Cancer as a Cause of Low Back Pain?

A retrospective pilot study reviewing the outcome of 43 patients with low back pain and a history of cancer who presented to Greater Glasgow Back Pain Service (GGBPS) between 2006-2008.

Eden Keillar, GGBPS, March 2009
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1.0 Abstract

**Purpose:** As 'history of cancer' is the red flag that raises the greatest index of suspicion to malignancy being the underlying cause of LBP the aim of this review was to determine the outcome of 43 patients who presented to the GGBPS between 2006-2008 with low back pain and a history of cancer.

**Methods:** Subject data was extracted from the GGBPS database, a resource which collects information from every patient who presents with LBP and is assessed by one of the 13 clinical physiotherapy specialists throughout Greater Glasgow. A data collection tool was used to audit the required information from physiotherapy and medical notes.

**Results:** Of the 43 subjects reviewed, 7% (n=3) were diagnosed with spinal metastasis as a cause of their low back pain. The patients with a diagnosis of spinal metastasis had twice as many red flags as those patients with mechanical LBP. The most common types of red flags were found to be identical between both the patients with spinal metastasis as a cause of their LBP and the patients with mechanical LBP (Age >55 years, night pain and leg weakness). The patients that failed to respond to physiotherapy and were referred back to their GP (49%) had an inconsistent route to diagnosis. The duration from onset of symptoms to diagnosis for the three subjects who were diagnosed with spinal metastasis as a cause of their LBP averaged 9 weeks.

**Conclusion:** The results should be interpreted with a degree of caution due to the small sample size. 7% of patients with LBP and a previous history of cancer were found to have spinal metastasis as a cause of their LBP. Despite this group having twice as many red flags as the group without spinal metastasis the types of red flags were indistinguishable. Do more effective referral pathways need to be established for GP’s to help reduce the delay in diagnosis with patients with suspected spinal metastasis? A larger retrospective study may further the evidence base on red flags already identified as having a strong index of suspicion. But most importantly, identify red flags we are less familiar with and look in greater detail how relevant the quantity of red flags are in screening for serious spinal pathology.
2.0 Introduction

Low back pain (LBP) is one of the most common complaints encountered in the health care setting, with some research estimating that 80% of people will experience back pain at some time during their life (Deyo & Tsui-Wu, 1987). Of this group, 20% of people will seek medical attention through the NHS, with the largest single professional group who treat LBP (after GPs) being Physiotherapists. It is estimated that Physiotherapists will assess and treat approximately 1.3 million people each year in the UK suffering from LBP (Mandiakis & Gray 2000; Nachemson et al, 2000; Pengel et al, 2003; Pinnington et al 2004) of which more than 55,000 patients with LBP will be referred to physiotherapy in Scotland alone (NHS QIS, 2009).

Access to physiotherapy for patients with LBP was previously controlled by a traditional medical model, namely GP controlled referral. However, more recently there has been a blurring of professional boundaries and more creative ways of developing health care such as patient self referral and Extended Scope Practitioner roles (Greenhaugh & Selfe, 2006). The overall physiotherapy management of patients suffering LBP within Greater Glasgow is overseen by Greater Glasgow Back Pain Service (GGBPS). The service, established in September 2002, is led by a lead clinician and 12 clinical specialist physiotherapists, and was set up to enable patients with low back pain to be assessed quickly and managed appropriately. With widening access through innovations such as patient self referral, Physiotherapists are increasingly the first medical point of contact. It is inevitable therefore, that with these changing times, characterised by innovative services and shifting professional boundaries, Physiotherapists will face the challenge of identifying serious spinal pathology (Greenhalgh & Selfe, 2006).

However, in the majority of cases LBP is benign and self limiting in nature, a specific diagnosis is rarely made and 90% of patients recover within 4-6 weeks (Pengel et al. 2003).

The main purpose of the clinician’s assessment is to identify those cases where LBP is caused by serious spinal pathology such as malignancy, infection, vertebral fracture and inflammatory diseases. Whilst malignancy is the most common, specifically spinal metastasis, the prevalence among primary care patients with low back pain is less than 1% (Deyo et al. 1992). However, early diagnosis and
treatment of spinal metastasis is important to help with pain control, prevent further spread and the development of other complications such as bladder and bowel dysfunction and cord compression (Joines et al 2001).

