

AIREDALE NHS FOUNDATION TRUST

Economic Evaluation of the Gold Line: Health
Foundation Shared Purpose project

Final Report

NICK HEX, Associate Director
DIANNE WRIGHT, Research Assistant

FEBRUARY 2016

Contents

	Page No.
Executive Summary	
Section 1: Introduction	1
1.1 Background	1
1.2 Health Foundation Shared Purpose Programme	4
1.3 Project Evaluation	7
Section 2: Methodology	8
2.1 Background	8
2.2 Baseline Audit	8
2.3 Comparator Group	9
Section 3: Findings and conclusions	11
3.1 Patient Demographics	11
3.2 Health Care Resource Use	11
3.3 Preferred Place of Death	15
3.4 Costs of Gold Line and potential Return on Investment	16
3.5 Conclusions and Recommendations	16

All reasonable precautions have been taken by YHEC to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall YHEC be liable for damages arising from its use.

Executive Summary

1. BACKGROUND

This report presents findings from the evaluation of the Gold Line system to enhance and improve end of life care in Airedale, Wharfedale and Craven, incorporating both economic findings from York Health Economics Consortium and other qualitative findings from work carried out by the University of Bradford. The project has been funded by the Health Foundation as part of its Shared Purpose Programme.

The main interventions provided through the project are:

- The introduction of an Electronic Palliative Care Coordination System to improve the recording of appropriate information to enhance the care of patients who are in their last year of life;
- Training to improve communication skills for clinicians who may care for patients on the end of life register;
- The introduction of the Gold Line as a single point of contact for patients and carers with the Telehealth Hub at Airedale Hospital.

2. METHODOLOGY

The economic evaluation focused on calculating a return on investment in relation to potential cost reduction generated through reduced levels of non-elective hospital admissions for patients offered the Gold Line. This is calculated by observing the reduced numbers of non-elective admissions in cohorts of patients that have received the intervention and subsequently died, compared to a cohort of patients that died before the interventions were introduced.

Data for the baseline cohort was generated through an audit in 2013 of last year of life. This was a retrospective review of the number of non-elective admissions and bed days occupied by patients who were admitted to Airedale Hospital between 1 June 2011 and 30 September 2011 and who subsequently died before 30 September 2012. All these patients were, therefore, in the last year of their lives at the point of the initial hospital admission. All of the patients reviewed died before the Gold Line became operational in November 2013. Patient data on the number and costs of admissions for each patient during their last year of life were gathered from the hospital patient administration system.

There were 97 patients admitted to the hospital in the audit period who died in the subsequent year, of which 70 had a GP in the Airedale, Wharfedale and Craven Clinical Commissioning Group (CCG). Payment by results (PbR) tariffs for 2011/12 were applied to the admission data using the appropriate HRG code to estimate the commissioning costs of inpatient non-elective episodes and any excess bed days. The numbers of bed days involved in the provision of unplanned care during the last year of life was calculated by aggregating the lengths of stay of the relevant hospital episodes.

A comparator cohort was measured against the baseline cohort. This group of patients had a GP in Airedale, Wharfedale and Craven CCG, died between 1 May 2014 and 30 April 2015 and had access to the Gold Line. This group is slightly different to the baseline in that they were not identified during a hospital admission. The same analysis was carried for this cohort of patients.

There is also potentially an economic value to be derived from an increase in the proportion of patients dying in their preferred place. Although we were not able to quantify whether patients were dying in their preferred place of death, national data allowed us to observe the proportion of patients at end of life dying in hospital compared to the current situation.

3. FINDINGS

The patients receiving the interventions through the Gold Line experienced fewer non-elective admissions compared to the baseline group of patients: for the matched cohort patients there were 129 non-elective admissions compared to 167. This equated to a 23% reduction in admissions equivalent to a reduction of 390 bed days. If this was applied to all of the people who were referred to the Gold Line between May 2014 and April 2015 and who subsequently died, there would be a reduction of nearly 2,000 bed days. If the reduction in admissions is monetised for the whole year, this would represent a £440,000 cost reduction. This compares favourably with the estimated cost of the Gold Line service which is around £240,000 for a year, for up to 1,000 patients.

Interpretation of these findings needs to be cautious. The groups of patients compared were only matched on diagnosis codes and were not matched using other factors such as economic status or gender and the data were gathered at different points in time. Nonetheless, there is a discernible reduction in the number of admissions between the baseline and the comparator groups, suggesting that the patients who have been given access to the Gold Line had fewer non-elective hospital admissions.

The proportion of people dying in hospital fell from 36.8% in 2011-2013 to 35.3% in Quarter 1 2015/16. This is all deaths, not just those identified as being in the last year of life. Although this does not appear to be a large reduction, Airedale, Wharfedale and Craven CCG already had the lowest rate in the country so further progress is very good. If the previous rate was applied to current activity then an extra 26 people would have died in hospital. Community based end of life care has been found to be less expensive than hospital care. The National End of Life Care Programme estimated a potential net saving of £958 per person who dies in the community, so an additional cost saving of around £25,000 can be imputed from these data.

4. CONCLUSIONS AND RECOMMENDATIONS

It can be concluded that the Gold Line, and the Shared Purpose project as a whole, has been successful in providing support to patients and also potentially in avoiding admissions to hospital. On that basis, the estimated return on investment is around £2 for every £1 spent. It is less clear whether or not there is an impact on the use of community and primary health care services because there are problems at a national and local level in accessing data in relation to those two settings.

It is recommended that:

- ANHSFT continues to provide the Gold Line service in Airedale, Wharfedale and Craven and also the Bradford area;
- More detailed data should be collected on patients' use of health care resources, particularly the use of community and primary care services;
- Should this data demonstrate more conclusively that the Gold Line helps to reduce the use of health care resources; the service could potentially be rolled out in other areas.

Section 1: Introduction

1.1 BACKGROUND

The National End of Life Care Strategy was published in 2008 by the Department of Health [1]. It set out a series of key areas that the Government acknowledged it needed to address to improve the quality of care for those at the end of life. The strategy included an increased profile for end of life care and a strategic approach to commissioning, as well as more practical measures to identify those people approaching the end of life and the development of care planning and coordination.

