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**Assessing the potential
economic benefit from the CHS
Healthcare hospital discharge
services: evidence from Trust-
based reports and a scoping
literature review**

Prepared for:

CHS Healthcare

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23rd June 2017

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Executive summary

Introduction

CHS Healthcare has requested an assessment of the potential economic returns of investing in their hospital discharge services compared to usual care within the NHS from an NHS perspective. It is perceived that the key potential economic benefit from investing in the CHS Healthcare hospital discharge services is from reducing delayed transfer of care (DTC), which can reduce length of stay (LOS) in hospitals related to inpatient care. The Five Year Forward View deal between the NHS and the Treasury is committed to making £22bn savings by 2020. Enabling timely discharge from hospitals could reduce costly extra inpatient bed days which is desirable as part of the Five Year Forward View.

Aims and objectives

The aim of this report is to describe and discuss the potential economic benefits from the CHS Healthcare hospital discharge services. The objectives are to:

1. Examine previous CHS Healthcare reports to summarise the potential bed days saved and the associated monetary savings to the NHS; a return on investment ratio is estimated based on these statistics.
2. Use a scoping search of the empirical literature to describe the potential economic benefits associated with hospital discharge services and then to relate these benefits and lessons learnt back to the hospital discharge services offered by CHS Healthcare.
3. Compare the results and discussion points from this report to that report previously produced for CHS Healthcare by Dr Steven Ariss to compare and contrast the qualitative results within that report to the results obtained from previous CHS Healthcare reports (objective 1) and the empirical literature (objective 2).

Methods

In order to inform this report, CHS Healthcare have provided ten reports across eight case studies (these case studies were based on before-and-after study designs), the key results (e.g. bed days saved, associated monetary savings and cost of the CHS Healthcare services) from which are summarised as part of the objectives of this report. The full reports and statistics are presented in the supplementary materials; only summary statistics are presented and discussed within this report, and it is advised that those wanting more details consult the original reports in the supplementary materials.

A scoping review of the empirical literature was conducted, focused on early discharge services within hospitals, which was conducted within Google Scholar with a focus on paper's published over the past decade (between the years 2007 and 2017); systematic reviews and meta-analyses were preferred to single study papers as part of the objectives of this paper. This scoping review was used to produce key themes focussed on the potential economic benefits from facilitating early and supported discharge from hospitals; key results are used to reflect on the potential economic benefits from the CHS Healthcare hospital discharge services.

Results

The overall results from the eight case studies suggested that the CHS Healthcare hospital discharge services did result in positive net savings from an NHS perspective (where a positive net saving is achieved when the assumed cost savings from reducing DTOC is greater than the cost of the CHS Healthcare services). The lowest per month net savings were estimated in Wiltshire (case study 5) which was £18,314; the largest per month net saving was £160,542 in East Lancashire (case study 4). Exploratory analysis indicated that when working at a maximum capacity at the suggested lower service cost for 20 placements per month (£16,000 per month), cost-neutrality (the assumed cost savings from reducing DTOC is equal to the cost of the CHS Healthcare services) could be achieved by reducing DTOC by just 2.21 bed days per placement each month. On average based on the results from all eight case studies, the return on investment ratio for the CHS Healthcare hospital discharge services was estimated to be £1:£3.56; that is on average for every pound [£] spent on the service, £3.56 was seen as a return on this investment due to the estimated bed day cost savings from the observed case studies. The standard error of the mean (SEM) for this estimated return on investment of £1:£3.56 was estimated to be 0.61; that is, the return on investment estimated for each of the case studies deviates by approximately £0.61 from the average return on investment ratio of £1:£3.56 across the eight case studies.

Based on the results identified within the scoping literature review, it seems rational to suggest that the care pathway for (older) people post-discharge is complicated and requires multiple components in order to provide a successful service which reduces costs to the healthcare system via early discharge and avoiding readmission rates, while also improving patient health, quality of life and satisfaction outcomes. Based on the results from the empirical literature, the CHS Healthcare hospital discharge services may not be able to achieve these other important outcomes through its implementation alone; however, these outcomes may be achieved by including the CHS Healthcare services within a wider care pathway redesign focussed on pre, post and transitional care.

Conclusion

The CHS Healthcare hospital discharge services have been shown to reduce DTOC in hospitals, which could lead to an overall monetary net-saving to the NHS which is desirable as part of the Five Year Forward View. There was no data to provide evidence of the service improving health or quality of life outcomes, or reducing readmission rates, which are other desirable outcomes from an patient, commissioning, and NHS perspective. However, the CHS Healthcare hospital discharge services represent a potentially successful component (in terms of reducing DTOC days) of an overall care pathway model focused on enabling timely hospital discharge, which is suggested to be an important aspect for healthcare services (from the provider and patient perspective) based on the results within the empirical literature.

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- Franklin M, Davis S, Horspool M, Kua WS & Julious S (2017) [Economic Evaluations Alongside Efficient Study Designs Using Large Observational Datasets: the PLEASANT Trial Case Study](#). *Pharmacoeconomics*, 35, 561-573.
- Franklin M, Wailoo A, Dayer MJ, Jones S, Prendergast B, Baddour LM, Lockhart PB & Thornhill MH (2016) [The Cost-Effectiveness of Antibiotic Prophylaxis for Patients at Risk of Infective Endocarditis](#). *Circulation*, 134(20), 1568-1578.

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1. Background

CHS Healthcare has requested an assessment of the potential economic returns of investing in their hospital discharge services compared to usual care from an NHS perspective (i.e. for every pound [£] invested in the CHS Healthcare services, so many pounds [£s] will be returned to the NHS). It is perceived that the key potential economic benefit from investing in the CHS Healthcare hospital discharge services is from reducing delayed transfer of care (DTOC), which can reduce length of stay (LOS) in hospitals related to inpatient care. The Five Year Forward View deal between the NHS and the Treasury is committed to making £22bn savings by 2020¹; proposed methods to achieve these savings involve new ways of managing resources across several sectors, including acute care (including specialised services), primary care (including GP contracts), community services, mental health, social care and public health. Enabling timely discharge from hospitals could reduce costly extra inpatient bed days which is desirable as part of the Five Year Forward View. If CHS Healthcare can provide such a service at a cost which would enable a favourable economic return to the NHS, then these hospital discharge services may prove to be cost-beneficial to the NHS which is in line with the Five Year Forward View.

This report will aim to identify the potential economic benefits from the CHS Healthcare discharge services, how the services might fit with the NHS's Five Year Forward View plans and the need to make large financial savings by 2020, as well as other considerations when implementing these hospital discharge services across the NHS. A return on investment ratio will be calculated based on the cost of the CHS Healthcare service relative to the potential cost-savings from inpatient bed days due to reduced DTOC.

2. The CHS Healthcare services

CHS Healthcare was established in 1996 and is now the UK's largest independent brokerage specialists, enabling 28,000 placements with 185 staff. CHS Healthcare works with 65 Hospitals and offers a variety of services. The services offered by CHS Healthcare can be split into two general groups: hospital discharge services and continuing healthcare services; it is the prior which is the focus of this report. The CHS Healthcare hospital discharge services include:

- care home selection service;
- domiciliary care brokerage;
- discharge to assess;
- care home liaison service;
- hospital admission avoidance schemes;
- winter pressures step-down scheme;

- directly-employed nurse service for CHC checklist.

Based on an overview from the CHS Healthcare website, the Hospital Discharge Schemes offered can be summarised as:

“CHS Healthcare currently provides services for 64 NHS trusts and clinical commissioning groups. We locally recruit teams of a co-ordinator and advisers who deliver the service to meet key performance indicators (KPI) set by the NHS organisation. For home of choice patients, we usually work to a target of: two days to choose a home, three further days to transfer to home (this includes referrals received during a weekend). In discharge to assess, step down and reablement schemes, timescales are even shorter, with transfer from hospital to community bed within 48 hours. This compares with transfer times in many hospitals of 15 to 20 days for home of choice patients.”

(<http://www.chshealthcare.co.uk/services/hospital-discharge-schemes/>)

Since 1996, various CCGs and hospitals have engaged with the CHS Healthcare hospital discharge services. This report uses summary statistics and reports from those that have used the hospital discharge services as part of the aims and objectives, which are described in the next section.

3. Aim and objectives

The aim of this report is to describe and discuss the potential economic benefits from the CHS Healthcare hospital discharge services. The objectives are to:

1. Examine previous CHS Healthcare reports to summarise the potential bed days saved and the associated monetary savings to the NHS; a return on investment ratio is estimated based on these statistics.
2. Use a scoping search of the empirical literature to describe the potential economic benefits associated with hospital discharge services and then to relate these benefits back to the services offered by CHS Healthcare.

