in inactive patient time	£79k	£81k	£78k	£76k	£74k	£388k
2.5. Reduction in POA solution costs	£21k	£20k	£20k	£19k	£18k	£98k
2.6. Reduction in greenhouse gas (GHG) emissions due to a decrease in patient travel	£20k	£21k	£20k	£19k	£19k	£99k
2.7. Reduction in patient travel costs	£169k	£174k	£168k	£163k	£158k	£832k
2.8. Reduction in greenhouse gas (GHG) emissions due to a decreased use of paper	£1k	£1k	£1k	£1k	£1k	£5k
2.9. Reduction in paper and printing costs	£77k	£80k	£77k	£75k	£73k	£382k
Total Benefits	£1,256k	£1,247k	£1,215k	£1,183k	£1,153k	£6,054k
Costs						
2.1. LifeBox solution cost per patient	£131k	£127k	£123k	£119k	£115k	£615k
2.2. Cost of 30-minute POA appointments	£265k	£260k	£254k	£249k	£243k	£1,271k
2.3. Cost of telephone POA appointments	£424k	£415k	£407k	£397k	£388k	£2,031k
2.4. Training costs - nurses	£12k	<£1k	<£1k	<£1k	<£1k	£17k
2.5. Training costs - anaesthetist	£119k	£15k	£14k	£14k	£13k	£175k
2.6. Training costs - admin	£5k	<£1k	<£1k	<£1k	<£1k	£8k
Total Costs	**£956k**	**£818k**	**£800k**	**£780k**	**£761k**	**£4,116k**
NPV						
Total NPV	**£300k** *(£239k to £370k)*	**£428k** *(£369k to £498k)*	**£415k** *(£356k to £484k)*	**£402k** *(£346k to £469k)*	**£391k** *(£336k to £457k)*	**£1,937k** *(£1,654k to £2,263k)*
Total BCR	**1.3**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
*The figures above have been rounded to the nearest whole pound for presentation and as such totals may not sum						

The sensitivity analysis (performed using @Risk; Figure 3) assessed how various sources of uncertainty within the model contributed to the model's overall uncertainty. Over a five-year period (2022/23 – 2026/27), the sensitivity analysis for Scenario 2 indicated that the modelled NPV varied

between £1,654k and £2,263k at the 90% confidence interval, with a mean expected outcome of £1,958k. The outcomes presented in Table 2, however, are the most likely outcome for this model[8].

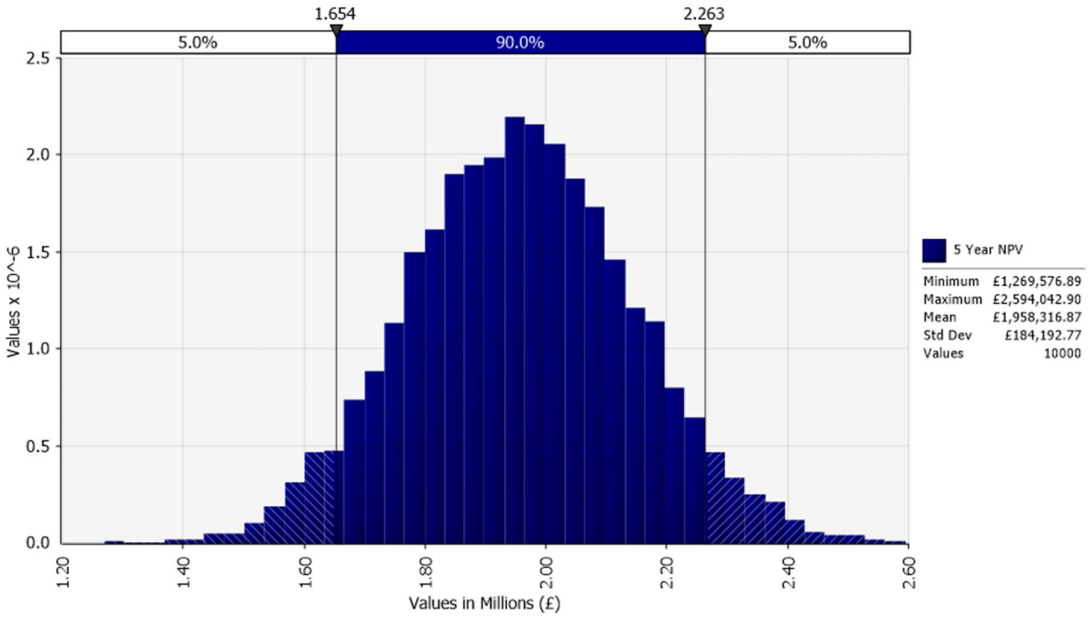

Figure 3. Scenario 2 sensitivity analysis results.

Analysis using tornado charts (Figure 4) showed that a variation to the proportion difference in 60-minute POA appointments had the greatest effects on the mean NPV.

[8] The sensitivity analysis mean does not exactly match the tabulated means due to certain assumptions having a distribution that is not triangular.

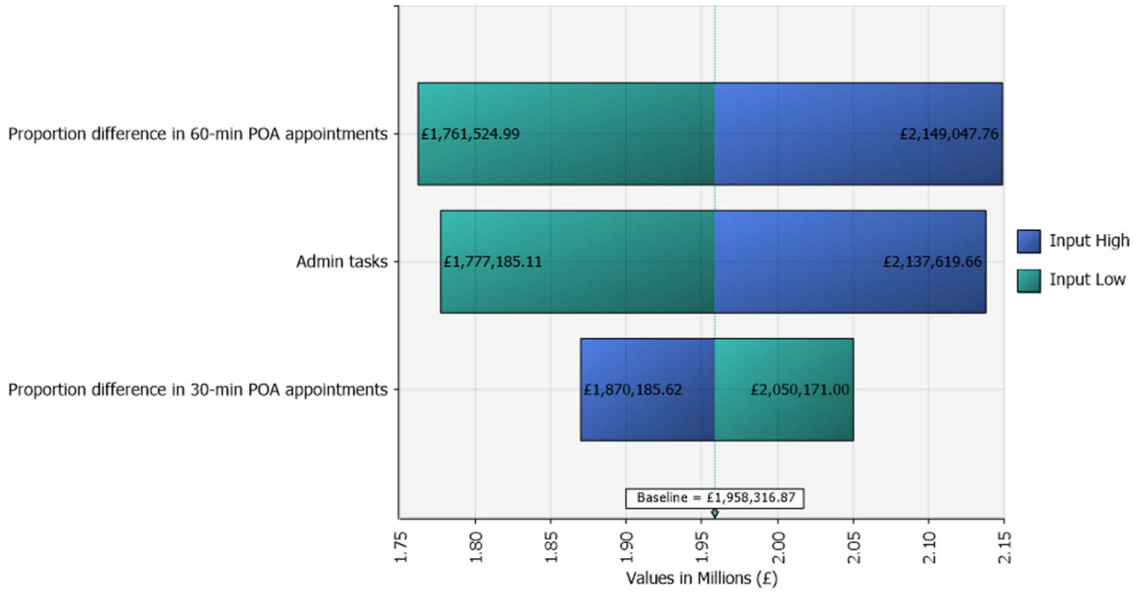

Figure 4. Tornado chart showing factors ranked by their effect on the output mean impact for Scenario 2. The key indicates the expected change in outcomes when each factor is changed according to the minimum and maximum within the stipulated sensitivity range. The baseline figure is representative of the output mean.