In the same year the National Audit Office and RAND Europe published a report stating that there was real potential for palliative care services to reduce expenditures associated with hospitalisation, while at the same time accommodating the expressed preferences of patients [2]. The report estimated an expected reduction in national annual expenditure of between £42 million and £171 million through such improvements.

Since then a number of initiatives have started to implement elements of the strategy. In February 2013, NHS Improving Quality carried out an economic evaluation of the early implementer sites for the Electronic Palliative Care Co-ordination System (EPaCCS), a means of supporting the co-ordination of care so that people's choices about where they die, and the nature of the care and support they receive, will be respected and achieved wherever possible [3]. The study reported that an additional 90 people were dying in their place of usual residence per 200,000 population in the four evaluation sites and that this would generate a saving of between £399 to £1,480 per person, generated through a reduction in the number and the cost of hospital admissions for these people in their final year of life. The study also found evidence of improved co-ordination of care and improved relationships between professionals and patients.

The Partnership for Excellence in Palliative Support (PEPS) pilot study in Bedfordshire in 2013 introduced a scheme to coordinate palliative care between statutory and Third Sector agencies and to provide a single 24-hour telephone point of access for palliative care services [4]. The evaluation found that of 1,051 patients registered with the scheme who died, 65% were supported to die at home and only 11% died in an acute hospital. The pilot also showed 30% fewer emergency hospital admissions, a 30% shorter length of stay for those admissions and a reduction in cost of around £300 per admission for people at the end of life, comparing results after the intervention with those before.

A study by the Nuffield Trust in 2014, reported that hospital costs were by the far the largest cost elements of end of life care, with an average of £4,500 per person in the last three months of life [5]. The report concluded that interventions could reduce these costs, for example the Marie Curie nursing service could reduce costs per patient by a net amount of up to £500.

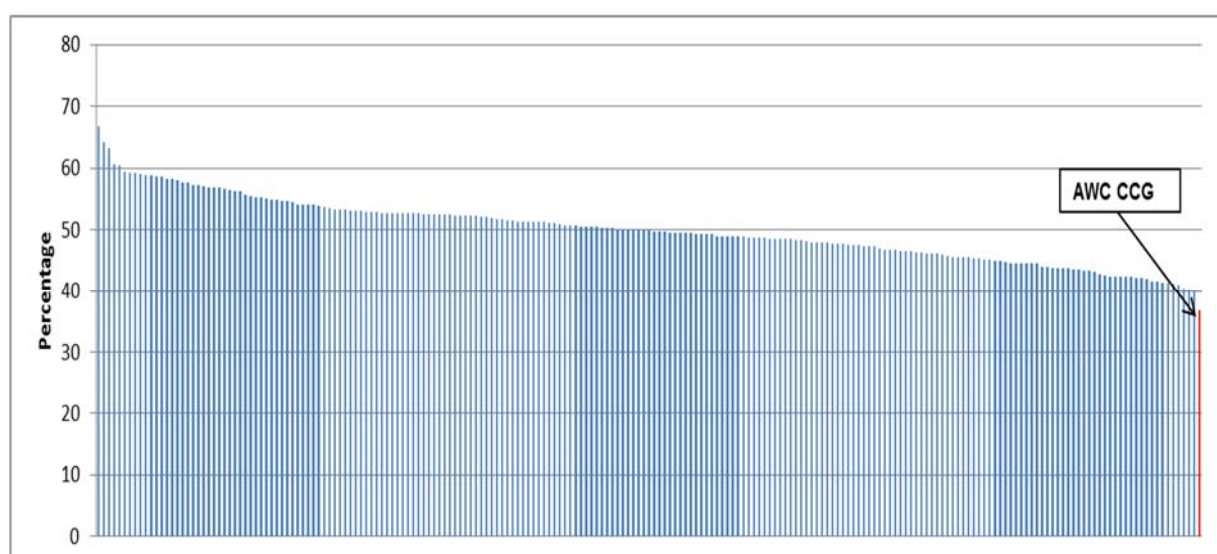
In 2014, an observational study in the North of England found that reducing length of hospital stay in palliative care patients may offer the potential to achieve higher hospital cost savings than preventing avoidable admissions [6]. The provision of the Gold Line for patients at the end of their lives is a form of hospital at home. A Cochrane Review in 2008 found that people receiving end-of-life care at home were more likely to die at home and that it was unclear whether home-based end-of-life care increases or decreases the probability of being admitted to hospital [7].

In June 2015, the National End of Life Care Intelligence Network (NEoLCIN, now part of Public Health England) published its annual report on end of life care and made the following observations [8]:

- The proportion of people dying at home or in care homes continues to increase;
- Patients with an EPaCCS record and those receiving palliative care services such as hospice at home, Gold Standards Framework or Macmillan services are more likely to die in the place of their preference;
- Factors most important to people at the end of their life were; having pain and other symptoms managed effectively, being surrounded by loved ones and being treated with dignity;
- More GPs are having conversations with people about their end of life care wishes but 25% still say they have never initiated such a conversation.

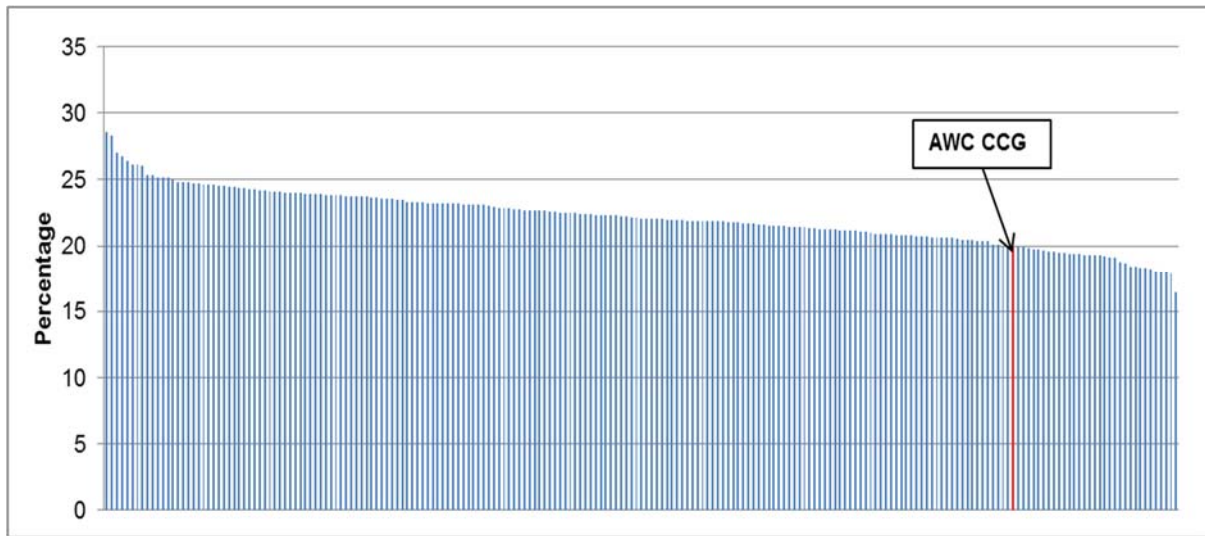
The Public Health England End of Life profiles for 2011-2013 show an interesting profile for Airedale, Wharfedale and Craven CCG. The CCG had the lowest percentage of deaths in hospital in the country during that period (36.8% - Figure 1.1). Although deaths at home (20.0% - Figure 1.2) were relatively low, the CCG had the highest level of deaths in a care home (32.4% - Figure 1.3) and also a high proportion of people dying in hospice (8.9% - Figure 1.4).