Note that this report acts as a supplement to a report previously provided by Steven Ariss (SchARR, University of Sheffield) titled “Report of secondary analysis of interview data: Strengths, Weaknesses, Opportunities and Threats related to CHS Healthcare hospital discharge services”.

Therefore, a third objective is to:

3. Compare the results and discussion points from this report to that report by Steven Ariss to compare and contrast the qualitative results within that report to the results obtained from previous CHS Healthcare reports and the empirical literature.

4. Methods

4.1. CHS Healthcare reports

In order to inform this report, CHS Healthcare have provided ten reports across eight case studies, the results from which are summarised as part of the objectives of this report. The full reports and statistics are presented in the supplementary materials; only summary statistics are presented and discussed within this report, and it is advised that those wanting more details consult the original reports in the supplementary materials.

Note that the original reports used different cost assumptions in regards to the potential cost savings per inpatient bed day. For the purpose of standardising the cost results presented in this report, the cost savings per bed day saved are set at £362; this unit cost is based on the excess bed day cost of elective inpatient stays as outlined with the NHS National Reference costs for 2015/16 ².

Each of these case studies and associated results are based on 'before-and-after' study designs, whereby the potential bed days saved is estimated from comparing DTOC before the CHS Healthcare services were implemented over a particular time horizon with a time period after the CHS Healthcare services were implemented. An overview of these ten reports, described as 'case studies' or an 'overview of case studies', are now described in the subsequent subsections (4.1.1 to 4.1.10).

4.1.1. Case study 1: Dudley Group NHS review of a Care Home Select pilot (October 2013 – January 2014)

A review of the 'Care Home Select' pilot in Dudley Group NHS Trust (21st October 2013 to 21st January 2014). This document reports the success of a CHS Healthcare Care Home Select service which was implemented to relieve winter pressures for the period October 2013 to January 2014, the results of which are compared to the number of bed days at the same time of year but for the year 2012/2013.

4.1.2. Case study 2: Gloucester Hospitals NHS Foundation Trust review of a D2A Pathway 2 pilot (December 2015 – May 2016)

A review and evaluation of the Discharge to Assess (D2A) bed-based service (D2A Pathway 2) for beds located in care homes across all of Gloucester Hospitals NHS Foundation Trust localities (December 2015 to May 2016). The review covers 6 months of activity through D2A beds and provides some early indications of the costs and benefits of the service.

4.1.3. Case study 3: CHS Healthcare Bristol Schemes Review (July 2014 – July 2015)

CHS Healthcare provided services to enable placements within two settings in Bristol: (1) University Hospital Bristol (UHB) Trust (Bristol Royal Infirmary and South Bristol Community Hospital); (2) North Bristol NHS Trust (NBT). The key performance indicators here are based on statistics between July 2014 and July 2015. The statistics reported were based on keeping with key performance indicators (2 days from referral to Home or Package of Choice identification and 5 days from referral to date of discharge) and bed days saved due to the scheme over the 12 month time period.

4.1.4. Case study 4: CHS East Lancashire Hospitals NHS Trust service review (1st March 2014 – 28th February 2015)

Summary statistics of bed days and associated cost savings due to the CHS Healthcare scheme run in East Lancashire Hospitals NHS Trust over 12 months (1st March 2014 to 28th February 2015). Results per month include: number of referrals; number of placements; total days saved; average reduction; total cost of service; bed day savings (assuming £174 per bed day saved); and net savings (total cost of service minus bed day savings).

4.1.5. Case study 5: Wiltshire CCG summary statistics (December 2012 – August 2013)

A pilot evaluation report from the Wiltshire CCG in regards to bed days saved and associated cost saving across 7 hospitals (RUH Bath; GWH Swindon; Salisbury; STARR; Chippenham; Savernake; Warminster) between December 2012 and August 2013. The bed days saved were reported based on Self-Funding (SF) and Fast Track (FT) patients.

4.1.6. Case study 6: Wiltshire CCG summary statistics (December 2014 – June 2015)

Summary statistics of bed days saved across 7 Wiltshire CCG monitored hospitals (RUH Bath; GWH Swindon; Salisbury; STARR; Chippenham; Savernake; Warminster) and a Discharge to Assess (D2A) service over a 7 month time period (December 2014 and June 2015). These appear to be updated statistics for the same service piloted between December 2012 and August 2013, the results from which are described in relation to case study 5. The bed days saved were reported based on Self-Funding (SF) and Fast Track (FT) patients.

4.1.7. Case study 7: Stoke and Stafford summary statistics (January 2015 – August 2015)

Summary statistics of bed days saved in Stoke and Stafford (January 2015 to August 2015) compared to before the CHS scheme commenced (dates unspecified).

4.1.8. Case study 8: Lancashire Teaching Hospitals NHS Foundation Trust (April 2012 – March 2013)

A selection of summary statistics based on the success of the CHS Healthcare service for the Lancashire Teaching Hospitals NHS Foundation Trust that were used as a submission to the Health Service Journal (HSJ) awards. Although a selection of summary statistics were used as part of the entry, the results of interest for the objectives of this report are based on bed days saved and associated cost-savings as reported for the first year of service between April 2012 and March 2013.

4.1.9. Overview of case studies 1: CHS Healthcare business case (five case studies)

A summarised report developed as a business case for the hospital discharge services which is primarily based on bed days saved and associated cost savings across five hospitals (some of these results are repeats of what have been described in relation to the other case studies):

1. University Hospital of North Staffordshire (see also case study 7 focused on ‘Stafford’);
2. Stafford Hospital (see also case study 7 focused on ‘Stafford’);
3. Bristol Royal Infirmary (see also case study 3);
4. Dudley Group of Hospitals (see also case study 1);
5. Royal Preston Hospital (see also case study 8).

4.1.10. Overview of case studies 2: CHS Healthcare executive summary (three case studies)

A report about the hospital discharge management service which summarises aspects such as: services offered; performance expectations; service models; set-up time and costs; evidence of the services’ performance (e.g. speed and quality of service; bed days and cost savings). The document also includes supporting documents for the results presented and a description/presentation of the hospital discharge process and Care Home Select referral process (note, this document is available as a supporting document with the supplementary materials for this report). The case studies are based on the:

1. Dudley Group of Hospitals (see also case study 1) for the bed day and cost savings produced by faster hospital discharge;
2. Lancashire Teaching Hospitals NHS Foundation Trust (see also case study 8) for the reduction in DTOC days and associated cost-savings;
3. Gloucester Hospitals NHS Foundation Trust (see also case study 2) for reduced delays in CHC checklist assessment, the results from which are not the focus of this report and so not described or discussed here.

4.2. Scoping literature review

A scoping review of the literature focused on early discharge services within hospitals was conducted within Google Scholar with a focus on papers published over the past decade (between the years 2007 and 2017). This scoping review utilised the following key terms:

- Services of interest: “early discharge”, “early supported discharge”, “supported discharge”, “transitional care”.
- Settings of interest: “hospital”, “care home”.
- Patient group of interest: “older people”, “elderly”
- Types of analysis of interest: “economic analysis”, “economic evaluation”, “costs”, “bed days”.

The aforementioned terms were used in a variety of combinations to identify any empirical literature that were deemed to be appropriate as part of the objectives of this paper. Journal articles were chosen initially based on the title heading, then the abstract, and then the content of the paper. Journals articles for inclusion in this report were not chosen based on the results of the study (i.e. if they suggested early discharge services were economically beneficial or not). Papers of interest had to focus mainly on the early discharge of older people (aged 65+); however, the service could focus on discharge to any type of community-based service or home (e.g. own home, residential or nursing care home). It was preferred that the early discharge services evaluated did not focus on any one specific health condition (e.g. stroke) and systematic reviews or meta-analyses were preferred over single study focused literature. Key characteristics related to the review or study design, population of interest and results are provided in the Results section and the relevance of these results in relation to the discharge services offered by CHS Healthcare is provided in the Discussion section of this report.

5. Results

5.1. CHS Healthcare running costs

“Because of our experience and training infrastructure, we can start a scheme within just six weeks, including all set-up and recruitment. Our schemes run for a minimum of one year. Costs are £16,000 per month (for up to 20 placements a month) to £26,000 per month for higher numbers of placements” (this quote comes from the document titled ‘Overview of case studies 2’ as described in the next section)

The report quoted above suggests that with a minimum running time of one year, the cost of the CHS hospital discharge service is a minimum of £192,000 per year based on up to 20 placements per month (240 placements per year). Based on this report the costs could be up to £312,000 per year

for a high number of placements; however, this figure does not specify an upper amount number of placements for this cost. Although the case studies do not always describe the running cost of the service or do not describe the running cost as the above amount, for descriptive purposes and exploratory analysis the aforementioned costs per month are used and assumed to be constant as part of an exploratory analysis described within section 5.3 (the implications of this is included as a point for discussion within the Discussion section).

