**Potential RoI using Deontics CDSS**

The clinical case for CDS is well established; the benefits have been thoroughly documented in many scholarly journals.

Most of these benefits, while of course valuable, are based on a relatively limited range of quality-improving “safety net” interventions built into electronic patient records (EPRs) and related modules (such as electronic prescribing). As EPRs have become established as a fundamental platform for modern and effective care delivery, the limitations of such EPR CDS (usually decision tree based) have become clear. “Off the shelf” drug-interaction databases, for example, are effective and invaluable. However, more complex decision support – such as helping to ensure that care is provided in accordance with the best available evidence – is far harder to sustain within available EPRs.

**Clinical Examples**

Several clinical examples demonstrate the clinical effectiveness and financial return that Deontics’ technology can bring.

**Clinical Illustrations of Deontics’ Effectiveness**

***Colon Cancer: [reference 1]*** Patients with Stage II colorectal cancer used a decision aid to assess different treatment strategies. Presented with evidence of outcome probabilities, 90% patients declined unnecessary adjuvant chemotherapy. Potentially saving the NHS £77M p.a.

***Breast Cancer: [reference 2 & 3]*** More patients were treated in accordance with guidelines (97% vs 93%); 1% critical errors with Deontics vs. 13% without Deontics AI; over 60% more trial-eligible patients identified.

***Renal transplant: [reference 4]*** Retrospective analysis using Deontics of actual live kidney donors showed that 41% of those who had undergone nephrectomy had major contraindications to nephrectomy

***Leukaemia: [reference 5]*** 0% errors with Deontics treating childhood leukaemia vs. 37% without Deontics AI

Each of these scholarly studies demonstrates the clinical utility of the Deontics approach. The financial implications of these studies are also important. Studying financial return was not the goal of these projects, they nevertheless identify how the Deontics platform can improve quality and reduce costs of care.

**Estimating the financial return**

From these studies and other studies, we can make estimates of the potential financial benefits that a Deontics implementation can bring to an organisation. To do this, we have a simple operational model that provides benefit categories:

* Admissions avoided
* Reduced costs during admissions (including reduced length of stay)
* More effective discharges

For each category, we make a simple estimate of the benefits that can flow from an effective Deontics implementation, and then sum these benefits across an organisation.

The figures below represent an average UK hospital (see “Base Data” below).

|  |  |  |
| --- | --- | --- |
| Estimating the financial opportunities: top ten clinical pathways only | | |
| Cost category | **Financial metrics** | **Annual value (£)** |
| *Admissions avoided* |  |  |
| Effective application of admission criteria to patients in emergency departments can help avoid unwarranted admissions. Estimate 3% reduction in admissions. | 3% of admissions = 196/year | 475,000 |
| *Reduced costs during admission* |  |  |
| Improved clinical guideline/pathway adherence Average 3% of care costs |  | 475,000 |
| Reduced average length of stay 0.3% reduction | £62.40/day reduction | 408,000 |
| *Effective discharge* |  |  |
| Readmissions due to ineffective or premature discharges: additional 0.5% reduction in admissions. | 32.7 cases per year | 79,000 |
| Total estimated savings per year | | **£1,437,000** |
| Total cost per year | | **£15,835,761** |
| Total percentage cost savings per year | | **9%** |
| Annual price for top 10 pathways | | **£200,000** |
| Estimated Deontics RoI | | **718%** |
| Base data:  Average hospital admissions 6,541/year for top ten pathways; average cost of £2,421 per case. (Based on data from Meaccok et al, Health Econ. 23: 1-13 (2014) and ‘2015/16 Enhanced Tariff Option spreadsheet’ March 2015) | | |

These figures can be interpreted in the context of the Royal Liverpool and Broadgreen University Hospitals NHS Trust (RLBUHT), a Deontics customer. Even although the RLBUHT is a much larger hospital than the UK average (so savings should be much greater), even the £1.43m saving modelled above would represent a further incremental 14% saving on the £10.3m annual savings achieved by the RLBUHT last financial year as a consequence of its Quality Efficiency and Productivity Programme. Moreover, we would also expect a rapid payback time which is supportive of an upfront loaded payment model.

**REFERENCES**

References in regards to the above information can be seen below:

|  |  |
| --- | --- |
| **Cost savings (%)** | **References** |
| 3.0% | Health Technology Assessment 2010; Vol. 14: No. 48, pg5 |
| 7.6% | J Am Med Inform Assoc 2012;**19**:439-442 |
| 11.0% | Health Technology Assessment 2010; Vol. 14: No. 48, pg5 |
| 12.7% | Arch Intern Med Vol 163, June 23, 2003, 1409-1416 |
| **Reduction in LoS (%)** | **References** |
| 0.3% | Meacock et al, Health Econ. (2014), 23: 1-13 |
| 13.0% | Spinal Cord, 2013, 52, 165-169 |
| 17.0% | J Am Med Inform Assoc. 2005;12:398–402 |
| 21%, 27.6%, 35% | JAMA. 2005;293:1223-1238 |
| **Reference Number** | **Clinical Illustrations of Deontics Effectiveness References** |
| 1 | <https://bmjopen.bmj.com/content/7/3/e012935> |
| 2 |  |
| 3 |  |
| 4 | <https://www.ncbi.nlm.nih.gov/pubmed/30028418> |
| 5 |  |