Figure 1.1: Percentage of deaths in hospital by CCG area (2011-13)



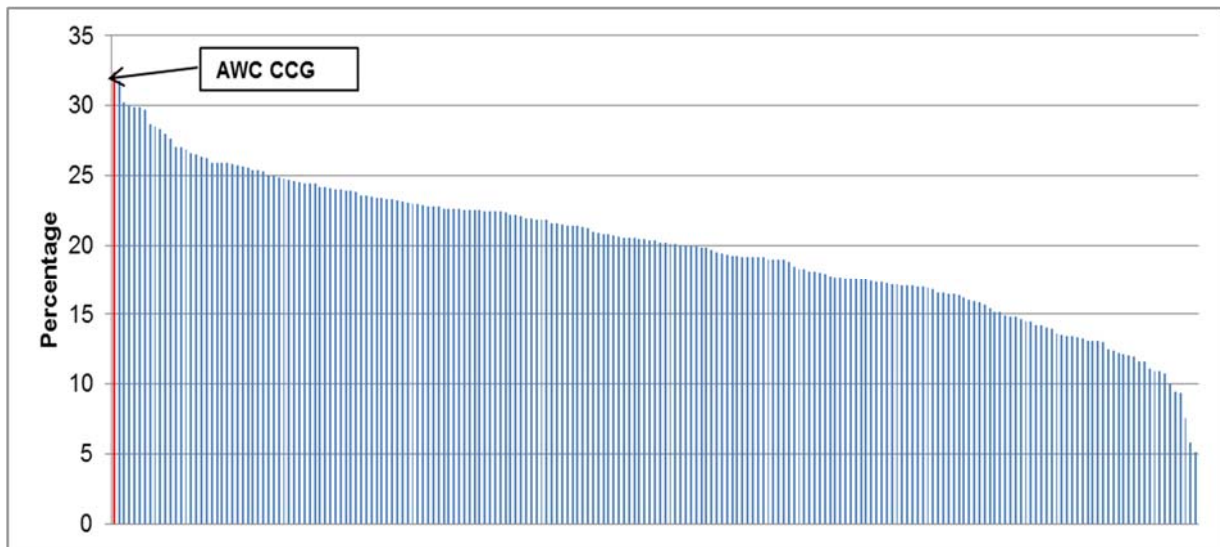
Source: Public Health England – End of Life profiles: Place of Death (CCG)
http://www.endoflifecare-intelligence.org.uk/profiles/CCGs/Place_of_Death/atlas.html

Figure 1.2: Percentage of deaths at home by CCG area (2011-13)



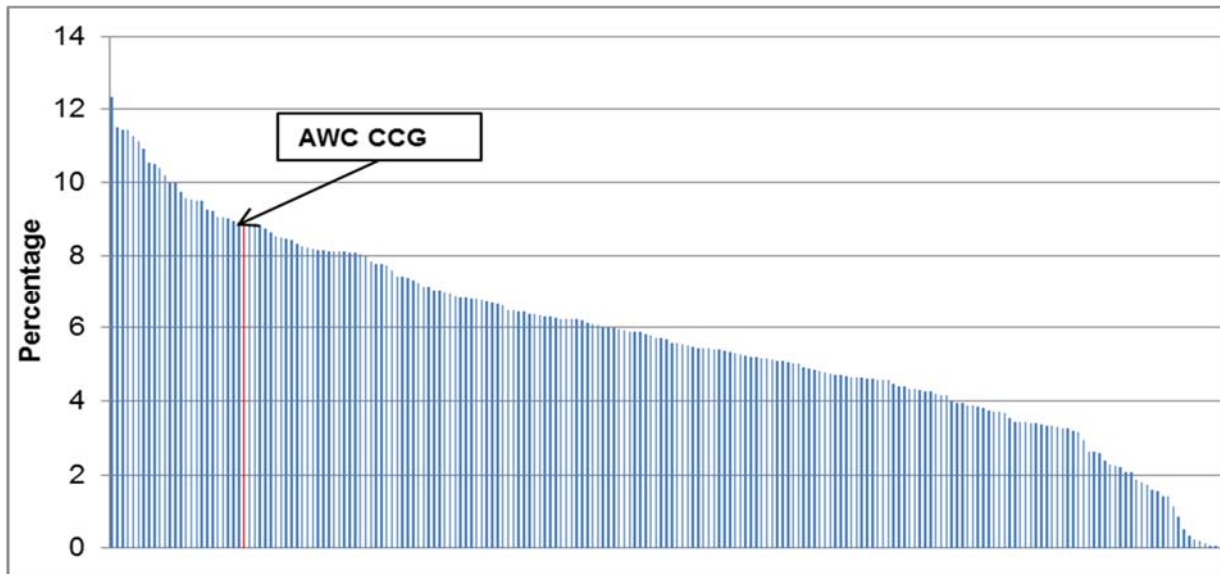
Source: Public Health England – End of Life profiles Place of Death (CCG)
http://www.endoflifecare-intelligence.org.uk/profiles/CCGs/Place_of_Death/atlas.html

Figure 1.3: Percentage of deaths in care homes by CCG area (2011-13)



Source: Public Health England – End of Life profiles: Place of Death (CCG)
http://www.endoflifecare-intelligence.org.uk/profiles/CCGs/Place_of_Death/atlas.html

Figure 1.4: Percentage of deaths in hospice by CCG area (2011-13)



Source: Public Health England – End of Life profiles: Place of Death (CCG)
http://www.endoflifecare-intelligence.org.uk/profiles/CCGs/Place_of_Death/atlas.html

1.2 HEALTH FOUNDATION SHARED PURPOSE PROGRAMME

Airedale NHS Foundation Trust (ANHSFT) submitted a bid to the Health Foundation's Shared Purpose programme in January 2012. The bid outlined a project to "improve the safety and quality of care for patients undergoing cancer treatment or in the last year of life by providing them with dedicated clinical support in their own home, nursing home, hospice or community Hub via telemedicine."