5.2. Key results by case study

5.2.1. Case study 1: Dudley Group NHS review of a Care Home Select pilot (October 2013 – January 2014)

A CHS Healthcare Care Home Select service ran for four months (October 2013 to January 2014). It is reported that the pilot saved 995 bed days, with a 29% reduction in DTOC days compared to an equivalent audit for 2012/2013. Based on a standardised per bed day cost saving of £362, the cost savings are approximately £360,190 (the original report assumed an average bed day cost of £220 over the 3 month pilot period and calculated a total cost saving of £218,900; also note, there is a calculation error in the original report which suggested the total savings were £220,890, not £218,900). The CCG also estimated some extra costs associated with having to fund care home placements due to the success of the pilot over the service period, which equated to £53,000 (two weeks within a care home for 53 placements) which was an additional cost of the service in this case.

5.2.2. Case study 2: Gloucester Hospitals NHS Foundation Trust review of a D2A Pathway 2 pilot (December 2015 – May 2016)

A Discharge to Assessment (D2A) service ran as pilot in Gloucestershire localities for a six month period (December 2015 to May 2016). The evaluation reported early statistics in order to inform the possibility of a long term model of care. The report suggested the results were inconclusive because it was hard to associate outcomes directly with the D2A service; however, the report suggested that the annual cost of the D2A service per patient for placements (not including cost of assessments) averaged £2,930 per patient (based on an annual cost of £1,677,200 which included 50 Care Home Assessment Beds and the placement/assessment services provided by CHS). Although the report attempted to produce some evaluation of benefits from the pilot, the results were inconclusive and the main result pertinent to the objectives of this report related to potential benefit was a suggestion that “it is likely that in the absence of D2A the numbers awaiting assessment in acute hospital beds would have been higher”. It is also important to note that the report suggested that “The cost-effectiveness of commissioning this additional capacity [in reference to the care home beds] is difficult to quantify”.

5.2.3. Case study 3: CHS Healthcare Bristol Schemes Review (July 2014 – July 2015)

The key performance indicators here are based on statistics between July 2014 and July 2015 based on the CHS Scheme in two settings within Bristol (UHB and NHT). The results suggest that over the 12 month period, the CHS scheme was achieving its performance indicators with a median of 2 days from referral to Home of Choice decision (the scheme sets out to achieve 2 days from referral to Home or Package of Choice identification) and a median of 5 days from referral to discharge (the scheme sets out to achieve 5 days from referral to date of discharge). Between the periods of January 2014 to April 2014 based on case studies within the UHB setting, it was estimated that the scheme saved a total of 853 bed days over the four month period. Per month, this equates to 213 bed days saved and associated savings of £77,197 (assuming a per bed day saving of £362). Based on these results, the report projected annual bed day savings of 2796 days (233 days per month) – note that this projection was based on 20 placements per month at UHB and a variance of 11.7 days per client. For the sake of this report, when assuming a cost of £362 per bed day cost saving (NHS reference costs 2015/17) this works out at an annual bed day saving of £1,012,152 (or £84,346 per month).

5.2.4. Case study 4: CHS East Lancashire Hospitals NHS Trust service review (1st March 2014 – 28th February 2015)

The report suggested that over the 12 months of service, there were 577 placements (667 referrals) which resulted in 6432 bed days saved at a service cost of £401,880. Therefore on average per month, there were 56 referrals and 48 placements. The total number of bed days saved was estimated to be on average 536 days per month (assuming per service average length of delay as 16.2 days; the average reduction in DTOC was estimated to be 11 days per month). The average monthly cost of the service was £33,940 (dependent on number of placements) and the average bed day cost savings were estimated to be £194,032 per month (assuming a per day bed savings of £362); therefore, the average net savings per month were estimated to be £160,542 or £3,345 per placement per month.

5.2.5. Case study 5: Wiltshire CCG summary statistics (December 2012 – August 2013)

The report suggests that over the 9 month time period, across all seven hospitals, there was a total saving of 844 bed days for self-funded (SF) patients. The suggestion within the report is that there is a £800 cost saving per bed day; however, this is more than twice the cost suggested in the NHS reference costs. Therefore assuming a £362 per bed day cost saving, the estimated total cost savings were £305,528 associated with SF patient (the cost saving estimate in the Wiltshire CCG evaluation

report is £675,200). The report also describes the bed days saved for Fast Track (FT) patients, which was estimated to be 207.86 days across all seven hospitals for the 9 month time period (this is based on an assumed average discharge time of 6.38 days). Therefore, assuming a £362 bed day cost saving, the estimated total cost savings was £75,245 for Fast Track Patients (the report describes cost-savings of £166,288 when based on an assumed per bed day cost-saving of £800). Over the 9 month period, the fixed fee for the service was reported to be £216,000 (9 months at £24,000 per month) for both general and fast track patients; therefore the estimated net savings was £164,773 for the 9 months across all seven hospitals (or £18,308 per month; or £2,615 per hospital, per month). Note, the original report presents the actual costs of placements by home which should be consulted; however, these costs could not be disentangled with the bed day savings to produce any meaningful results as part of the objectives of this report, therefore please consult the report directly to assess these separate results.

5.2.6. Case study 6: Wiltshire CCG summary statistics (December 2014 – June 2015)

The report suggested that over the 7 month time period, across all seven hospitals and the D2A service, there was a total saving of 1787 bed days for self-funded (SF) and Fast Track (FT) patients. The cost estimations in this report are more detailed and complex than the cost estimations for the 2012/13 report (case study 5). The 1787 bed days saved were broken down across acute care (899 bed days at an assumed £212.93 per bed day cost), community care (263 bed days at an assumed £170 per bed day cost) and STARR/ICB/DTA (625 bed days at an assumed £927.29 per bed day cost). Due to the more complex nature of the assumptions and a lack of references to update these cost estimates, the cost savings reported here are based on this estimates provided within the report. For the 7 month time period across all 7 hospitals and the D2A service, the total estimated cost savings were £296,940. Over the 7 month period, the fixed fee for the service was reported to be £157,500 (7 months at £22,500 per month) for both general and fast track patients; therefore, the net savings were reported to be £139,440 (or £19,914 per month). The median days from referral to placement across the entire scheme was reported to be 3 days, which was within the 5 days contracted. Note, the costs per month for placements per month are presented in the original report, but could not be linked directly to bed days saved and so are not reported as part of the objectives of this report.

5.2.7. Case study 7: Stoke and Stafford summary statistics (January 2015 – August 2015)

The summary statistics suggested that over a 8 month period, the CHS service resulted in 868 bed days saved in Stoke (the median number of days to placement before the CHS service was 11 days for home of choice patients) and 1796.5 days in Stafford (the median number of days to placement before the CHS service was 16 days for home of choice patients). Based on an assumed cost saved

per bed day of £362, the cost savings over the 8 month period was estimated to be £314,216 in Stoke (£26,185 per month) and £650,333 in Stafford (£54,194 per month). In Stoke the total number of placements per month only once went above 20 (to 21 placements); thus, assuming the cost per month was still no more than £16,000 per month (thus £128,000 for the 8 months), the total net savings are estimated to be £186,216 (or £10,185 per month). In Stafford, 4 out of the 8 months involved more than 20 placements (24, 21, 27, and 29). Assuming the higher cost of £26,000 per month was applied to these months and £16,000 per month for the cost of service for the other months, the total cost would have been £168,000, resulting in a net saving of £482,333 (or £40,194 per month).

5.2.8. Case study 8: Lancashire Teaching Hospitals NHS Foundation Trust (April 2012 – March 2013)

The report and summary statistics for the 12 month period (April 2012 to March 2013) suggests that the CHS service saved 5,203 bed days with an average reduction in DTOC of 6.88 relative to the previous year. Based on an assumed cost saved per bed day of £362 (NHS Reference costs 2015/16), the cost savings over the 8 month period could be estimated to be £1,883,486 from the NHS perspective (the report used an assumed cost saved per bed day of £174 and reported potential savings of £905,322). The total number of patients placed during this 12 month period was 567 placements, averaging 47.25 placements per month; however, due to the aggregated results and lack of information in regards to the cost of the service during this period, is difficult to assess the net savings of the service over this time period. If it is assumed that the maximum assumed cost of £26,000 per month (£312,000) for the service was applied here, then the net savings from the service could be estimated to be £1,571,486 for the 12 months of service (or £130,957 per month).

