PANCREATIC CANCER UK POLICY BRIEFING

Every Life Matters: the real cost of pancreatic cancer diagnoses via emergency admission

PANCREATIC CANCER UK – INTRODUCTION

Pancreatic Cancer UK is a national charity fighting pancreatic cancer on all fronts: support and information, campaigning, and research. Our vision is a long and good life for everyone diagnosed with pancreatic cancer.

Pancreatic Cancer UK's flagship campaign – Campaign for Hope sets out two simple but ambitious goals:

- To double five-year pancreatic cancer survival rates within five years
- To move the NHS experience of pancreatic cancer patients from being one of the worst to one of the best

Pancreatic Cancer UK's Study for Survival[i] launched in 2011, marked the first ever comprehensive review of pancreatic cancer across the UK. It drew on the experiences and views of over 1000 people living and working with pancreatic cancer as well as an analysis of data, including survival data, supported by the National Cancer Intelligence Network (NCIN).

This Study found a serious number of shortcomings on almost every front, from significant variations in survival across the UK, and between the UK and other countries, through to poor patient experience. In brief the Study for Survival reported:

- Pancreatic cancer survival rates are lower in the UK than in many other European countries. Five-year UK survival rates, now just under 4%, are nearly half of what they are in the US, Canada and Australia
- Significant regional variations in survival rates in the UK
- Surgical rates – the only life saving treatment for pancreatic cancer available - are about half (10%) of the estimated number of patients who may be eligible for surgery at the point of diagnosis. Surgical rates also vary across the UK
- Patients having to visit their GP significantly more often than other cancer patients before being referred to hospital. Our own Pancreatic Cancer UK patient and carer survey found that nearly 25% of patients said that they experienced symptoms for up to a year before diagnosis with almost 30% reporting that they visited their GP five or more times
- Poor NHS experience – pancreatic cancer patients reported less satisfactory NHS experiences than almost any other cancer patient group across a range of issues
- Despite being the 5th most common cause of cancer death in the UK, pancreatic cancer receives less than 1% of the National Cancer Research Institute's (NCRI) spend

EVERY LIFE MATTERS: THE REAL COST OF PANCREATIC CANCER DIAGNOSES VIA EMERGENCY ADMISSION

Summary

An analysis [ii] undertaken by the National Cancer Intelligence Network (NCIN) for Pancreatic Cancer UK shows that reducing the number of pancreatic cancer patients diagnosed as a result of an emergency presentation could significantly increase the number of patients living one year or longer. A 25% reduction in emergency presentation diagnoses, with patients diagnosed via other routes, like the Two Week Wait route, could mean an additional 150 pancreatic cancer patients surviving for one year or longer. It is appreciated that this is a challenging ambition. An ambition that highlights the urgent need for further research into pancreatic cancer screening tests that will aid earlier detection of the disease. However, even a modest reduction of 10% in emergency presentation diagnoses could result in an additional 50 patients surviving a year or longer.

Further research [iii] undertaken by researchers from Imperial College London for Pancreatic Cancer UK highlights the significant cost to the NHS of a pancreatic cancer diagnosis as a result of an emergency admission. This analysis shows an average cost of nearly £5000 per patient for an emergency admission related diagnosis of pancreatic cancer - more than three times higher than the average cost per patient (around £1500) of all NHS emergency admissions combined.

With an average length of inpatient stay of 13.2 days, clinical experts have raised concerns that these patients are experiencing longer waits than necessary for access to diagnostic investigations, and more importantly, to treatment that could extend and improve the quality of their life.

This policy briefing highlights an opportunity to improve pancreatic cancer survival rates. The Government should aim to halve pancreatic cancer diagnoses as a result of emergency presentation and make a commitment via the Cancer Reform Strategy to reduce these by 10% within 3-years. By way of supporting this commitment an audit of deaths of patients who are diagnosed via the emergency admission route must be undertaken. This will determine exactly how many of these cases might be avoided in the future - with a view to identifying actions to increase the number of patients being diagnosed earlier through more appropriate routes. For example, implementation of more appropriate referral pathways and services.