Clinical guidelines for the management of LBP have recommended the use of ‘red flag’ screening questions to alert clinicians to the presence of serious spinal pathology and indicate when further medical review is required, table 1 (Koes et al. 2001, Waddell, 2004, CSAG, 1994)

Table 2.1 Red Flags (CSAG, 1994)

<table>
<thead>
<tr>
<th>• Age &lt; 20 or &gt; 55 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Violent Trauma</td>
</tr>
<tr>
<td>• Constant progressive, non mechanical pain</td>
</tr>
<tr>
<td>• Thoracic pain</td>
</tr>
<tr>
<td>• Previous history of Cancer</td>
</tr>
<tr>
<td>• Systemic Steroids</td>
</tr>
<tr>
<td>• Drug abuse/HIV</td>
</tr>
<tr>
<td>• Systemically unwell</td>
</tr>
<tr>
<td>• Weight loss</td>
</tr>
<tr>
<td>• Persistent severe restriction of lumbar flexion</td>
</tr>
<tr>
<td>• Widespread neurology</td>
</tr>
<tr>
<td>• Structural deformity</td>
</tr>
</tbody>
</table>

The red flag combination with the highest likelihood ratios for predicting cancer as a cause of LBP were a previous history of cancer, age greater than 50, unexplained weight loss and the failure to improve with conservative management (Deyo & Diehl, 1988). More recently, Henschke (2007) stated that a previous history of cancer is the red flag that raises the greatest index of suspicion to malignancy being the underlying cause of LBP.

Therefore the aim of this review is to analyse the outcome of patients who presented to GGBPS between 2006-2008 with low back pain and a history of cancer. More specifically the review will examine:

1. The number of patients with LBP and a history of cancer that actually had a diagnosis of spinal metastasis.
2. The patient's pathway to diagnosis.
3. The number and type of red flags present.
3.0 Methodology

3.1 Subjects

43 subjects’ data was extracted retrospectively from the GGBPS database, a resource which collects data from every patient who presents with LBP and is assessed by one of the 13 clinical physiotherapy specialists throughout Greater Glasgow. This data includes information such as:

- Age
- Sex
- Postcode
- Current symptoms
- Duration of symptoms
- Onset of symptoms
- Red/yellow flags
- Objective findings such as neurological testing
- Overall patient outcome.

By documenting ‘history of cancer’ as a red flag on initial assessment the database is able to generate a report on all patients who have been assessed by the GGBPS with LBP and a history of cancer.

The GGBPS database generated 11,729 patient entries between January 2004 and December 2008, of which 355 patients (3%) presented with LBP and a previous history of cancer. Of the 355 patients, a convenience sample of 43 was selected to be retrospectively reviewed by half of the specialist team. Each of the 6 clinical physiotherapy specialists represented different localities with in the Community Health Care Partnerships allowing a more accurate patient review throughout Greater Glasgow.

3.2 Data Collection

A data collection tool was established to document and audit the required information from physiotherapy and medical notes, Appendix 1. The physiotherapy notes were reviewed to establish age, sex, current symptoms, duration, onset and behaviour of symptoms, previous history of LBP, type of primary cancer and date of diagnosis, red
flags on initial assessment or subsequent visits, any investigations since onset of LBP and overall outcome.

If the patient’s symptoms did not resolve with conservative management and were referred back to their GP for a medical review, the patient’s medical notes were audited to establish diagnosis, pathway to diagnosis, investigations performed and duration of onset to diagnosis. Each clinical specialist was responsible for collecting patient data from their geographical locality.

Descriptive statistics were carried out to analyse the study population. Significance testing between groups was not carried out due to the small sample size.

For the purpose of this study the term ‘spinal metastasis’ was adopted and defined as the spread of cancer from the primary tumour site to the spine.