5.2.9. Overview of case studies 1: CHS Healthcare business case (five case studies)

This overview presented key statistics from select case studies focused on: DTOC based on five case studies; and a cost-benefit analysis (bed days saved and associated cost savings) for three case studies. Across the five case studies, the CHS scheme reduced the average number of DTOC days from between 7 days (from a baseline of 15.4 days for Dudley Group of Hospitals) to 4.5 days (from a baseline of 11 days for the University Hospital of North Staffordshire); the biggest change was from a baseline of 17.3 days to 5.9 days with the CHS service, which is a reduction of 11.4 DTOC days at the Bristol Royal Infirmary. For the cost-benefit analysis in this business case there was an assumed per bed cost of £220 per day, which is altered to £362 per day (NHS reference cost 2016/17) for consistency within this report. Therefore, the net savings per month ranged from £57,734 (Bristol) to

£77,448 (Dudley); the summary results from these case studies with updated costs are presented in Table 1.

Table 1: Summary results from three case studies

	Bed days saved	Cost per bed day*	Overall savings	Cost of service reported	Net savings	No. months of services	Net savings per month
Dudley ¹	995	£362	£360190	£50,400	£309,790	4	£77,448
Bristol ²	853	£362	£308786	£77,850	£230,936	4	£57,734
Stafford ³	1796	£362	£650152	£125,400	£524,752	8	£65,594

¹ Dudley group of Hospitals (Oct 2013 – Jan 2014); ² North Bristol Infirmary (Jan 2014 – Apr 2014); ³ Stafford Hospital (Jan 2015 – Aug 2015).

*NHS reference cost for an excess elective bed day (2015/16)²

5.2.10. Overview of case studies 2: CHS Healthcare executive summary (three case studies)

To indicate the business case for the CHS services, this document describes high level statistics to fit its purpose of rationalising the use of the service. The document highlights the average reduction in bed days from 21.4 days to 7 days in the Dudley Group of Hospitals, resulting in 995 bed days saved over three months and an overall saving of £220,890 at a service cost of £50,400 during this time period (updated costs for this case study are reported as part of the results for case study 1 in this report). The document also highlights the reduction in DTOC's from 16.2 to 5 days in the Lancashire Teaching Hospital NHS Foundation Trust, which is suggested to have resulted in a “cash-releasing saving” of £150,000 (updated costs for this case study are reported as part of the results for case study 8 in this report). The document also presents some other results in relation to reducing delays in CHC checklist assessment, which can viewed in the original document as part of the supplementary materials of this report, but the results of which are not described as part of the objectives of this report.

5.3. Summary results: bed days saved, cost savings and cost of service

Within section 5.2. of this report, there has been a brief description of results for each of the 8 case studies and 2 overviews of case studies. Each of these reports have described different cost assumptions and different types of results in different ways, often focussing on the overall cost and savings over different time periods. Within this section, each of these results are summarised and standardised to provide an overview of key results from all of the case studies; the focus here is on the average cost and savings per month, and associated return on investment ratio (see also Table 2); but it is worth noting that the interpretation of these results has limitations (e.g. the cost-savings are dependent on number of placements, but number of placement has not always been described).

The implications when interpreting the generalisability of these results is included in the Discussion section.

A key result to note is that across each of the case studies, the CHS Healthcare hospital discharge services have resulted in positive net savings over the service period and on average per month (where net saving is the assumed cost of DTOC relative to the cost of the service). The lowest per month net savings were estimated in Wiltshire (case study 5) which was £18,314; the largest average net saving per month was £160,092 in East Lancashire (case study 4). The largest average net savings per month were observed in the two case studies focused on the largest geographical areas (and therefore, presumably, the higher number of placements required per month): East Lancashire (£160,542) and Lancashire (£130,957; however, this is based on an assumed cost of service per month). Across all the case studies, this resulted in an average net saving of £75,453 per month; which on the basis of a return on investment ratio, was estimated to be £1:£3.56 (i.e. for every pound [£] spent on the service, £3.56 was seen as a return on this investment due to the estimated bed day cost savings). The standard error of the mean (SEM) for this estimated return on investment of £1:£3.56 was estimated to be 0.61; that is, the return on investment estimated for each of the case studies deviates by approximately £0.61 from the return on investment of £1:£3.56 across the case studies (the estimated return on investment by case study is presented in Table 2).

Table 2: Summary results based on evidence from 8 case studies and subsequent estimates of net savings per month

Case study (Overview) No.)	Place	^No. months of service	Standardised NHS cost (saving) per bed day*~	Service period ^~				Per month ~				
				Bed days saved	Bed days saving (£)	Cost of service (£)	Net savings (£)	Bed days saved	Bed days saving (£)	Cost of service (£)	Net savings (£)	Return on investment (£1: £X)
1 (1 [#])	Dudley	<u>4</u>	<i>£362</i>	<u>995</u>	£360,190	<u>£50,400</u>	£309,790	249	£90,048	£12,600	£77,448	£1:£6.15
2	Gloucester	<u>6</u>	<i>£362</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3 (1 [#])	Bristol	<u>4</u>	<i>£362</i>	<u>853</u>	£308,786	<u>£77,850</u>	£230,936	213	£77,197	£19,463	£57,734	£1:£2.97
4	East Lancashire	<u>12</u>	<i>£362</i>	<u>6432</u>	£2,328,384	<u>£401,880</u>	£1,926,504	536	£194,032	£33,490	£160,542	£1:£4.79
5	Wiltshire	<u>9</u>	<i>£362</i>	<u>1052</u>	£380,824	<u>£216,000</u>	£164,824	117	£42,314	£24,000	£18,314	£1:£0.76
6	Wiltshire	<u>7</u>	<i>£362</i>	<u>1784</u>	£645,808	<u>£157,500</u>	£488,308	255	£92,258	£22,500	£69,758	£1:£3.10
7	Stoke	<u>8</u>	<i>£362</i>	<u>868</u>	£314,216	£128,000	£186,216	109	£39,277	<i>£16,000</i>	£23,277	£1:£1.45
7 (1 [#])	Stafford	<u>8</u>	<i>£362</i>	<u>1796</u>	£650,152	<u>£125,400</u>	£524,752	225	£81,269	£15,675	£65,594	£1:£4.18
8	Lancashire	<u>12</u>	<i>£362</i>	<u>5203</u>	£1,883,486	£312,000	£1,571,486	434	£156,957	<i>£26,000</i>	£130,957	£1:£5.04
	Average (SEM)							267 (49)	£96,669 (17,696)	£21,216 (2,230)	£75,453 (16,180)	£1:£3.56 (0.61)

Footnote. SEM = standard error of the mean (how much the sample mean from the case studies deviates from the actual mean [average] across the case studies). Net-saving in this case is defined as the estimated 'Bed day savings' minus 'cost per service', the results for which are presented for the period the service was implanted in the case study and disaggregated to a 'per month' estimate. The return on investment is calculated as the ratio of net profit from 'bed day savings' relative to 'cost of service' per month e.g. if bed day savings were estimated to be £96,669 and the cost of service was £21,216 (per month), for every £1 spent the return on investment (associated net savings) is estimated to be £3.56 (i.e. £1:£3.56).

~All figures presented that are underlined are results presented within the original reports; all figures with no format change (i.e. not in *italics* or underlined) are estimated based on the other figures provided within the reports or on cost assumptions; all figures that are in *italics* are based on an assumption (in this case, the cost per bed day and it the assumed service cost per month which could be either: (i) £16,000 assuming no more than 20 placements per month; (ii) £26,000 if it was assumed there was more than 20 placement per month).

Note that the 'bed days saved' and 'cost of service' estimates for these case studies are from the "Overview of Case Studies 1" report and not from the original case study report.

*NHS reference cost for an excess elective inpatient bed day (2015/16)²

5.4. Exploratory results: cost-neutrality and the potential to achieve net savings

An issue with the results presented in section 5.2 and the summary results presented in section 5.3 is that the number of placements is not always described and therefore focussing on the potential savings per placement has been difficult. In this section, based on an assumed fixed cost for service, it is possible to explore the required number of bed days by which DTOC would have to be reduced in order to achieve cost-neutrality (that is, the assumed cost of service is equal to the assumed cost savings by reducing inpatient bed days). The potential to achieve cost-neutrality is the first step to achieving cost-savings and is a point where positive outcomes (such as patient satisfaction with the service) may become to focus for decision makers assuming the cost of the service achieves cost-neutrality. Table 3 shows the required number of bed days saved per placement for cost-neutrality assuming that for up to 20 placements the cost is fixed at £16,000; Table 4 shows the required number of bed days saved per placement for cost neutrality assuming that for more than 20 placements (up to 40 placements) the cost is fixed at £26,000. Although the cost per service may change and the assumed savings per bed day may also change, this exploratory analysis is an example of the type of goals the service would have to achieve to reach cost-neutrality under the aforementioned cost assumptions.