Single points of referral from primary to secondary care for coordination of diagnostic investigations of patients with suspected cancer and access to open referral rapid access clinics, have great potential to increase survival, reduce unnecessary treatment delays for patients as well as NHS costs related to diagnosis. These services should be commissioned on a widespread basis at local level.

Pancreatic cancer – routes to diagnosis

Currently 50% of all pancreatic cancer diagnoses are made as a result of an emergency presentation to hospital, for example, through A&E. This is double the average rate of diagnosis as a result of emergency presentation of all other cancers.[iv]

Importantly, patients diagnosed with cancer as a result of emergency presentation are much less likely to survive the next year. Specifically for pancreatic cancer patients:

- **One-month survival** rates for patients diagnosed as a result of emergency presentation is only 61% compared to an 83% one-month survival rate for patients diagnosed as a result of a GP referral.
- **One-year survival** rates for patients diagnosed as a result of an emergency presentation is only 9% compared to 26% for patients diagnosed as a result of a GP referral.

The fact is that patients diagnosed as a result of emergency presentation to hospital are more likely to be at an advanced stage of the disease. Poor survival rates are not because the patient was diagnosed as an emergency presentation but rather this is indicative of advanced disease.

Our recent 2013 analysis, undertaken by the NCIN for Pancreatic Cancer UK, shows that if pancreatic cancer diagnoses as a result of emergency presentation were halved, and therefore reduced to 25%, and these patients were diagnosed via the Two Week Wait route, as many as 150 additional pancreatic cancer patients would survive for a year or longer. Even a modest reduction of 10% of patients diagnosed through the emergency presentation route would mean an increase of 50 additional pancreatic cancer patients living a year or longer.[v]

Table 1

Estimated number of additional pancreatic cancer patients (per year) surviving 1-year or more if Emergency Presentation (EP) diagnosis of cancer is reduced

	Rate of EP	Estimated no of additional people (per year) surviving their cancer by 1-year
Current	50%	0
Reduce EP rate by 10%	40%	50
Reduce EP rate by 25%	25%	150
No EP	0%	300

The challenge of diagnosing pancreatic cancer

Pancreatic cancer has a well-established reputation as a lethal cancer that is frequently diagnosed at an advanced stage. Early diagnosis represents an enormous challenge – on average a GP will only see one new pancreatic cancer patient every 5-years[vi]. Pancreatic cancer symptoms can be non-specific and some patients only experience symptoms (for example, sudden onset of jaundice) at a late stage. Therefore, for some patients a diagnosis as a result of an emergency presentation may be unavoidable.

However, there is also a growing body of evidence that shows that many pancreatic cancer patients do experience symptoms for some time before diagnosis and do visit their GP. The Department of Health's 2012 National Cancer Patient Experience Survey (NCPES) found that nearly 40% of pancreatic cancer patients visited their GP three or more times before being referred to hospital.[vii] Pancreatic Cancer UK's own research in 2011 found that as many as 25% of patients said they had visited their GP five or more times prior to diagnosis.[viii]

By way of highlighting the challenge, further research undertaken by Pancreatic Cancer UK (2012) based on a survey of over 250 GPs,[ix] found that although most GPs could list one or two possible symptoms, half of those surveyed (49%) said that they were not confident that they could identify the signs and symptoms of possible pancreatic cancer in a patient.

Cost to the NHS of emergency admission pancreatic cancer diagnosis

Pancreatic Cancer UK's aim is simple - improving pancreatic cancer survival rates and patient experience. However, our research has also identified that in addition to lower survival rates, a diagnosis as a result of an emergency admission brings with it significant costs to the NHS.