4.0 Results

4.1 Study Population

43 patients with low back pain and a history of cancer were retrospectively reviewed, of which 67% (n=29) were female and 33% (n=14) were male, ranging in age from 30 to 90 years (mean, 61 years, SD=14.27). 72% (n=31) reported having had LBP for 3 months or less, of which 37% (n=16) described their symptoms as worsening, with the other 63% reporting their symptoms either improving (33%) or unchanging (30%). 86% (n=37) described an insidious onset of their current episode of LBP, and 65% (n=28) had reported a previous history of LBP at some point prior. The most common types of cancer being breast (30%), bowel (12%) and Uterus/Cervix or Ovarian (12%), figure 4.1.
Figure 4.1 Subjects Primary Cancer Diagnoses (n=43)

4.2 Investigations Prior to Physiotherapy Referral

Prior to physiotherapy referral, 68% (n=29) of the subjects reported having had some type of investigation since their onset of LBP. The most common being bloods (66%) and lumbar spine x-ray (29%), figure 4.2. The percentages do not exclusively add up to 100% as some subjects had more than one test performed. 32% (n=14) of subjects had no investigations performed prior to their referral to physiotherapy.
4.3 Red Flags on Physiotherapy Assessment

The mean number of red flags reported by subjects on initial physiotherapy assessment was 1.88, figure 4.3.

![Figure 4.3 A Comparison of the Average Number of Red Flags Between Subjects with Mechanical LBP and Subjects Diagnosed with Spinal Metastasis](image)

The most common types of red flags included Age >55 (63%), night pain (21%), leg weakness (19%), weight loss (14%), table 4.1.

Table 4.1 A Comparison of the Prevalence Rates of Red Flags Between Patients with and without a Diagnosis of Spinal Metastasis as a cause of their LBP

<table>
<thead>
<tr>
<th>RED FLAGS</th>
<th>Prevalence Rate of Patients with Spinal Metastasis (n=3)</th>
<th>Prevalence Rate of Patients without Spinal Metastasis (n=40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &lt;20 or &gt;55</td>
<td>100% (n=3)</td>
<td>60% (n=24)</td>
</tr>
<tr>
<td>Weight loss</td>
<td>33% (n=1)</td>
<td>13% (n=5)</td>
</tr>
<tr>
<td>Thoracic pain</td>
<td>0</td>
<td>5% (n=2)</td>
</tr>
<tr>
<td>Lumbar flexion</td>
<td>33% (n=1)</td>
<td>5% (n=2)</td>
</tr>
<tr>
<td>Night pain</td>
<td>66% (n=2)</td>
<td>18% (n=7)</td>
</tr>
<tr>
<td>Constant nonmechanical pain</td>
<td>33% (n=1)</td>
<td>10% (n=4)</td>
</tr>
<tr>
<td>Trauma</td>
<td>0</td>
<td>5% (n=2)</td>
</tr>
<tr>
<td>HIV/Drugs</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Widespread Neuro</td>
<td>33% (n=1)</td>
<td>8% (n=3)</td>
</tr>
<tr>
<td>Cough/Sneeze</td>
<td>0</td>
<td>10% (n=4)</td>
</tr>
<tr>
<td>Leg weakness/Gait abnormalities</td>
<td>66% (n=2)</td>
<td>15% (n=6)</td>
</tr>
<tr>
<td>Systemically unwell</td>
<td>0</td>
<td>8% (n=3)</td>
</tr>
</tbody>
</table>
4.4 Outcome of Physiotherapy Intervention

51% (n=22) of patients reported their symptoms resolved with physiotherapy input and were happy to self care. However, 49% (n=21) failed to resolve with physiotherapy, therefore, all 21 patients with a history of cancer who failed to respond to physiotherapy were, in line with GGBPS guidelines, referred back to their GP for a medical review.

Of these referred back to the GP, 14% (n=3) were diagnosed with serious spinal pathology, namely spinal metastasis, 14% with spinal stenosis and 14% with a prolapsed disc, see figure 4.4. At present, in 24% (n=5) of patients in the review, diagnosis was not established; either due to the patient being deceased or they have not received further investigations to date.

![Figure 4.4 Diagnoses of subjects that failed to respond to physiotherapy]

4.5 Onward Referral

The pathway to diagnosis for patients with suspected spinal pathology not resolving with conservative management was varied. 29% (n=6) patients were reviewed by Orthopaedics, 14% by Neurosurgery and 14% by Oncology, see figure 4.5. 24% (n=5) patients pathway to diagnosis was unknown due to the patient being deceased or awaiting further investigations. The most common investigations reported were MRI (52%) and isotopic bone scan (24%). In 10% of cases both MRI and a bone scan were performed.
Of the 43 subjects reviewed, 7% (n=3) were diagnosed with spinal metastasis as a cause of their low back pain. Appendix 2 highlights the demographic and clinical features of these three patients in more detail.