Focussing first on the cost for service up to 20 placements, it is apparent how the CHS Healthcare Hospital Discharge service is able to achieve positive net savings. When working at full capacity before a service cost increase (20 placements per month), the service only has to reduce DTOC by 2.21 days per placement to achieve cost-neutrality. Even at half capacity (10 placements per month), the service only has to reduce DTOC by 4.42 days per placement to achieve cost-neutrality. It is also worth noting that the cost associated with DTOC is cumulative across patients, therefore if the service managed to reduce DTOC by 11 days for one person, this is the equivalent to reducing DTOC by 2.25 days for four people to achieve cost-neutrality, as an example.

Relating back to a result in section 5.3 which suggested that the larger number of placements was associated with the potential for higher net-savings (dependent on the business model for implementing these service within localities) which saw the highest net-savings in East Lancashire (£160,542 per month); the results in Table 4 indicate how cost-neutrality can be achieved by utilising the placements at this higher cost per service (£16,000 versus £26,000). However, note that this analysis is exploratory and CHS Healthcare does not explicitly suggest it would provide a service for up to 40 placements at a cost of £26,000. In fact, the average cost per month in the East Lancashire case study (case study 4) was estimated to be £33,490 (£401,880 for the year) for an estimated 48 placements per month (a total of 577 placements were reported for the year). Therefore, this should be accounted for before using the results in Table 3 and Table 4 for practical decision making purposes.

Table 3: Required bed days saved per placement for cost neutrality (cost of service = cost savings; up to 20 placements per month)

Placements per month	Cost of service (up to 20 placements)	Cost per placement	Cost saving per bed day	Required bed days saved per placement for cost neutrality*
20	£16,000	£800	£362	2.21
19	£16,000	£842	£362	2.33
18	£16,000	£889	£362	2.46
17	£16,000	£941	£362	2.60
16	£16,000	£1,000	£362	2.76
15	£16,000	£1,067	£362	2.95
14	£16,000	£1,143	£362	3.16
13	£16,000	£1,231	£362	3.40
12	£16,000	£1,333	£362	3.68
11	£16,000	£1,455	£362	4.02
10	£16,000	£1,600	£362	4.42
9	£16,000	£1,778	£362	4.91
8	£16,000	£2,000	£362	5.52
7	£16,000	£2,286	£362	6.31
6	£16,000	£2,667	£362	7.37
5	£16,000	£3,200	£362	8.84
4	£16,000	£4,000	£362	11.05
3	£16,000	£5,333	£362	14.73
2	£16,000	£8,000	£362	22.10
1	£16,000	£16,000	£362	44.20

Table 4: Required bed days saved per placement for cost neutrality (cost of service = cost savings; 21 to 40 placements per month)

Placements per month	Cost per service (up to 20 placements)	Cost per placement	Cost saving per bed day	Required bed days saved per placement for cost neutrality*
40	£26,000	£650	£362	1.80
39	£26,000	£667	£362	1.84
38	£26,000	£684	£362	1.89
37	£26,000	£703	£362	1.94
36	£26,000	£722	£362	2.00
35	£26,000	£743	£362	2.05
34	£26,000	£765	£362	2.11
33	£26,000	£788	£362	2.18
32	£26,000	£813	£362	2.24
31	£26,000	£839	£362	2.32
30	£26,000	£867	£362	2.39
29	£26,000	£897	£362	2.48
28	£26,000	£929	£362	2.57
27	£26,000	£963	£362	2.66
26	£26,000	£1,000	£362	2.76
25	£26,000	£1,040	£362	2.87
24	£26,000	£1,083	£362	2.99
23	£26,000	£1,130	£362	3.12
22	£26,000	£1,182	£362	3.26
21	£26,000	£1,238	£362	3.42

5.5. Overview of results from the empirical literature

The scoping search of the empirical literature produced five key themes which focused on the care pathway from hospital to discharge and back into the community (including a move [back] into care homes). These five themes focused on: models of care for older people; transitional care; hospital discharge planning; avoiding hospital readmissions; and, older peoples' perception of their readiness for discharge (i.e. if the patient felt ready to be discharged). Another key theme was focused on the use of hospital-at-home services which is not directly relevant to the objectives of this report because the CHS Healthcare hospital discharge services only focus on the discharge aspect of the care pathway; however, this aspect of post-discharge care will be discussed because it is an aspect for consideration when integrating the CHS Healthcare hospital discharge services into the wider NHS care system. Within this section, the focus is on these five key themes which should be taken into account when discussing the potential economic benefit of the CHS Health hospital discharge services and aspects to consider from an NHS, commissioner and patient perspective. This section discusses key results from the empirical literature as part of these themes; the relevance of these results in relation to the CHS Healthcare discharge services is discussed in the Discussion section of this report.

5.5.1. Models of care for older people

Enabling and supporting hospital discharge is a complex care pathway to assess. Models of care for older people have tended to recognise that older people are high resource users of care services, and require a variety of care service which includes costly hospital services and a high reliance on primary care. A paper which is part titled "Successful models of comprehensive care for older adults with chronic conditions" – described as part of the evidence for the "Retooling for an Aging America" report in North America – identified fifteen "successful" model of care for this population group:

"Nine of these models are based on interdisciplinary primary care (Model A) or supplemental health-related services that enhance traditional primary care (Models B–I). Three models address the challenges that accompany care transitions, including one that facilitates transitions from hospital to home (Model J) and two that provide acute care in patients' homes in lieu of hospital care (Model K) or after brief hospital care (Model L). This literature search also revealed successful models of care for residents of nursing homes (Model M) and for patients in acute care hospitals (Models N and O)." (Boult et al. ³; pp. 2329 – 2330)

Of these fifteen models of care, discharge services directly played an important part in two of the models of care: transitional care (Model J) and early-discharge hospital-at-home (Model L) services. A summary of these respective services are:

Transitional Care: “Most interventions in transitional care are designed to facilitate smoother, safer, and more-efficient transitions from hospital to the next site of care (another healthcare setting or home).”

Early-discharge hospital-at-home (HaH): ““Early discharge” models of HaH provide acute care in the home after a brief hospitalization. In early-discharge HaH models, after a patient’s medical condition has stabilized in the hospital, the patient returns home and is treated there by a HaH team consisting chiefly of nurses, technicians, and rehabilitative therapists.”

Within the report, it is stated that based on empirical evidence “Transitional care is clearly capable of reducing hospital readmission rates and costs ⁴⁻⁶” and “[Early discharge HaH] programs have demonstrated the potential to reduce inpatient utilization ⁷⁻²²”. The report and its web-supplements constitute a catalogue of the positive studies of 15 successful care models for older people with chronic conditions. Each of these models provide comprehensive health care for older patients and was deemed successful within the report, because at least one high-quality study reported that at least one version of the model is capable of improving the quality, outcomes, or efficiency of care (compared with “usual care”).

5.5.2. Transitional care

Naylor and Keating ²³ suggest that “Transitional care encompasses a broad range of services and environments designed to promote the safe and timely passage of patients between levels of health care and across care settings” (pp. 65). Naylor and Keating ²³ focused on the engagement of family carers in the transitional care process and suggested that “The available evidence suggests that nurses play pivotal roles in ensuring that successful care transitions occur.”, while suggesting that more evidence is needed to suggest what expert guidance was needed to ensure appropriate transitional care is in place for patients (e.g. family care-givers, social workers, and joint nurse and social worker teams).

Renneke, et al. ²⁴ performed a systematic review focused on “Hospital-Initiated Transitional Care Interventions as a Patient Safety Strategy” addressed the effectiveness of hospital-initiated care transition strategies aimed at preventing clinical adverse events (AEs), emergency department (ED) visits, and readmissions after discharge in general medical patients (focused on papers published between January 1990 and September 2012). In general the evidence was scant, and most studies did not report intervention context, implementation, or cost. The overall conclusion was that the strategies which hospitals should implement to improve patient safety at hospital discharge remain unclear. The review also suggested that only a limited number of bridging interventions involving a

dedicated transitional care provider seems to reduce readmissions and ED visits after hospital discharge to home.