At that stage, the aim of the project was to deliver a hospital at home service for what ANHSFT defined as the most vulnerable patients by delivering clinical care through telemedicine. The bid explained that 24-hour video links between the patient and clinical or care teams would enable patients and families to get the right support whilst remaining at home. The project also aimed to build greater co-ordination between corporate and clinical teams in the Trust and to enhance patient experience. The rationale was that healthcare services will need to be more resilient to pressures from rising demand and financial constraints. The project aimed to achieve this by delivering higher quality to patients, being more efficient and developing more integrated models of care.

The bid was successful and the confirmation of approval from the Health Foundation was received in May 2012. The Health Foundation provided funding and technical support for three and a half years into 2015.

Once funding was approved, ANHSFT engaged key stakeholders in a series of meetings and workshops with support from the Health Foundation. These meetings and workshops were initially part of the process of developing the Shared Purpose Delivery Plan and were subsequently focused on delivery and evaluation of the project. Emerging themes from the Delivery Plan work gave greater clarity to the actions needed to improve the experience for patients in their last year of life.

The project was aligned to ANHSFT's End of Life Care Strategy and the on-going wider work to integrate health and social care with partner organisations in the NHS and local government. The ANHSFT End of Life Strategy Group was the delivery group for the End of Life workstream, one of five workstreams in the Airedale Transformation and Integration Group.

Part of the integration work has been to develop better use of the Gold Standard Framework¹ (GSF) by all relevant health and social care practitioners. The GSF is a systematic approach that looks to optimise the care for patients during their last year of life. Other tools to support the better co-ordination of the later stages of End of Life (EoL) care are National Institute for Health and Care Excellence (NICE) guidelines on Care of dying adults in the last days of life² and the Amber Care Bundle³.

As a result of stakeholder engagement, the aims of the project were developed further. The aim was adapted to the improvement of the patient experience during their end of life care by implementing a locally applicable version of the National End of Life strategy⁴. The six steps of the end of life (EOL) strategy are:

- Identify;
- Discuss;
- Assess;
- Support and coordinate;
- Care in the last days;
- Care after death/bereavement.

The project also aimed to:

- Reduce the number of bed days patients in the last year of life spend in hospital;
- Increase the number of patients who are supported to die in their preferred place of death.

¹ <http://www.goldstandardsframework.org.uk/>

² <https://www.nice.org.uk/guidance/ng31>

³ <http://www.ambercarebundle.org/homepage.aspx>

⁴ http://www.endoflifecareforadults.nhs.uk/assets/downloads/pubs_EoLC_Strategy_1.pdf

During 2013, the Gold Line hub started to hold an electronic register of patients recognised to be in the last year of life. Patients consented to be included on this register and to share their health record with the Gold Line. Key information relating to their end of life decision making is held in a dedicated template within the record (EPaCCS template). This has subsequently increased the sharing of patient information, helping health and social care providers to co-ordinate their support to patients more effectively and also to gather better data about these patients. Around 1% of the population die each year, but prior to the project only around a quarter of those people were identified as being in their last year of life. As a result of this project, ANHSFT hoped to increase this proportion to between a half and three-quarters.

In the first year of the project (2013), ANHSFT undertook the following objectives:

- Workstream 1: Introduce an Electronic Palliative Care Coordination System (EPaCCS) to record all patients who have been identified as being in their last year of life. The Telehealth Hub at Airedale Hospital holds the register and it is available to SystmOne users. SystmOne is the data system now used by all GP practices in AWC and Bradford CCGs. ANHSFT included all eligible residents of the Airedale, Wharfedale and Craven CCG area into the register and is also now including eligible residents in the two other CCGs in the Bradford district;
- Workstream 2: Deliver communication skills training to staff who need to discuss with patients their inclusion in an EoL register;
- Workstream 3: Use the Telehealth Hub as a central coordination centre for all End of Life services and teams via the Gold Line. The Gold Line started operating in November 2013 for Airedale, Wharfedale and Craven CCG and in April 2014 for Bradford CCGs, and is a single point of contact for patients and carers, allowing access to help and advice 24 hours a day, 7 days a week. Where possible, Gold Line aims to support patients in their preferred place of care. All registered EoL patients are eligible to use the Gold Line (some may chose not to use it), and staff refer their enquiries to other services as appropriate. The hope is that this service will help to reduce avoidable admissions to hospital. A subset of patients on the EOL register has been given access to telemedicine units in addition to the Gold Line.

1.3 PROJECT EVALUATION

York Health Economics Consortium (YHEC) was appointed to carry out the economic evaluation of the project. At the outset of the project an evaluation plan was drafted which identified the objectives of the economic evaluation as being the extent to which the project has been successful in:

- Reducing the number of hospital bed days (and any other healthcare resources) used by EoL patients as a result of the project interventions;
- Increasing the number of patients who are supported to die in their preferred place of death.

The University of Bradford has carried out a qualitative evaluation of the Gold Line. The evaluation was reported in February 2015. Its main conclusions were:

The Gold Line is viewed as a valuable adjunct (and sometimes replacement for) mainstream services in both the acute and community settings. It provides a personalised service at a time of need and potential crisis. It appears that overnight is a time when patients and family members reach out to the Gold Line to provide practical advice, support and calm reassurance. It is this personalised support that can prevent or reduce a crisis, facilitate intervention, manage symptoms or prepare family members for an expected death.