The research undertaken by Imperial College London researchers for Pancreatic Cancer UK looked at the financial costs associated with patients diagnosed with pancreatic cancer as a result of emergency admission. The analysis drew on data covering 3022 emergency admission patients from 2008 with pancreatic cancer as a primary diagnosis. The analysis identified an average NHS cost per admission (based on 2010 costs) of £4,977 – about 3 times the average cost, per patient, of all emergency admissions combined which is estimated to be in the region of £1,522.[x]. Annually, the cost to the NHS of these pancreatic cancer emergency admissions diagnoses is over £14,650,000.

Perhaps more significantly, this analysis shows an average length of stay of 13.2 days for those pancreatic cancer patients diagnosed as a result of emergency admission. (Although not directly comparable, the average length of elective inpatient stay of patients with cancer is 7.4 days)[xi] Expert clinical feedback on this figure strongly suggests that these patients may be experiencing unnecessary delays in accessing diagnostic investigations, and importantly treatment for relief of symptoms.

In contrast, patients, even those with sudden onset symptoms like jaundice, who are referred, for example, to a rapid access jaundice clinic instead of admitted via an emergency route, will be far more likely to get an urgent referral for a ERCP - a procedure used for diagnosis and more importantly for palliation of symptoms for patients who are not candidates for curative surgery. The referral can be made whilst the patient is still out of hospital with the procedure arranged on a day case basis. This is quicker, avoids expensive bed-days in hospital and reduces the impact of emergency hospital admissions on other elective admissions. These kinds of clinics are available in some hospitals but are not in widespread use across the NHS.

Case-study

Southampton University Hospitals NHS Trust – Rapid Access Clinic for Jaundiced Patients

The Rapid Access Clinic for jaundiced patients was set up in the mid-1990s with the aim of streamlining assessment and initial management. The clinic consists of two slots held open in two general surgery clinics with matching slots for ultrasound (US) examination. Patients are then seen with the US result: those with dilated ducts are scheduled for admission and treatment, usually enhanced CT followed by surgery or therapeutic ERCP as appropriate. Those with normal ducts are seen immediately in a simultaneous Hepatology clinic. Internal audit confirmed that this approach reduced pre-treatment stay (by at least 4 days), and led to this pattern of assessment being incorporated into the cancer waiting time initiative (2-week wait clinic).

Overview and Conclusions

This briefing is concerned with the challenge of improving early diagnosis of pancreatic cancer with a view to improving survival. There are patients who do not experience symptoms, or at least symptoms that they have acted on, prior to their emergency presentation. These emergency admissions, and the late stage at which patients are diagnosed, may not be avoidable. What is avoidable are delays in access to diagnosis, staging of their cancer and the offer of important palliative treatments.

However, there is also a growing body of evidence that shows there are significant numbers of patients that experience symptoms for some time prior to their diagnosis and that do visit their GP. For these patients, it must be acknowledged that the opportunity for treatment at an early stage has been missed and lives may have been needlessly shortened or lost.

Pancreatic Cancer UK's 2012 Early Diagnosis Summit, highlighted below, identified a number of key actions, including increasing awareness, that if implemented could help to improve early diagnosis of pancreatic cancer.

Pancreatic Cancer UK – 2012 Early Diagnosis Summit

In 2012 Pancreatic Cancer UK held an Early Diagnosis Summit with the explicit aim of identifying practical actions that could empower clinicians, including GPs, to support an earlier diagnosis of pancreatic cancer.

The Summit brought together over 70 pancreatic cancer experts including patients, GPs, secondary care clinicians, nurses, NHS managers and senior health policy officials.

The key actions put forward that delegates felt if implemented, could better support clinicians pick up pancreatic cancer concerns earlier were, as follows:

- **Referral pathways**: a strengthening of referral pathways from primary to secondary care for patients with non-specific, persistent symptoms. Currently, cancer referral pathways are designed around site specific concerns and symptoms, for example, those associated with breast or bowel cancer. They do not accommodate referrals for patients with unexplained, persistent non - specific symptoms that give rise to a suspicion of cancer.
- **Tools and resources:** Implementation of tools, like Risk Assessment Tools, in primary care are required to give GPs additional support in identifying patients that should be referred for further investigation. This would help to address the challenge faced by GPs related to determining actions that should be taken for patients with non-specific symptoms. (Macmillan Cancer Support are now piloting decision tool aids across a number of GP practices in the UK).