All three subjects were older than 55 years of age (mean 61 years: SD=5.13), 67% (n=2) were male and 33% (n=1) female. No subjects reported LBP as their only symptom, in fact one subject reported no LBP just leg pain. All three subjects reported leg symptoms, either unilateral (67%) or bilateral (33%). All subjects reported a previous history of episodic low back pain, with this current episode being of insidious onset, ranging in duration from 3-72 weeks (mean 28 weeks), with the symptoms either unchanging or worsening.

Their primary diagnosis of cancer was that of the bowel, liver, breast and kidney, 66% (n=2) were diagnosed in the past 5 years, however, one patient’s primary diagnosis of kidney cancer was 35 years ago. 66% (n=2) had bloods taken and lumbar spine x-rays performed prior to physiotherapy assessment and showed no abnormalities. One subject with no tests done prior to physiotherapy assessment, however, reported a planned 6-monthly review with Oncology in 2 weeks time.
4.7 Spinal Metastasis and Red Flags

During their initial physiotherapy assessment the subjects who were found to have spinal metastasis as a cause of their LBP reported red flags ranging from 3-5 (mean 3.7), figure 4.3.

The most common types of red flag being:

- Age > 55 years (100%)
- Previous history of cancer (100%)
- Night pain (66%)
- Leg weakness (66%), table 4.1.

Two subjects reported further red flags on subsequent visits, including the pain becoming constant nonmechanical and a worsening of their gait and leg weakness. This patient went on to develop malignant spinal cord compression.

4.8 Pathway and Time to Diagnosis

The pathway to diagnosis varied for all three patients with spinal metastasis. One patient’s 6-monthly review at oncology was due at a similar time to his onset of symptoms, therefore, a whole spine MRI was conducted and spinal metastasis promptly diagnosed. Another patient was admitted via Accident & Emergency and an MRI concluded malignant spinal cord compression due to spinal metastasis. The final patient was a medical admission via their GP and further investigations, including an MRI and bone scan, concluded spinal metastasis.

The time from onset of symptoms to diagnosis ranged from 7-12 weeks (mean 9 weeks), figure 4.6.
5.0 Discussion

5.1 Patients with Spinal Metastasis

The review found that 7% (n=3) of patients with LBP and a history of cancer went on to have a diagnosis of spinal metastasis as a cause of their low back pain. There appears to be very few studies available in the literature comparing similar study populations. Hatrick *et al.* (2000) states that the vertebral column is the most common site of skeletal metastases, with up to 70-80% of cancer patients harbouring secondary spinal disease. However, Grant *et al.* (1991) went on to say that only up to 10% of cancer patients will develop symptomatic spinal metastasis, a similar figure found in this review.

A comprehensive study by Deyo & Diehl (1988) looking at cancer as a cause of back pain in 1,975 patients, whose chief complaint was LBP with no known history of cancer, found only 0.66% (n=13) to have underlying cancer as a cause of their LBP. However, of these 13 patients, 31% (n=4) had a previous history of cancer, a much higher figure than stated by Grant *et al.* (1991) and reported in this pilot study.

Despite cancer remaining a very rare cause of LBP, affecting less than 1% of the population, having a patient with a history of cancer and LBP increases the index of suspicion of spinal metastasis as a potential cause, but by how much is still unclear.
Henschke et al. (2007) stated that a previous history of cancer is the most informative red flag, with a pooled LR+ of 23.7.

As Henschke et al. (2007) points out, despite the evidence being favourable towards certain red flags such as previous history of cancer, the conclusions are based on previous guidelines in which the evidence was lacking or single studies performed by the likes of Deyo & Diehl (1988) over 20 years ago. Therefore, because of the importance of identifying patients with low back pain caused by spinal malignancy more up-to-date research is required to aid clinicians in their screening process.

Of the 43 subjects studied in this review 44% had a primary diagnosis of breast, lung or prostate cancer, the three most common areas of origin, accounting for more than 80%, of spinal metastasis (Jarvik & Deyo 2002). In addition, it has been suggested that metastasis often presents 2-5 years after the primary diagnosis (Goodman et al. 1998). Although only one of the three patients diagnosed with metastasis as a cause of their LBP had either breast, lung or prostate cancer, two out of the three were diagnosed with in 5 years of their primary tumour. However, one patient went on to be diagnosed with spinal metastasis 35 years after their original diagnosis of kidney cancer. Despite it proving difficult to find any literature to support secondary spread so long after a primary diagnosis, Goodman et al. (1988) does say that some low grade lesions can develop metastasis as much as 20 years later.