The support provided by the Gold Line does not necessarily prevent an admission to hospital, but it clearly facilitates care at home. However, as we can see from at least one patient, just calming breathlessness can prevent panic and what might under less supportive circumstances lead to a crisis admission.

The Gold Line has great potential to fill the gap in out of hours service provision for patients and their families over the last year of life. Palliative care services have a long held tradition of identifying and filling gaps in patient care often found in the space between statutory services and the independent and voluntary sectors. However, the future development of the Gold Line needs to carefully consider how the service is rolled out, how patients and family members have the service explained to them and what expectations they can have of the service.

There was a difference in perception and understanding of the reasoning behind being offered the Gold Line by patients with a non-malignant diagnosis and their family and this is one area that needs further exploration and discussion. Importantly the Gold Line needs to consider how to more effectively engage people from the diverse cultural and educational backgrounds across Bradford, Airedale and Craven for this to be more successful and reach a wider client group.

Section 2: Methodology

2.1 BACKGROUND

The Palliative Care Funding Review in 2011 made recommendations that pilots should be set up to collect data, to address the lack of good quality data then available [9]. A review of the costing information available in relation to end of life care reported in 2012 [10]. It found that while there are no robust, agreed costs of end of life care, there is a range of costing information to draw on to inform the range of costs for end of life care in acute and community settings. However, the study found that there is much work still to do to develop robust cost information to support the continued development of high quality, cost effective end of life care. The study concluded that there are potential savings that could be released by shifting care from the acute to the community setting, if the patient desires such a change, but that this is dependent on commensurate disinvestment in acute care systems being achieved.

This emphasises the importance of the key economic measures for the Gold Line project: a reduction in the number of unplanned bed days used in the final year of life; and an increase in the proportion of patients dying in their preferred place of death.

2.2 BASELINE AUDIT

Palliative care consultants, Dr Wilson and Dr Livingstone, carried out a last year of life (LYOL) audit in 2013. This consisted of a retrospective case note analysis of non-elective adult (over 18 years of age) admissions to Airedale Hospital between June and September 2011 who subsequently died within a year. This has been used as a baseline for the health care resource use analysis, as all of the patients reviewed died before the Gold Line became operational in November 2013. The patient data were gathered from the hospital patient administration system and collated by members of the specialist palliative care team using a standard proforma to gather information on various parameters including evidence of recognition of patients being in the last year of life, evidence of care planning and numbers of non-elective admissions in the year before death. The data were analysed to show the costs of admissions for each patient during their last year of life.

There were 97 patients included in the audit. All were admitted to Airedale Hospital between 1 June 2011 and 30 September 2011 and they all subsequently died before 30 September 2012.

Of the 97 patients in the baseline audit, 70 were from the Airedale, Wharfedale and Craven CCG area. Admission data for those patients was provided for the final months of their lives, including Hospital Resource Group (HRG) codes. These codes are used as the currency in the NHS through which payments are made by commissioners to providers of care.

Payment by results (PbR) tariffs for 2011/12 were applied to the admission data using the appropriate HRG code to estimate the commissioning costs of inpatient non-elective episodes and any excess bed days. These costs were aggregated and analysed and the results are presented in a set of tables in Section 3 of this report. This effectively represents the costs of the unplanned admitted care provided for these patients, from the perspective of the commissioner, during their last year of life. The numbers of bed days involved in the provision of unplanned care during the last year of life was calculated by aggregating the lengths of stay of the relevant hospital episodes.

In some cases there was no valid HRG code attached to the activity data so the primary diagnosis was searched using the app 'Reference NHS'. This allowed us to obtain the base HRG code to enable it to be mapped to PbR tariffs. Where it was not possible to determine the exact HRG a weighted average for the base HRG was applied. Where the length of stay (LOS) of an episode exceeded the 'trimpoint' LOS for the reference cost, the additional days of care for long stays were added to the episode cost to give a total cost for each non-elective admission.

2.3 COMPARATOR GROUP

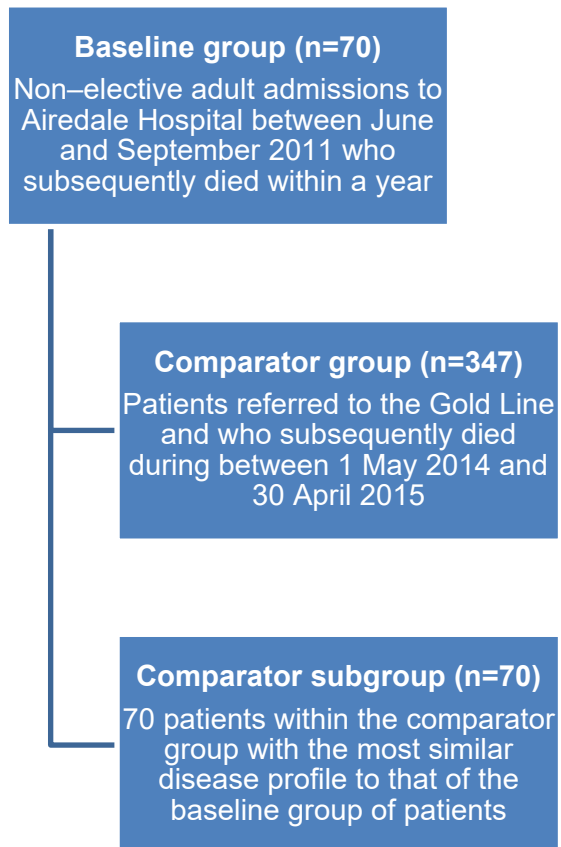
An interim evaluation was carried out at the end of 2014 to assess some preliminary results from the project. This compared the baseline audit group of patients with a group of patients with similar disease profiles who died during 2014, and who therefore potentially had the opportunity to use the Gold Line for at least part of their final year of life. We found a small reduction in the number of admissions in the comparator group and this was reported to the Health Foundation.

For the final evaluation of the Gold Line project data similar to the baseline data (from the LYOL audit) were collected for a comparator group after November 2013, i.e. after the Gold Line was put in place. The comparator group were patients (n=347) referred to the Gold Line and who subsequently died during between 1 May 2014 and 30 April 2015.

The numbers and cost of non-elective admissions for the year prior to death were identified for this group of patients and were compared to the numbers and cost of non-elective admissions for the baseline group of patients.