  In addition, although there are diverging views on this issue, some clinicians do support direct access to diagnostic tools for GPs. In the case of pancreatic cancer this would involve direct access to CT scans.
- **Awareness and education:** All clinicians, including GPs, need increased awareness of pancreatic cancer and its symptoms. Awareness campaigns should be supported by the health service and professional bodies. The general public would also benefit from campaigns that raise awareness of non-specific symptoms that may be a sign of pancreatic concerns.

Pancreatic Cancer UK's strong view is that whilst acknowledging that there will be a number of unavoidable diagnoses of pancreatic cancer as a result of emergency admission there remains significant scope for reducing the number of patients diagnosed through this route - thereby increasing the number of patients that live for one year or longer with their disease. For those patients for whom a diagnosis of pancreatic cancer by emergency admission is unavoidable, there is also significant scope for reducing delays in access to diagnostics, and most importantly treatments that could significantly improve the quality of their life. Achieving both of these aims could also reduce NHS costs related to emergency admission diagnoses.

By outlining new research into the cost to lives and to the NHS of pancreatic cancer diagnoses as a result of emergency admission this briefing underscores the urgent need to take action to improve early diagnosis, including implementation of actions, like improving awareness of pancreatic cancer symptoms, put forward at Pancreatic Cancer UK's Early Diagnosis Summit. Further actions needed are outlined below.

Recommendations

1. Government

Since the launch of our flagship campaign, Campaign for Hope, Pancreatic Cancer UK has worked hard to secure measures that will result in improvements in pancreatic cancer survival and patient experience. During this time, we have been encouraged by a number of initiatives, including the development of a pilot awareness campaign on non-specific cancer symptoms and the pilot (ongoing) of a decision aid tool for GPs.

However, we have also concluded that unless pancreatic cancer is formally acknowledged as a cancer health priority we will not be able to secure the resource, nor focus, from the Department of Health and NHS required to make a significant difference to survival rates and to the lives of the 8,500 people who are diagnosed every year with this disease.

Because of this, **Pancreatic Cancer UK's overriding call to action is for pancreatic cancer to be identified as a cancer health priority.**

As part of this, a commitment to reduce pancreatic cancer diagnoses as result of emergency presentation by at least 10%, with a longer-term aim of halving these is required. Secondly, an audit of deaths of patients diagnosed via an emergency route. This audit would provide further evidence about opportunities for earlier diagnosis and actions that could be taken to avoid future failings in this area.

2. NHS Commissioning Board

2.1 National Clinical Commissioning Group Indicator Set (OCG OIS)

Indicators measure outcomes at Clinical Commissioning Group (CCG) level to help inform priority setting and drive local improvement. The areas covered by the indicators contribute to the five domains of the NHS Outcomes Framework, including preventing people from dying prematurely. The NHS Commissioning Board will decide the final set of indicators in autumn 2013.

In view of the current position regarding pancreatic cancer survival, and the opportunity to improve survival by improving earlier diagnosis highlighted in this briefing, **Pancreatic Cancer UK is calling for the NHS Commissioning Board to introduce specific pancreatic cancer indicators related to diagnosis and treatment – as there currently are for example, for breast cancer (mortality and recurrence rates) and lung cancer (includes 3-month and 1-year survival)**.

These pancreatic cancer specific indicators must include:

- 3-month and 1-year survival rates
- Proportion of patients diagnosed via emergency admission
- Stage of disease at time of diagnosis
- Resection rates

Indicators that are specific to pancreatic cancer will go some way to ensuring that CCGs acknowledge the importance of achieving improvements in pancreatic cancer early diagnosis and survival.