A paper by Kripalani, et al.²⁵ performed a review of key issues in regards to promoting effective transitions of care at hospital discharge. The paper outlined the following:

“The period following discharge from the hospital is a vulnerable time for patients. About half of adults experience a medical error after hospital discharge, and 19%-23% suffer an adverse event, most commonly an adverse drug event. This article reviews several important challenges to providing high-quality care as patients leave the hospital. These include the discontinuity between hospitalists and primary care physicians, changes to the medication regimen, new self-care responsibilities that may stress available resources, and complex discharge instructions. We also discuss approaches to promoting more effective transitions of care, including improvements in communication between inpatient and outpatient physicians, effective reconciliation of prescribed medication regimens, adequate education of patients about medication use, closer medical follow-up, engagement with social support systems, and greater clarity in physician–patient communication.” (Kripalani, et al.²⁵; pp. 314)

Kripalani, et al.²⁵ highlighted key aspects which should be accounted for within a transitional care program. They concluded that:

“Hospitalists and other inpatient providers should not view discharge as an end to their obligation to patients but rather should attempt to promote a safe and efficient transition of care. Hospitalists can play an important role in bridging the gap between inpatient and outpatient care through appropriate discharge planning and effective communication with patients, their family members, and outpatient physicians.” (Kripalani, et al.²⁵; pp. 320)

Kripalani, et al.²⁵ highlights the need for appropriate transitional care planning, particularly at the point of discharge and thereafter to ensure the patient is cared for appropriately.

LaMantia, et al.²⁶ conducted a systematic review of interventions to improve transitional care between nursing homes and hospitals. The systematic review was conducted to identify and evaluate interventions to improve communication of accurate and appropriate medication lists and advance directives for elderly patients who transition between nursing homes and hospitals (published papers were searched from inception to June 2008). Five studies ultimately met all inclusion criteria. The study results indicated that a standardized patient transfer form may assist with the communication of advance directives and medication lists and that pharmacist-led review of medication lists may help identify omitted or indicated medications on transfer. The suggestion by the authors was that

preliminary evidence supports adoption of these methods to improve transitions between nursing home and hospital; however the review provided very little evidence in regards to the actual economic or patient quality of life benefits from the transfer of such information.

Naylor, et al.²⁷ performed a systematic review to assess and describe the importance of transitional care for achieving health reform (in reference to the USA's Affordable Care Act of 2010). They suggested that a variety of transitional care programs and services have been established to improve quality and reduce costs, by helping hospitalized patients with complex chronic condition transfer in a safe and timely manner from one level of care to another or from one type of care setting to another. The systematic review summarised 21 randomised controlled trials (RCTs) of transitional care programs focused on adults (not just older people). Many of the successful interventions (those that reduced readmission within 30 days of discharge) shared similar features, such as assigning a nurse as the clinical manager or leader of care and including in-person home visits to discharged patients. The interventions identified across the 21 studies included comprehensive discharge planning and follow-up with (four studies) or without (three studies) home visit, disease or case management (four studies), coaching (two studies), education or psychoeducation (two studies), peer support (two studies), telehealth facilitation (one study), mobile crisis (one study), post-discharge geriatric assessment (one study), or intensive primary care (one study). The economic benefits and effect of quality of life of such transitional care programs were unclear; however, they concluded that there was evidence which suggested that properly established transitional care plans could potentially be beneficial in relation to reducing readmission rates (please refer to the paper by Naylor, et al.²⁷ directly for more information in regards to the individual transitional care interventions assessed).

5.5.3. Hospital discharge planning

Hospital discharge planning has been identified as a key aspect for consideration not only as part of the whole transitional care pathway but on its own merit for improving outcomes for patients and potential economic returns. Shepperd, et al.²⁸ states that; "Discharge planning is a routine feature of health systems in many countries. The aim of discharge planning is to reduce hospital length of stay and unplanned readmission to hospital, and improve the co-ordination of services following discharge from hospital."

Shepperd, et al.²⁸ updated a systematic review focused on determining the effectiveness of planning the discharge of patients moving from hospitals. The selection criteria was focused on randomised controlled trials (RCTs) that compared an individualised discharge plan with routine discharge care that was not tailored to the individual patient (participants were hospital inpatients). Twenty-one RCTs (7234 patients) were included in the review; ten of which were identified in the updated

review. Fourteen trials recruited patients with a medical condition (4509 patients), four recruited patients with a mix of medical and surgical conditions (2225 patients), one recruited patients from a psychiatric hospital (343 patients), one from both a psychiatric hospital and from a general hospital (97 patients), and the final trial recruited patients admitted to hospital following a fall (60 patients). Hospital length of stay and readmissions to hospital were significantly reduced for patients allocated to discharge planning (mean difference length of stay -0.91, 95% CI -1.55 to -0.27, 10 trials; readmission rates RR 0.85, 95% CI 0.74 to 0.97, 11 trials). For elderly patients with a medical condition (usually heart failure) there was insufficient evidence for a difference in mortality (RR 1.04, 95% CI 0.74 to 1.46, four trials) or being discharged from hospital to home (RR 1.03, 95%CI 0.93 to 1.14, two trials). In three trials patients allocated to discharge planning reported increased satisfaction. There was little evidence on overall healthcare costs. Shepperd, et al.²⁸ overall conclusions were that the evidence suggests that a structured discharge plan tailored to the individual patient probably brings about small reductions in hospital length of stay and readmission rates for older people admitted to hospital with a medical condition. The impact of discharge planning on mortality, health outcomes and cost remains uncertain.

Preyde, et al.²⁹ performed a meta-analysis focused on discharge planning from hospital to home for elderly patients. In this systematic review (focused on papers published between 1995 and 2005), randomized, controlled or quasi- experimental trials of discharge planning from hospital to home of patients aged 65 years or older were examined; 25 trials were included in the final review. Outcomes were assessed in relation to discharge planning effect of hospital outcomes (length of stay; hospital readmissions; hospital-based costs; community-based costs), patient outcomes (mortality; quality of life and well-being), functional status, and patient satisfaction. Large effects were noted for patient satisfaction, while moderate effects were evident for patients' quality of life and readmission rates. No strong effects were noted for any one type of discharge planning technique, patient characteristic, or quality assessment rating. In terms of study quality, inadequate reporting of methods and outcome data was evident in a considerable number of trials which restricted the ability to make overall conclusions as part of this meta-analysis.

Hickman, et al.³⁰ conducted a literature review focused on best practice interventions to improve the management of older people in acute care settings (papers were sourced between 1985 and 2006); 26 controlled trials met the search criteria. One of the four identified elements of interventions which appear critical in providing optimal health outcomes for older people admitted to acute care was an increased emphasis on discharge planning. The key concepts presented within the theme 'Increased emphasis on discharge planning' argue for an emphasis on early comprehensive discharge planning, preferably in a ward, configured to meet the needs of older

people and placing an emphasis on improving care before discharge, early rehabilitation and nursing involvement in the discharge planning programs.

Bauer, et al.³¹ reviewed the evidence around hospital discharge planning for frail older people and their families, and if the best possible practice is being delivered (papers were sourced between 1995 and 2007). The main results suggested that numerous factors impact on the hospital discharge planning of the frail older person and their family carer's, which when categorised focus on: the role that discharge planning plays in bridging the gap between the care provided in hospital and the care needed in the community; its potential to reduce the length of hospital stay; the impact of the discharge process on family carer's; and the need for a coordinated health professional approach that includes dissemination of information, clear communication and active support. The authors concluded that the current evidence indicates that hospital discharge planning for frail older people can be improved if interventions address family inclusion and education, communication between health care workers and family, interdisciplinary communication and ongoing support after discharge. Interventions should also commence well before discharge.

Mistiaen, et al.³² performed a systematic meta-review assessing interventions focused on reducing problems in adult patients discharged from hospital to home (papers were sourced between 1994 and 2004). Fifteen systematic reviews met the inclusion criteria for the systematic meta-analysis. Their overall results suggested that although a statistically significant effect was occasionally found, most review authors reached no firm conclusions that the discharge interventions they studied were effective. They found limited evidence that some interventions may improve knowledge of patients, may help in keeping patients at home or may reduce readmissions to hospital. Interventions that combine discharge planning and discharge support tend to lead to the greatest effects. There is little evidence that discharge interventions have an impact on length of stay, discharge destination or dependency at discharge. The authors also found no evidence that discharge interventions have a positive impact on the physical status of patients after discharge, on health care use after discharge, or on costs. They concluded that based on fifteen high quality systematic reviews, that there is some evidence that some interventions may have a positive impact, particularly those with educational components and those that combine pre-discharge and post-discharge interventions. However, on the whole there is only limited summarized evidence that discharge planning and discharge support interventions have a positive impact on patient status at hospital discharge, on patient functioning after discharge, on health care use after discharge, or on costs.