The profile of disease and co-morbidities in the comparator group were compared to the baseline group of patients. From the whole comparator group 70 patients were selected with the most similar disease profile to that of the baseline group of patients, to create a comparator subgroup with the same number of patients and a similar disease profile to that of the baseline group. It should be noted, however, that the groups of patients compared were only matched on diagnosis codes and were not matched using other factors such as economic status or gender and the data were gathered at different points in time. Comparison of the numbers and cost of non-elective admissions in the final year of life were also made for this disease matched comparator sub-group with the baseline group.

Figure 2.1 Baseline and comparator groups of patients



Section 3: Findings and conclusions

3.1 PATIENT DEMOGRAPHICS

Of the 70 patients in the baseline cohort, 31 were female and 39 male, with an average age of 81. There were 347 patients in the comparator group. We do not know the gender balance of the comparator cohort, but the average age was 77. Reported diagnoses were used to identify a matched subgroup of 70 patients within the comparator group. Table 3.1 shows the disease characteristics of the matched groups. These are total numbers of patients for whom each disease was recorded in the hospital data, along with the percentage of patients in the cohort with each disease type.

Table 3.1: Disease characteristics of baseline group and comparator subgroup

Disease type	Baseline group (n=70)		Comparator subgroup (n=70)	
	No.	%	No.	%
COPD	22	31%	17	24%
Cancer	22	31%	17	24%
Heart conditions	37	53%	39	56%
Dementia	17	24%	14	20%
Hypertension	40	57%	30	43%
Renal failure	14	20%	17	24%
Diabetes	11	16%	13	19%

Although this allows for a reasonable comparison, caveats have to be expressed about the comparability of the two groups of patients. While the patients may have similar demographic and disease profiles, there is the possibility that some patients may have experienced particular complications associated with their conditions that could skew the results either way. In the matched comparator cohort, for example, there were three patients with 11, 9 and 7 unplanned inpatient admissions in their last year of life (Table 3.4). These three patients (4% of the matched cohort) accounted for 21% of the unplanned admissions.

3.2 HEALTH CARE RESOURCE USE

YHEC were provided with data on health care resource use including:

- Non-elective hospital admissions;
- Elective hospital admissions;
- Elective day cases.

For the purpose of analysis only non-elective admissions have been considered as it is considered that it is unlikely that elective admissions would be affected by the interventions in the project. Elective day cases are likely to relate to specific treatments for diseases, such as chemotherapy for cancer, and so again are unlikely to be affected by the interventions.

3.2.1 Comparison of Baseline Group with Matched Comparator Subgroup

For the 70 patients in the baseline group of patients from 2011, 167 non-elective admissions were observed during the final year of life for the patients. An admission will lead to a spell in hospital which may consist of more than one consultant-led episode of care. The final year was calculated by counting back from the date of death for each individual patient. Sixty-nine patients had some form of non-elective admission during that period. Table 3.2 details the numbers of admissions per patient.

Table 3.2: Baseline group – non-elective admissions per patient

Numbers of non-elective admissions	Number of patients
6	5
5	5
4	5
3	11
2	16
1	27
0	1
Total	70

The most common reasons for admission were in relation to cardiac and respiratory problems and this is summarised in Table 3.3. The total cost of the admissions to the commissioner was £464,257.

Table 3.3: Reasons for non-elective admissions for baseline group by ICD chapter code

ICD Chapter Heading		No.	Total cost
A/B	Certain infectious and parasitic diseases	6	£19,263
C/D	Neoplasms / Diseases of the blood and blood-forming organs	20	£73,513
E	Endocrine, nutritional and metabolic diseases	11	£30,341
F	Mental and behavioural disorders	2	£1,292
G	Diseases of the nervous system	1	£1,275
I	Diseases of the circulatory system	30	£81,634
J	Diseases of the respiratory system	39	£108,633
K	Diseases of the digestive system	11	£22,237
L	Diseases of the skin and subcutaneous tissue	3	£9,370
M	Diseases of the musculoskeletal system and connective tissue	4	£5,482
N	Diseases of the genitourinary system	8	£29,248
R	Symptoms, signs etc., not elsewhere classified	15	£29,523
S	Injury, poisoning and certain other consequences of external causes	15	£48,221
T	Injury, poisoning and certain other consequences of external causes	2	£4,225
Total		167	£464,257

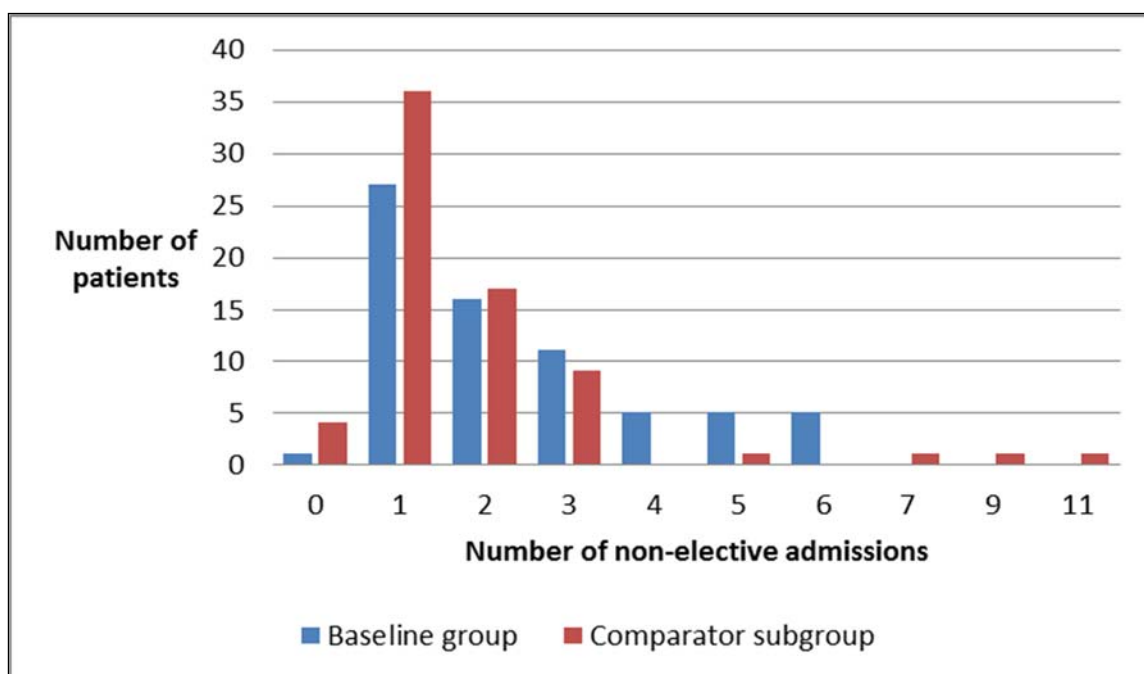
For the 70 matched patients in the comparator subgroup, 126 non-elective admissions were observed during the final year of life for the patients. The same observation process was undertaken for the comparator subgroup, i.e. counting back from the date of death for each individual patient. Sixty-six of the 70 patients had some form of non-elective admission during that period. Table 3.4 details the numbers of admissions per patient.