2.2 NICE Quality Standard

We are also calling for the NHS Commissioning Board, as a matter of urgency, to **request the National Institute for Health and Clinical Excellence (NICE) to develop a pancreatic cancer quality standard**. NICE quality standards set out high-priority areas for quality improvement, which are aspirational but achievable, in a defined care or service area. NICE quality standards are not mandatory but they can be used for a wide range of purposes both locally and nationally. For example, commissioners can use the quality standards to ensure high-quality care is being commissioned through the contracting process or to incentivise provider performance.

This quality standard is important for the reasons highlighted above, in particular to highlight pancreatic cancer survival as an area that must be improved. However, it is also important as there is an urgent requirement for a review of the service specifications set out in the 2001 Improving Outcomes Guidelines (produced by the DH) and to incorporate any new developments since that could improve early diagnosis, for example, implementation of decision aid tools for GPs, should the evaluation of the pilot show promising results.

2.3 Cancer Referral Pathway Guidelines for patients with unexplained, persistent, non-specific symptoms

NICE guidelines currently exist for referral of patients with an unknown secondary cancer. There is some debate about whether these referral guidelines are also applicable for patients with a suspected primary cancer of unknown origin. What is agreed however is that clarification is needed. **Pancreatic Cancer UK is calling for the NHS Commissioning Board (or DH if appropriate) to ask NICE to review the status of these guidelines. Should it be determined that the guidelines extend to patients with suspected primary as well as suspected secondary cancer, this must be clearly communicated to GPs and secondary care providers. If they are not found to be adequate, development of a new referral guideline for patients with an unknown primary cancer is urgently required**.

3. **Department of Health**

3.1 Awareness campaigns

We are awaiting the outcome of the evaluation of the Know 4 Sure public awareness campaign on non-specific cancer symptoms. Should this evaluation show a positive impact on the number of patients with pancreatic cancer being referred for investigation, it is essential that the campaign be funded to be rolled-out on a national scale. It is also **essential that the evaluation examine whether existing referral pathways from primary to secondary care adequately support prompt and appropriate referral of patients with non-specific symptoms**.

3.2 Decision Aid Tools (Risk Assessment Tools)

The Department of Health is currently funding Macmillan Cancer Support to undertake a pilot of decision aid tools to support GPs in identifying patients who may require further investigation for cancer, including pancreatic cancer. The pilot is being evaluated by Cancer Research UK. **Should this pilot show that use of these tools improve referral of patients for investigation of pancreatic cancer, the Department of Health must take action to support their widespread implementation within primary care**.

4. **NICE**

NICE Referral Guidelines for suspected cancer are currently under review. Feedback to date suggests a strong preference for introduction of guidelines that focus on symptoms as much as on site specific tumours. Pancreatic Cancer UK welcomes this move and looks forward to the forthcoming publication of the draft guidelines. In the interim, **we would ask the NICE Guideline Development Group to take on board the research outlined in this briefing to ensure that the draft guidelines address the issues, as appropriate, related to pancreatic cancer emergency admissions**.

5. **Local Commissioners and Providers – Clinical Commissioning Groups**

Local commissioners (CCGs) also have a role to play. As this briefing outlines, measures that can support an increase in early detection of pancreatic cancer patients – before patients become emergency admission cases – are urgently required. Other measures that address unnecessary delays in diagnosis and treatment for those patients where emergency admission may not be avoided are also required.

These measures include:

Improved coordination between primary and secondary care for dealing with patients with unexplained, nonspecific symptoms. **Pancreatic Cancer UK believes that there is an urgent need for local commissioners to commission providers to offer:**

- **A single point of referral for coordination of cancer diagnostics for patients with unexplained, nonspecific symptoms**
- **Rapid Access Clinics, like the jaundice clinic case study highlighted in this briefing, that offer a more appropriate and streamlined service for patients with sudden onset emergency symptoms**

Currently, patients with nonspecific symptoms may have several different and separate referrals to specialist areas for investigations - each time returning to their GP for the outcome of test results. Should the referral not identify the source of their problem, they should be referred to another specialist area for further investigation. Secondary care consultants do not have the authority to make direct referrals within hospital to consultants in other specialist areas. The effect for patients is like that of being a human ping-pong ball being batted back and forth between primary and secondary care until the source of their problem is identified. More importantly, this arrangement must bring with it significant delays in relation to diagnosis – delays that pancreatic cancer patients cannot afford. A single point for access and coordination of diagnostics for these patients could significantly reduce the time it takes to identify the underlying problem.

