

BUDGET IMPACT OF SOFTWARE SUPPORTING SAFE, EFFECTIVE AND EFFICIENT WORKING OF NHS ACUTE CARE PROVIDERS:
ACTUAL BUDGET IMPACT FOR IMPLEMENTATION SITE AND LOST OPPORTUNITY SAVING AND PROJECTED BUDGET IMPACT POTENTIAL FOR OTHER SITES

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Background

The concurrent pressures on acute care providers of rising A&E attendances, rising patient acuity upon hospital admission, reduction in hospital beds and increases in delays in transfer of care back to the community make it essential for them to continually improve patient flow. But these factors make it all the more difficult to achieve.
Nervecentre Software is developer and supplier of the Nervecentre suite of digital health products that support safe, effective and efficient working of acute care providers. Since 2011, Nottingham University Hospitals NHS Trust (NUH) has been rolling out the software, helping to improve the accuracy, relevance and timeliness of the hospital's processes and communications, delivering macro-level improvements in patient flow and patient safety.



A highly desirable consequence of improved patient flow can be provider budget savings, which can lessen the purchasing/commissioning and adoption barriers. Here we present the results of a budget-impact assessment of Nervecentre at NUH. The approach taken is top-down, assessing the financial impact of improved patient flow across the whole Trust over the past 5 years.

Methods

The efficiency of each NUH bed was calculated for each year between 2013/14 and 2018/19. A simulation was then made to calculate the number of additional beds that would have been required from 2014/15 onwards had NUH still been operating at its 2013/14 efficiency level (i.e. before Nervecentre was widely implemented). NUH's total incomes received and costs expended were then calculated under two scenarios: 1. Actual scenario, and 2. Simulated scenario.
An estimate of NUH's 2013/14 – 2018/19 patient-flow budget-impact was made by summing the differences in incomes and costs between the two scenarios, plus the Commissioning for Quality and Innovation (CQUIN) monies received by NUH, reductions in their printing and paper costs, and software, hardware and staff costs attributable to implementation of the Nervecentre software.
All of the data required to estimate the incomes received and costs expended under the two scenarios are publicly available for all NHS Trusts. Therefore, the NUH budget-impact model was extended to estimate the patient-flow budget-impacts of all other NHS Trusts during 2013/14 – 2018/19, allowing the user to run relevant budget-impact calculations for any NHS Trust selected.

NHS Trust - Patient and hospital statistics

A

Midlands and East

B

Nottingham and Nottinghamshire Health and Care STP

C

Nottingham University Hospitals NHS Trust

Clear override values

Our records indicate that this Trust has implemented equivalent to NUH deployment of Nervecentre since 2013/14

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	
D	% harm-free care	94.2%	94.3%	95.9%	94.7%	95.1%	94.6%
E	Mortality indicator (adjusted)	0.91	0.96	1.04	1.01	1.01	1.07
F	Total number of hospital beds (average for the year)	1,669	1,656	1,664	1,634	1,688	1,686
G	Ratio inpatient elective vs non-elective inpatient stays	0.4607	0.4788	0.5003	0.5007	0.4857	0.4854
H	Total number of inpatients	206,110	206,766	209,171	214,041	218,420	225,735
I	Total bed days occupied	606,730	603,168	593,551	596,044	594,970	589,445
J	% elective admissions that are daycases	75.2%	76.3%	77.3%	78.4%	79.5%	80.9%
K	Average provider cost of elective excess bed day	£574	£530	£772	£737	£758	£769
	Override						
L	Average provider cost of non-elective excess bed day	£441	£496	£552	£560	£568	£568
	Override						
M	Average provider cost of elective stay	£3,592	£3,962	£4,371	£3,910	£4,087	£4,264
	Override						
N	Average provider cost of non-elective stay	£2,120	£2,445	£2,452	£2,505	£2,422	£2,422
	Override						
O	Average provider income from elective stay (national average)	£578	£581	£1,130	£1,151	£1,134	£1,117
P	Average provider income from non-elective stay (national average)	£1,323	£1,345	£1,659	£1,674	£1,986	£2,356

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Next

The patient-flow budget-impacts on incomes and costs were calculated identically for NHS Trusts that are and are not already NUH customers. For Trusts that are already Nervecentre customers, relevant years of CQUIN, printing and paper cost reductions and implementation costs were derived from NUH costs, weighted by their relative size. For Trusts that are not already Nervecentre customers, the difference of their actual patient-flow budget-impacts were compared with those we estimate would have occurred had they experienced the same patient-flow improvement journeys as Nervecentre, weighted by their relative size. This generated an estimated opportunity loss for those Trusts for not yet implementing Nervecentre. Finally, an estimate was

made of the expected budget-impact that these Trusts would experience if they began implementing Nervecentre according to same journey as NUH.

Results

	2014 - 2019: NUH actual	The patient-flow budget-impact at NUH over the past 5 years is estimated to be £50.8m. This is driven by £76.9m of reduced operating costs, primarily because 230 fewer beds needed to be kept open, £5.5m of extra CQUIN income and £600k of printing and paper cost-reductions. It came at the expense of £23.2m reduced income and £8.9m of implementation costs.
Reduction in operating costs	£76,927,308	
Increase in income for clinical activity (CCG and NHSE spend)	-£23,237,156	
Attributable CQUIN payments	£5,466,534	
Paper-based materials	£606,531	
Additional staffing to enable Nervecentre implementation	-£2,084,591	
Infrastructure, hardware and software	-£6,886,701	
Total 5-year cost-saving	£50,791,926	

Conclusions

This top-down budget impact assessment shows that, over the five-year period in which the main modules of Nervecentre were implemented, net savings of £50.8m were accrued. Given that that this period encompassed an unprecedented period of cost retrenchment on the part of the NHS, it is difficult to attribute exactly the proportion of this saving that is directly attributable to Nervecentre. However, if we compare it to its peer Trusts, NUH has increased to a greater extent the ratio of elective vs non-elective care services it provides (5.3% increase compared to 0.6% increase), reduced to a greater extent the number of patient bed-days it provides (2.6% reduction compared to 0.0% reduction), and reduced to a greater extent the income it received (1.5% reduction compared to 0.2% reduction). The reduction in income is a true cash-releasing saving, allowing these resources to be invested in other hospital services within the area.

These macro-level budget-impact results are an accumulation of micro-level impacts, some of which will have been enabled by Nervecentre. These micro-level impacts include increased clinician time to care due to faster vital signs observations recording and optimized time management, and availability of real-time, more accurate and prioritised information for improved clinical and operational decision making. Nervecentre will now complete a bottom-up budget-impact model to better understand which specific aspects of their software have had greatest budget-impact on different areas of NUH's operations.

The macro-level model is now being used to help Nervecentre identify which NHS Trusts could benefit most from implementing its software in future.