Table 3.4: Comparator subgroup – non-elective admissions per patient

Number of non-elective admissions	Number of patients
11	1
9	1
7	1
5	1
3	9
2	17
1	36
0	4
Total	70

The distribution of admissions per patient between the two groups is shown in chart 3.1

Chart 3.1 Distribution of non-elective admissions per patient for the baseline group and the comparator subgroup



The most common reasons for admission were in relation to diseases of the respiratory system and this is summarised in Table 3.5. Although there were fewer admissions, the total cost to the commissioner was higher than for the baseline group, £532,504.

Table 3.5: Reasons for non-elective admissions for comparator subgroup by ICD chapter code

ICD Chapter Heading		No.	Total cost
A/B	Certain infectious and parasitic diseases	11	£35,992
C/D	Neoplasms / Diseases of the blood and blood-forming organs	16	£53,898
E	Endocrine, nutritional and metabolic diseases	4	£12,697
G	Diseases of the nervous system	1	£4,767
I	Diseases of the circulatory system	10	£37,061
J	Diseases of the respiratory system	34	£164,447
K	Diseases of the digestive system	8	£18,250
L	Diseases of the skin and subcutaneous tissue	1	£1,283
M	Diseases of the musculoskeletal system and connective tissue	2	£7,924
N	Diseases of the genitourinary system	15	£103,448
R	Symptoms, signs etc., not elsewhere classified	14	£27,425
S	Injury, poisoning and other consequences of external causes	10	£56,490
Total		129	£532,504

There were 38 fewer admissions (23%) in the comparator subgroup ($p < 0.00001$). The mean number of bed days per admission in the comparator subgroup was 10.25, so the 38 admissions avoided represent a reduction of 390 bed days, based on a sample of 70 patients. Applied to the full set of patients who used the Gold Line and died between May 2014 and April 2015 ($n=347$), this could equate to a reduction of 1,930 bed days per year or just over five beds.

The cost of the admissions for the comparator subgroup was £59,000 higher than for the baseline group. For example, there were 39 admissions for respiratory diseases costing £109,000 in the baseline group, while there were 34 admissions costing £164,000 for the comparator subgroup. Some of this may be due to inflation of the PbR tariff but this is unlikely to account for such large differences in cost and it could be due to many reasons such as patients with unmet need being identified and admitted appropriately to hospital.

While an increase in costs with a reduction in number of admissions might appear unusual it could be because the comparator subgroup was more frail or had more disease requiring hospitalisation than the baseline group. It can also be argued that there is a significant reduction in admissions between the two groups, which may indicate that many of the less serious reasons for admission to hospital were prevented through use of the Gold Line or other interventions.

This raises issues around the limitations of the study. The study is not randomised and takes patient data from two different points in time (2011 and 2014/15) so there is potential for confounding factors. It can be argued that not all of the changes in activity observed will relate to the interventions being observed. It is also important to note that the cohort matching approach was necessarily simplistic, due to the limitations of budget for the evaluation, and that it did not involve propensity matching. This means that even though the two groups observed appeared to have the same characteristics in terms of age and disease profile, one group may have had a significantly higher propensity for being admitted to hospital. The sample of patients in each cohort is relatively small.

Nevertheless, the final evaluation comparator subgroup has demonstrated a reduction in the number of non-elective admissions in the final year of life.

If an average tariff for a non-elective admission of around £2,350 [11] is applied to this cohort, it could be argued that a cost reduction of around £89,300 can be observed in the comparator cohort. Applied to the full set of patients who used the Gold Line and died between May 2014 and April 2015 (n=347), this could be extrapolated to a cost reduction of around £443,000. However, the limitations of the methodology need to be borne in mind so caution should be exercised in interpreting these results.

It must also be borne in mind that this research has only examined non-elective inpatient episodes of care. No data were obtained on comparative A&E usage or the usage of community, primary and social care resources. This is an important consideration because it only presents a partial picture of the changes in resource use as a result of the introduction of Gold Line. It would be interesting, were data available, to be able to measure whether a subsequent visit from a District Nurse was avoided, or took place, as a result of a call to the Gold Line. It may also be that for those people with access to an iPad as part of the Gold Line, fewer GP visits are made because the nurses in the Telehealth Hub are able to carry out a visual examination of the patient.

An overall analysis of the activity and costs data shows that the average number of admissions per patient is lower in the comparator cohort than for the baseline cohort but the comparator cohort had a higher cost per patient. Table 3.6 demonstrates this.

Table 3.6 Comparison of unplanned admissions activity and costs (baseline and comparator groups)

	No.	Admissions	Average	Cost	Average
Baseline	70	167	2.39	£464,257	£6,632
Cohort 2 (matched)	70	129	1.84	£532,504	£7,607

3.3 PREFERRED PLACE OF DEATH

Due to data limitations, it has not been possible to collect data on patients' preferred place of death. However, rolling data recently published by PHE give an indication of the extent to which patients are dying in hospital or elsewhere, similar to the baseline data reported in Figures 1.1 to 1.4.

The most recent data⁵ (for Quarter 2 2014/14 to Quarter 1 2015/16) show that in Airedale, Wharfedale and Craven CCG area, 35.31% of patients died in hospital (614 out of 1,739 deaths in total). This represents an improvement on the baseline position of 2011-13 when 36.79% died in hospital. 54.28% of patients died in their usual place of residence, in contrast with 52.4% at baseline.