Similarly, the opportunity offered by Rapid Access Clinics is that patients with symptoms, like jaundice, that require urgent attention are much more likely to receive quicker access appropriate clinicians and tests – and avoid delays associated with standard emergency admission routes.

Finally, based on informal feedback from contact with a significant number of named contacts for local HPB/pancreatic cancer site-specific tumour working groups, Pancreatic Cancer UK is aware that the abolishment of Cancer Networks has meant that many have struggled to continue to function. Most of these groups will have relied on Cancer Networks for support and coordination of their work and many report that this support is no longer provided under the new arrangements. These groups play a critical role in driving improvements in services and pathway processes and must continue to be supported. **Local Commissioning Groups must make provision to ensure that these HBP/pancreatic cancer tumour groups are resourced to do this important work.**

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[i] Study for Survival, Pancreatic Cancer UK, 2011

[ii] National Cancer Intelligence Network (NCIN), - For Pancreatic Cancer UK; Projections of additional number of people living 1 year or longer if emergency admission diagnosis of pancreatic cancer were reduced and patients were diagnosed through other routes, 2013 (England).

[iii] Estimating the cost of inpatient care in patients diagnosed with pancreatic Cancer as a result of an emergency admission, Mauro Laudicello, Imperial College London, 2013 (England).

[iv] Routes to Diagnosis, 2006-2008, NCIN information supplement, 2012

[v] Abdel-Rahman M, Stockton D, Rachet B, Hakulinen T, Coleman MP (2009) What if cancer survival in Britain were the same as in Europe: how many deaths are avoidable? BJM 101 (Supple 2): S115-S124

[vi] NHS Executive, Improving Outcomes in Upper Gastro-intestinal Cancer, NHS Executive, 2001

[vii] Cancer Patient Experience Surrey, 2011/12, Department of Health, 2012

[viii] Study for Survival, Pancreatic Cancer UK, 2011

[ix] Pancreatic Cancer UK, GP Early Diagnosis Survey, 2012

[x] https://www.gov.uk/government/publications/2010-11-reference-costs-publication

[xi] Hospital Episode Statistics (HES) 2008/09, Health And Social Care Information Centre

APPENDIX 1

Estimating the Cost of Inpatient Care in Patients Diagnosed with Pancreatic Cancer as a Result of an Emergency Admission

Author:
Mauro Laudicella, PhD

Objectives
This work estimates the direct cost of hospital care in patients with a diagnosis of pancreatic cancer as result of an emergency admission in 2008

Study design
Observational cohort study

Study setting, patients, and main outcome measures
We selected a cohort of 3,022 patients admitted to NHS hospitals as emergency in 2008 and having a primary diagnosis of pancreatic cancer. Patients are followed up to 365 days from first admission. We exclude 5,724 patents reporting a diagnosis of pancreatic cancer during earlier hospital admissions and 2,157 patients with a diagnosis of pancreatic cancer other than their primary diagnosis. The first sample is excluded because the patient diagnosis has been made outside the time window relevant to our study. The second sample is excluded since the main reason for the hospital admission is not pancreatic cancer and the cancer diagnosis is likely to be already known at the time of the emergency admission.

We measured the cost of all the HRG (homogeneous resource groups) services delivered to these patients during their first emergency admissions in 2008. We include costs generated by excessive length of stay and utilisation of special services, such as diagnostic imaging, chemo and radiotherapy, rehabilitation, specialist palliative care. We also measure the costs of subsequent emergency admissions occurring within 365 days from first admission.