Greenwald, et al.³³ performed a review of the hospital discharge process as a 'high risk care transition' which highlighted aspects which could be reengineered to improve outcomes. The authors suggested that hospital discharge is a handoff, ripe embedded with structural risks and hazards that

can result in passive or active failures among ‘sharp end’ providers. The authors suggest these failures can result in medical errors and an array of post-discharge adverse events; however, these post-discharge-related adverse events and re-hospitalisations could be reduced through interventions at the time of hospital discharge. The article reviewed the modifiable components of the hospital discharge process related to adverse events and re-hospitalisations, including those relating to the characteristics of the hospital, patient, and clinician. Using multimethod analysis, the authors described the principles thought to be important to the discharge process and described a set of 11 discrete and mutually reinforcing components that they believe should be consistently part of every hospital discharge. These 11 components included (note, the following are summarised headings for the components): (1) Educate the patient about their diagnoses throughout their hospital stay; (2) Make appointments for clinician follow-up and post-discharge testing; (3) Discuss with the patient any tests or studies that have been completed in the hospital and discuss who will be responsible for following up the results; (4) Organize post-discharge services; (5) Confirm the medication plan; (6) Reconcile the discharge plan with national guidelines and critical pathways; (7) Review the appropriate steps on what to do if a problem arises; (8) Expedited transmission of the discharge summary to the physicians (and other services such as the visiting nurses) accepting responsibility for the patients care after discharge; (9) Assess the degree of understanding by asking them to explain in their own words the details of the plan; (10) Give the patient a written discharge plan at the time of discharge; (11) Telephone reinforcement of the discharge plan and problem solving 2 to 3 days after discharge.

5.5.4. Avoiding hospital readmissions

A key outcome that has emerged throughout the models of care for older people, transitional care and discharge planning is the need to ensure the avoidance of readmissions, particularly within the first 30 days post-discharge.

Konetzka, et al.³⁴ reviewed evidence from 55 peer-reviewed articles to suggest how it might be possible to reduce hospitalisations from long-term care settings, with a particular focus on care for older people. The authors suggested that the interventions showing the strongest potential for reducing hospitalisations were those that improve the hospital-to-home transition; substitute home health care for selected hospital admissions; and increase skilled staffing, especially through physician assistants and nurse practitioners.

Hansen, et al.³⁵ conducted a systematic review of interventions to reduce readmission within 30 days of discharge (papers were sourced based on publication between 1975 and 2011). Overall, 43 articles were identified, and a taxonomy was developed to categorize interventions into 3 domains that encompassed 12 distinct activities: (1) Pre-discharge interventions – included patient education,

medication reconciliation, discharge planning, and scheduling of a follow-up appointment before discharge; (2) Post-discharge interventions – included follow-up telephone calls, patient activated hotlines, timely communication with ambulatory providers, timely ambulatory provider follow-up, and post-discharge home visits; (3) Bridging interventions – included transition coaches, physician continuity across the inpatient and outpatient setting, and patient centred discharge instruction. The authors concluded that no single intervention implemented alone was regularly associated with reduced risk for 30-day rehospitalisation.

5.5.5. Older peoples' perception of their readiness for discharge

A single paper was identified focused on the concept of older people's perception of their readiness for discharge and post-discharge use of community support and services; however, the focus and results seemed pertinent to the objectives of this paper and aligned with the results outlined in other papers identified as part of the scoping review.

Coffey and McCarthy³⁶ aimed to examine older patients' perception of their readiness for discharge from hospital to home and use of community supports post-discharge, including readmission. The authors suggested that early discharge leaves little time for older people, families and professionals to prepare. The perspectives of patients are essential to therapeutic caring; however, few studies have examined patient's perception of their readiness for discharge.

“Older people can feel excluded from discharge planning and process owing to lack of involvement (Proctor et al., 2001; Roberts, 2002; Effraimsson et al., 2003; Grimmer et al., 2004; Huby et al., 2004; Janlov et al., 2006). Alternatively, effective preparation for discharge is linked to patient satisfaction (Bull et al., 2000), emotional comfort (Driscoll, 2000), increased understanding of medical conditions (Rowe et al., 2000; Worth et al., 2000; McMurray et al., 2007) and improved ability to solve problems at home (Driscoll, 2000; Weiss et al., 2007). Research has shown that when patients were simply asked ‘are you ready for discharge?’, the majority reported that they were (Clarke et al., 1997; Bull et al., 2000; Worth et al., 2000; Weiss et al., 2007). However, on return home many experienced uncertainty about their medical condition and use of medications (Bull et al., 2000; Grimmer et al., 2004; McKeown, 2007; Miller et al., 2008).” (Coffey and McCarthy³⁶; pp. 105)

Data were collected from older patients (n = 335) at discharge and post-discharge using the Readiness for Discharge Scale³⁷ and a Demographic and Community Resource Questionnaire. The author's findings were that at 6 weeks post-discharge, almost one-quarter of patients had been readmitted. Family support had increased, yet a minimal increase in formal services was found. At discharge, differences in readiness existed between the younger and older old. Significant relationships existed between lower perception of readiness at discharge and increased use of

informal and formal support post-discharge. Lower perception of readiness had a significant relationship with readmission in the older old. The authors concluded that perceptions of readiness reflect the patient's reality and may be significant to discharge preparation and arrangements for support. The suggested implications for practice was that older patients' perspectives should be included in discharge decisions and in individualised approaches by nurses to discharge preparation.

6. Discussion

6.1. CHS Healthcare data and reports

The results from the CHS Healthcare reports suggest that the service can achieve outcomes in relation to enabling early discharge, thereby reducing DTOC which could result in a net-savings to the NHS whereby the cost of the service is estimated to be less than the cost-savings due to avoiding excess bed days in hospital (i.e. those days in hospital after the patient has been deemed eligible for discharge). Other outcomes of interest from such a service (compared to usual care) includes an improvement in health outcomes and quality of life, as well as a reduction in readmission rates; these outcomes of interest are discussed in relation to findings from the empirical literature in the next section (6.2) while also discussing the potential role of the CHS hospital discharge services within the wider NHS care system.

Across all the case studies, an average return on investment ratio was estimated to be £1:£3.56 (i.e. for every pound [£] spent on the service, £3.56 was seen as a return on this investment due to the estimated bed day cost savings). The standard error of the mean (SEM) for this estimated return on investment of £1:£3.56 was estimated to be 0.61; that is, the return on investment estimated for each of the case studies deviates by approximately £0.61 from the return on investment of £1:£3.56 across the case studies (the estimated return on investment by case study is presented in Table 2). It is important to note that this estimate of the average (and SEM) return on investment ratio is based on aggregated statistics from the Trusts as part of eight case studies which used before-and-after study designs. The results (data) provided by the Trusts is not person/placement level information nor has bias been controlled for using appropriate trial-methodology (such as randomisation), and therefore there is a certain amount of uncertainty around this estimates that was or could not be controlled for as part of this analysis. This restricts the generalisability of these results and only uncertainty between Trusts (i.e. SEM) could be reported, which does not account for the potential uncertainty at the placement/person level; however, these results still suggest that the services did reduce DTOC in these eight studies. Although the results are not based on 'perfect' information (e.g. free of bias and generalisable to all Trusts and patients who need a placement), they still provide a good basis to suggest that the service can (and has) reduce DTOC resulting in monetary cost-savings from a NHS perspective at the Trust level.

6.2. Empirical literature: potential role of the CHS Healthcare hospital discharge services

The scoping literature search identified five key themes related to the CHS Healthcare hospital discharge services which were pertinent to the objectives of this report; these were: models of care for older people; transitional care; hospital discharge planning; avoiding hospital readmissions; and older peoples' perception of their readiness for discharge.

Within the fifteen “successful” models of care for older people identified by Boulton, et al.³, discharge services played a key part in two of these models of care: transitional care and early-discharge hospital-at-home care. Note, successful was defined within the report because at least one high-quality study reported that at least one version of the model is capable of improving the quality, outcomes, or efficiency of care (compared with “usual care”). It is important to note that hospital discharge services were only a component of these successful models of care; however, they were integral in relation to reducing inpatient utilisation in relation to bed days. In relation to “early-discharge hospital-at-home”, the hospital-at-home aspect of this model of care is not wholly relevant to the CHS Healthcare hospital discharge service; however, overall care planning at the point of discharge is relevant and also became a key aspect for consideration within all five key themes identified by the scoping literature search.