⁵ <http://www.endoflifecare-intelligence.org.uk/search/rolling+data>

If the baseline proportion of patients dying in hospital (36.79%) had died in hospital in the most recent period then 640 patients would have died in hospital. This would equate to an extra 26 people. Evidence from the National End of Life Care Programme suggests that, as well as a benefit to the patient, there is also a financial saving associated with the avoidance of patients dying in hospital [12]. This is based on taking a midpoint of the estimated inpatient (£3,065.50) and community-based (£2,107.50) end of life care costs, demonstrating an estimated potential net saving of £958 per person who dies in the community. If that saving is applied to the number of avoided deaths in hospital observed in Airedale, Wharfedale and Craven, an additional cost saving of £24,908 can be observed. It is important to note that we do not know whether the reduction in numbers of people dying in hospital is attributable to the Gold Line or whether it is part of a national trend towards more people dying in places other than hospital.

3.4 COSTS OF GOLD LINE AND POTENTIAL RETURN ON INVESTMENT

The costs of the Gold Line service are around £240,000 per year, to serve up to 1,000 patients. The estimated cost reduction in relation to the reduced number of admissions observed, extrapolated for the patients who were referred to the Gold Line between May 2014 and April 2015 and who subsequently died (n=347) was around £440,000. This represents a return on investment of around £2 for every £1 spent.

As has been stated in this report, this has to be caveated on the basis that this was not a randomised controlled trial and observations of non-elective admissions were taken across two time periods (2011 and 2015). An alternative way of analysing this is to examine how many admissions would need to be prevented to make the cost of the Gold Line service value for money. On the basis of an average cost per non-elective admission of £2,350 and an annual cost for the Gold Line service of £240,000 per year, 102 non-elective admissions would need to be avoided each year in a cohort of 1,000 patients for a return on investment to be shown.

3.5 CONCLUSIONS AND RECOMMENDATIONS

Research into palliative care has demonstrated that there is significant scope for improvement in many aspects of patient care. Across the UK, there is a need to provide more integrated services for people at the end of their lives and there is scope for a rebalancing of palliative care from a predominantly hospital-led service to a greater emphasis on community approaches. There is also a need to generate important improvements in palliative care processes through, for example, a more systematic approach to the identification of people at the end of their lives and better training for health care professionals in informing people and families of this.

The Gold Line project in Airedale, Wharfedale and Craven has successfully attempted to address many of these issues. From a patient and family perspective, the film commissioned by the Health Foundation, *The Power of People* has demonstrated what this means for people (<http://www.health.org.uk/gold-line>). The qualitative research, conducted by the University of Bradford, has provided detail on how the Gold Line facilitates care at home and can help to fill the gap in out of hours care. Their conclusions were that the Gold Line is “*viewed as a valuable adjunct...for mainstream services in both the acute and community settings*”.

The economic evaluation has focused on whether or not the use of the Gold Line has resulted in a reduction in the use of hospital resources and also whether or not there has been an improvement in the numbers of people being enabled to die in their preferred place of death.

There are limitations in the methodology used to examine the impact of the Gold Line on the use of hospital resources, particularly the choice of a comparator group which was constrained by the available data. There are, however, some clearly discernable trends, particularly in a reduction in the number of non-elective admissions. There is a reduction of more than 20% of non-elective admissions compared to patients identified as being at the end of life before the Gold Line was introduced. If this is extrapolated to all patients referred to the Gold Line between May 2014 and April 2015 who subsequently died then there is potential for nearly 2,000 bed days per year to be released for additional capacity.

Although there is potentially an observed increase in costs, this can also be seen as an expected outcome: the use of technology does not eliminate the need for hospital admissions but it can reduce the number of admissions for less serious complications. The main concern with these findings would be the ability to attribute the results to the Gold Line, alongside other interventions that may have had an impact on the reduction of hospital admissions among people at the end of life.

Additionally, it is observed that since the introduction of Gold Line, a smaller proportion of patients are dying in hospital in Airedale, Wharfedale and Craven. This is quite an achievement given that between 2011-2013 (the baseline position), the area had the lowest proportion of deaths in hospital in England. This improvement is estimated to represent a cost saving of approximately £25,000.

It can be concluded that the Gold Line, and the Shared Purpose project as a whole, has been successful in providing support to patients and also potentially in avoiding admissions to hospital. It is less clear whether or not there is an impact on the use of community and primary health care services.

It is recommended that:

- ANHSFT continues to provide the Gold Line service in Airedale, Wharfedale and Craven and also the Bradford area;
- More detailed data should be collected on the patients use of health care resources, particularly the use of community and primary care services;
- Should this data demonstrate more conclusively that the Gold Line helps to reduce the use of health care resources; the service could potentially be rolled out in other areas.

References

1. Department of Health. End of Life Care Strategy – promoting high quality care for all adults at the end of life. July 2008.
2. RAND Corporation and National Audit Office. The potential cost savings of greater use of home and hospice-based end of life care in England. 2008.
3. NHS Improving Quality. Economic evaluation of the Electronic Palliative Care Coordination System (EPaCCS) early implementer sites. February 2013.
4. Partnership for Excellence in Palliative Support (PEPS). Evaluation of pilot. May 2013.
5. Georghiou T and Bardsley M. Exploring the cost of care at the end of life. Nuffield Trust. September 2014.
6. Gardiner C, Ward S, Gott M, Ingleton C. Economic impact of hospitalisations among patients in the last year of life: an observational study. *Palliat Med.* 2014 May;28(5):422-9.
7. Shepperd S, Gonçalves-Bradley DC, Straus SE, Wee B. Hospital at home: home-based end-of-life care. *Cochrane Database of Systematic Reviews* 2016, Issue 2.
8. Public Health England. National End of Life Care Intelligence Network. What we know now 2014. June 2015.
9. Hughes-Hallett T, Craft A, Davies C, Mackay I, Nielsson T. Palliative Care Funding Review – Funding the Right Care and Support for Everyone. July 2011.
10. NHS National End of Life Care Programme. Reviewing end of life care costing information to inform the QIPP End of Life Care Workstream. September 2012.
11. National Audit Office. Emergency admissions to hospital: managing the demand. October 2013.
12. National End of Life Care Programme. What do we know now that we didn't know a year ago? New intelligence on end of life care in England. May 2012.