Methods
Patients with a diagnosis of pancreatic cancer (ICD-10 code C25) are extracted from the Hospital Episodes Statistics from 2006 to 2009 fiscal years. From such a population, we select our patient cohort by including all patients with an emergency admissions in NHS hospitals occurring in 2008 (calendar year) and with a primary diagnosis of pancreatic cancer. The long time series allows us to exclude from our cohort patients reporting a diagnosis of pancreatic cancer in hospital admissions occurring before 2008. Also, we are able to identify subsequent emergency admissions occurring to our patient cohort up to 365 days after their first admission.

We link hospital episodes of care into spells of care that track patients from initial hospital admission to hospital discharge using methodology developed in earlier studies [2].

The HRG costing grouper [3] was used to group hospital activity into HRG v4. Then, data on service costs reported by NHS hospitals in the National Schedules of Reference Costs [4] are linked to patient spells of care using methodology developed in previous studies [5, 6].

Results
The average cost of the first emergency admission in our patient cohort is £4,977 (at 2010 prices). 22.9% of the sample (691 patients) experiences at least a second emergency admission within 365 days from the first admission and with an additional cost of £3,798 for these patients. The average total cost of all the emergency admissions experience by our patient cohort within 365 days of first admission is £7,040.

Earlier studies reports 6,007 new diagnoses of patients with pancreatic cancer in 2008 with 49% (2,943 patients) diagnosed after an emergency hospital admission. Combining these numbers with the results of our work, we can provide an estimate of the total cost of hospital care in patients diagnosed with pancreatic cancer as a result of an emergency admission in 2008:

Total cost of first emergency admissions in 2008:
£4,977*6,007*0.49 = £14,651,635

95% Confidence intervals:
£3,336,446 – £34,023,519

Total cost of all emergency admissions occurring within 365 days from first admission:
£7,040*6,007*0.49 = £20,724,058

95% Confidence intervals:
£4,664,866 - £50,793,830

The most frequent HRG service delivered to the patients in our sample is care management for "Malignant Liver and Pancreatic Disorders with length of stay 2 days or more" (HRG code: GC12A) with 1,462 patients (48% of the sample). This HRG costs £2,604 if delivered during an emergency admission and £2,713 if delivered during an elective admission. The lower service costs reported for emergency admissions are most likely explained by the poorer health and lower chance of survival of patients admitted as emergency with respect to patients admitted as elective. This in turn affects patient's length of hospital stay and her/his ability of receiving expensive care.

Study limitations and Conclusions
The data on costs used in this study are obtained from the hospital submissions to the National Schedules of Reference Costs in 2010. A 3% annual inflation rate can be applied to obtain the cost at 2013 prices. We use data on costs reported in 2010 to optimize the time allocated to this work as we have used similar data in earlier works.

The costs considered in this analysis do not include critical care and rehabilitation services provided during the hospital stay. Also, the costs of care occurring after the patient is transferred from the hospital of first admission to a different hospital are not included in this study. We expect the average cost of emergency admissions to increase if such costs are included as some patients are likely to be transferred to more specialised centres once the diagnosis of pancreatic cancer is reached. Estimating costs occurring after hospital transfers requires a more sophisticated analysis that can be delivered at a later stage if required.

Administrative data used in this study have the advantage of covering the whole population of patients with pancreatic cancer accessing hospital care. However, measurement errors and misreporting might affect the quality of the data as it has been reported elsewhere [7]. Our knowledge and experience in the manipulation of these data has been devoted to exclude outliers and minimize the impact of measurement error in the analysis.

The data used in this analysis does not contain direct information on the route to cancer diagnosis. We use our experience to identify a cohort of patients most likely to have been diagnosed with cancer during an emergency admission. However, we cannot exclude that a share of patients in our cohort has been diagnosed with cancer via different routes and before the hospital admissions examined in our study. Remarkably, our patient cohort (3,022 patients) is very close to the estimated population of patients diagnosed with pancreatic cancer as result of an emergency admission (2,943 patients) and reported in an earlier study by the National Cancer Intelligence Network 1.