Despite Boulton, et al.³ identifying transitional care as a successful model of care for older people, the identified literature which focused on transitional care provided mixed results in relation to the benefits of providing transitional care. The reviews by Naylor and Keating²³, Rennke, et al.²⁴, and LaMantia, et al.²⁶ provided very little evidence in regards to the benefits of providing transitional care services. However, the reviews by Kripalani, et al.²⁵ and Naylor, et al.²⁷ summarised key issues in regards to offering transitional care and aspects which should be considered when designing transitional care programs. Post-discharge care was highlighted as a key aspect to ensure a successful transitional care program, whereby readmission rates was a key indicator in describing if a care program was successful.

Hospital discharge planning was identified as a key aspect which needed to be accounted for in transitional care programs and as part of early discharge services. The overall results from the identified papers suggested that, like transitional care, the overall aspects which need to be considered are complicated and needs to take into account pre and post-discharge care needs which are personalised to the patient. Although the overall impact of discharge planning on mortality, health outcomes and cost remained uncertain across many studies²⁸⁻³², there was a suggestion that discharge planning for older people could improve patient satisfaction and perhaps quality of life and readmission rates²⁹; there was a strong case that such discharge planning would need to be

focused directly on the patient's individual needs to be successful in this regard^{28 30 31 33}. Six reviews²⁸⁻³³, identified by the literature scoping search as part of the objectives of this report, each assessed different aspects of hospital discharge planning and collectively make a number of suggestions in regards to designing a successful hospital discharge plan, with a particular focus on older people. Enabling successful care transition between services was one key aspect of their suggestions; however, enabling this aspect alone was not deemed sufficient for a successful care pathway.

A key outcome for assessing the success of the models of care, transitional care and hospital discharge planning services was perceived to be reducing readmissions to hospital (particularly within 30 days post-discharge). Both Konetzka, et al.³⁴ and Hansen, et al.³⁵ conducted systematic reviews which were focused on interventions to reduce hospital readmissions (the latter with a particular focus on the 30 day readmission window). The two reviews identified many components of pre and post-discharge care which would need to be accounted for to reduce readmissions; "bridging interventions"³⁵ and improving the "hospital-to-home transition"³⁴ was again identified as aspects which should be focused on in order to reduce readmissions to hospital.

Based on the results identified within the scoping literature review, it seems rational to suggest that the care pathway for older people post-discharge is complicated and requires multiple components in order to provide a successful service which reduces costs to the healthcare system via early discharge and avoiding readmission rates, while also improving patient health, quality of life and satisfaction outcomes. Although CHS Healthcare has not collected this wide range of outcomes to describe the hospital discharge services it provides in this manner, it is not set up to provide every aspect of pre, post and transitional care services that older people need in relation to hospital discharge. However, this is not a criticism of the service because its main drivers for the service have been to find places for people post-hospital discharge, which it seems to have achieved based on the case studies previously described within this report (see sections 5.2 and 5.3). In this regard it is important to discuss the role of the CHS Healthcare hospital discharge services within the overall NHS care pathway. The CHS Healthcare hospital discharge services provided seem to contribute to relieving bed pressures within hospitals at a cost for service which appears to produce a net saving for the NHS. In this regard, it could be deemed a successful service. Further evidence is needed to assess if it provides a service which also improves health and quality of life outcomes (i.e. is it cost-effective rather than just cost-beneficial in monetary terms), and if it also reduces (or at least does not increase) readmission rates to hospital. However, given that in order to achieve these types of outcomes the literature seems to suggest interventions are required at multiple time points along the care pathway, such outcomes could be perceived to be outside the purview of the CHS Healthcare hospital discharge services and the NHS needs to build other interventions around the service rather than expecting the CHS Healthcare services to achieve these outcomes on their own.

6.3. “Report of secondary analysis of interview data: Strengths, Weaknesses, Opportunities and Threats related to CHS Healthcare hospital discharge services”: points for discussion

A previous report produced by Steven Ariss at SchARR (titled: “Report of secondary analysis of interview data: Strengths, Weaknesses, Opportunities and Threats related to CHS Healthcare hospital discharge services”) suggested that a threat to the CHS services was related to the “poor understanding of financial impacts” from the discharge services provided by CHS Healthcare. The report stated that:

“ Poor understanding of financial impacts: An obvious threat to CHS is the poor understanding of outcomes attributable to the service, particularly economic impacts. There are some clear problems with assessing these benefits, for instance: a complex changing environment, a lack of good quality retrospective data, and lack of suitable comparative data.

Lack of data, apart from that collected by CHS themselves, is a substantial problem for evaluation work in this field. Hospital Episodes Statistics (HES) data for 2013/14 shows that a ‘discharge ready date’ is only recorded for around 7% of patients and approximately 99% of these were discharged on the same day.

Therefore, economic analysis is problematic, and on its own might not demonstrate any useful findings. However, an economic analysis could usefully incorporate qualitative/theory-driven evaluation methods to fully understand the context, help to explain findings, investigate counterfactuals and demonstrate plausible causal links between activities and outcomes.”

It is apparent that based on the reports already produced by CHS Healthcare, or on behalf of CHS Healthcare by the Trusts implementing the CHS Healthcare hospital discharge services, that the focus so far has been mainly on bed days saved, subsequent cost savings related to these bed days, net savings when accounting for the cost of service, and patient satisfaction (the results of which are not described in this report, but can be observed within the CHS Healthcare reports in the supplementary materials; the overall summary being that the service improves patient satisfaction). These reports highlight CHS Healthcare in a positive way; however, based on the literature, other outcomes of interest for these types of services are more focused on health and quality of life outcomes, readmission rates, as well as overall potential cost-savings to the NHS. Also, the literature suggests that achieving these outcomes requires more than a single component change within the care pathway (the service offered by CHS Healthcare can be considered a unidimensional service focused mainly on enabling discharge from hospital and reducing DTOC) and actually requires a whole service change with multiple interventions pre, post and during discharge from hospital (transitional care) to achieve these outcomes in a statistically significant way. Therefore, although the overall economic benefits of the CHS Healthcare hospital discharge services are not fully

understood, the services ability to reduce costs associated with DTOC days seems evident from the case studies provided within this report.

6.4. Limitations of this report

There was no raw data provided by CHS Healthcare which could be analysed as part of a primary data analysis of the potential bed days saved from using the hospital discharge services compared to current usual care within the NHS. Therefore, this report is based on secondary analysis of aggregated results (rather than primary patient-level data, which would be more ideally suited to analysing the economic returns of the services). There is also a certain level of reliance that the results based on before-and-after studies are an accurate representation of the cost and benefits of the services in the respective settings. However, it should be noted that even in the empirical literature, there is a certain level of reliance that the authors are reporting results appropriately and that any issues with the information presented has been verified during the peer-review process.

The scoping literature search was performed for pragmatic reasons such as to produce a summary of papers relevant for the needs of this report. The vast majority of papers identified were focused on the healthcare system within the United States of America (USA) which is not always generalisable to the healthcare system in England or across the UK. However, many of these papers were systematic reviews which were not refined to focus only on evidence from the USA, and so the overall results from these reviews may still be relevant to the English healthcare system and so may have generalisable results.

7. Conclusion

The CHS Healthcare hospital discharge services, through reports from the Trusts implementing the services, have been shown to reduce expected delayed transfers of care (DTOC) days which could lead to an overall monetary net-saving to the NHS; that is, the expected savings from reduced inpatient bed days exceeds the cost of the service. On average across the eight case studies, the return on investment ratio for the CHS Healthcare hospital discharge services was estimated to be £1:£3.56 (standard error of the mean [SEM]: 0.61); that is, for every pound [£] spent on the service, on average £3.56 was seen as a return on this investment due to the estimated bed day cost savings estimated from the observed case studies (there was a deviance of approximately £0.61 on this return across the case studies based on the SEM). There was no data available for analysis to provide evidence of the service improving health or quality of life outcomes, or reducing (30 day) readmission rates, which are desirable outcomes from a patient, commissioning and NHS perspective. However, the CHS Healthcare hospital discharge services represent a potentially cost-beneficial component of an overall care pathway model in relation to those (older) people who have been admitted to hospital and may experience DTOC days. The empirical literature suggests that a

service like that offered by CHS Healthcare alone would probably not achieve more broader outcomes (in terms of health or quality of life improvements, or reduced readmissions rates; although patient satisfaction may be improved), but such outcomes may be achieved if adapted into a wider care-pathway change which also incorporates both pre and post-discharge, and transitional care tailored to patient needs. In terms of the Five Year Forward view, the net-savings from reducing DTOC are desirable and could aid the NHS achieve its monetary saving goals compared to usual care based on the results within this study.

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