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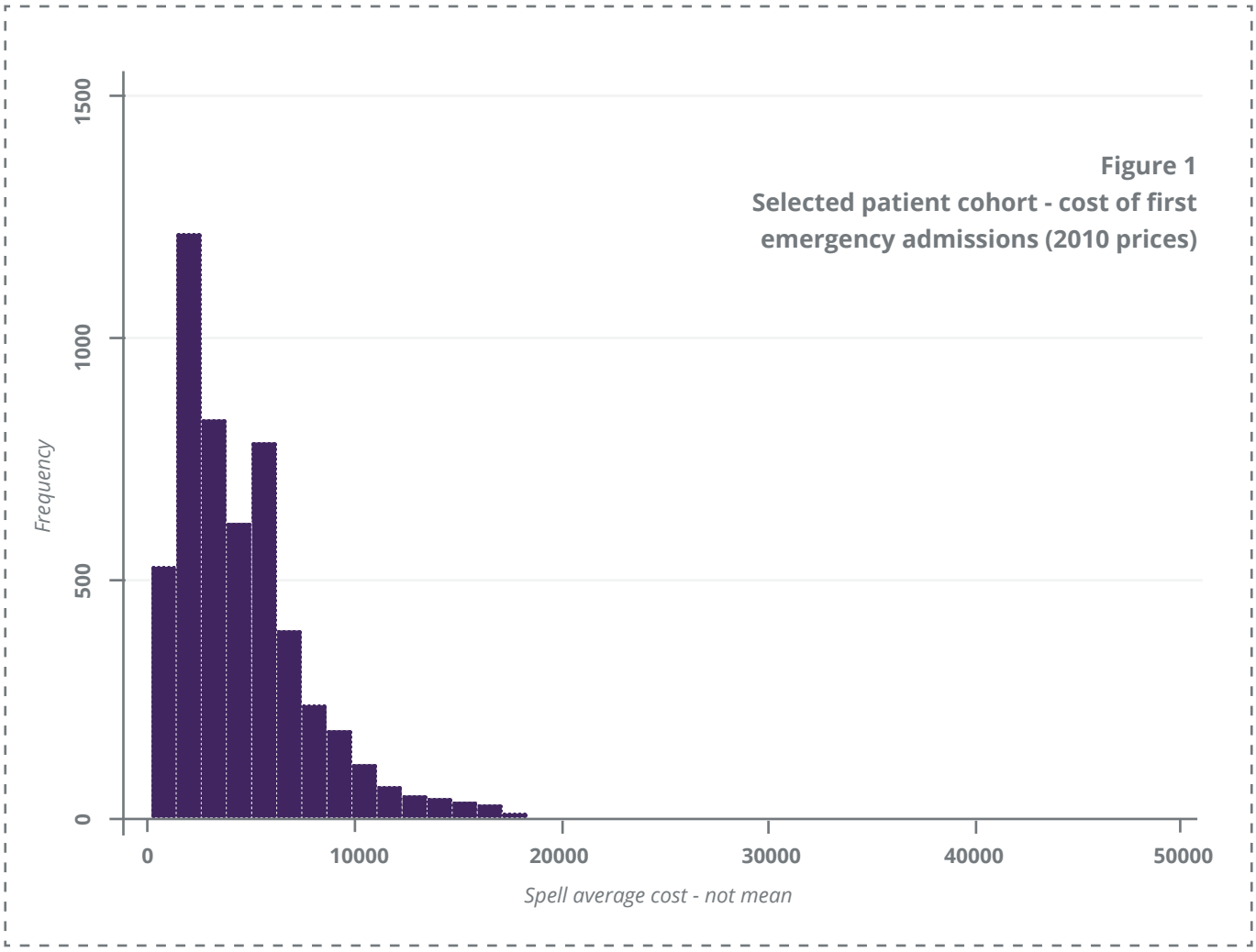

Figure 1
Selected patient cohort - cost of first emergency admissions (2010 prices)

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