5.2 Red Flags

One the most interesting findings of the review was that the subjects with a diagnosis of spinal malignancy as a cause of their LBP had on average twice as many red flags as those whose back pain was of a mechanical origin, see figure 3. The malignancy group averaging 3.77 red flags and the mechanical low back pain 1.88 red flags. However, contrary to this, the individual patient with the highest number of red flags, six in total, had comprehensive investigations performed which were all found to be negative for any serious pathology and resulted in the patient being referred to the pain clinic for chronic pain management.

The most common types of red flags were found to be identical between both the subjects with spinal malignancy as a cause of their LBP and the subjects with mechanical LBP. These were; age >55, night pain and leg weakness. This poses a challenge for clinicians screening patients for spinal malignancy. Such screening
would no doubt be refined if the most relevant types of red flags could be more clearly established. It also demands consideration of the question – is the quantity (total number of red flags) more pertinent that the type of red flag?

Deyo & Diehl's (1988) review of 1,975 compared the prevalence of certain red flags found in the 13 patients with a diagnosis of cancer as a cause of their LBP. Findings that were significantly more common in the cancer patients, resulting in a 1.00 sensitivity rate, included age > 50 years, failure to respond to conservative treatment after 4 weeks and a previous history of cancer. Although not statistically significant weight loss was also associated with cancer. From this and other research Greenhalgh & Selfe (2006) has established a Hierarchical list of red flags giving more weight towards either combinations of red flags or certain types of red flags being more relevant than the quantity of red flags. At present there appears to be very little research examining the quantity of red flags and their relevance to serious spinal pathology.

Of the 43 patients in this review, more than half (51%) had red flags including age >50, history of cancer and failed to respond to conservative management after 4 weeks and were referred back to their GP for medical review. Of these, 14% (n=3) patients were found to have spinal metastasis of their spine and only one patient had all four red flags mentioned above in Deyo & Diehl’s (1988) study. The majority of the remaining patients that failed to respond to conservative management had degenerative spinal pathology or other non-serious spinal pathology, see figure 4.

Again this highlights the difficulty clinicians have in using red flags in differentiating between serious spinal pathology and degenerative spinal disease. When analysing the problem of differential diagnosis of spinal tumours in coexisting degenerative spine disease Borm et al. (2004) concluded that spinal tumours can mimic the typical clinical picture of disc herniation or lumbar stenosis, therefore, no definitive diagnosis can be made on clinical findings alone. Moreover, they stated that an MRI was the most helpful diagnostic tool, however, emphasised the importance of a whole spine MRI as a number of patients presented with lumbar symptoms despite the lesion being situated a considerable distance away in the thoracic spine. This emphasises the important point that - any patient with a history of cancer and persistent LBP that is not resolving with conservative management - requires a prompt medical review.
A similar retrospective review with a greater sample size may be justified and go some way to helping clinicians identifying which red flags are statistically more significant to help differentiate between patients with spinal malignancy and mechanical LBP. Henschke (2007) emphasised this point when reviewing the screening process of patients with malignancy. He states that it would be useful to have a more accurate red flag screening tool that puts emphasis on combinations of red flags that elevate the index of suspicion of malignancy. In addition Henschke (2007) highlights that 70% of the clinical features identified come from one study by Deyo & Diehl (1988) over 20 years ago and that future research is needed to evaluate other factors such as clinical judgement and possibly clinical features such as leg weakness or night pain.

5.2 Investigations

68% of patients with LBP and a history of cancer had some sort of investigation performed prior to physiotherapy referral. The other 32% reported no formal investigations. This could be due to either the GP not feeling that any investigations were appropriate at that time, as almost half of patients (47%) had their symptoms for less than 6 weeks, or that with the introduction of self-referral patients did not consult their GP prior to physiotherapy referral.

As far as the author is aware there are no current guidelines on the medical screening of patients with a history of cancer and an acute onset of LBP. However, there have been proposed recommendations if certain clinical features are present (Deyo & Diehl, 1988; Joines et al., 2001; Henschke et al, 2007). Henschke et al. (2007) highlighted if the patient has a previous history of cancer, ESR and anaemia were found to be useful screening tools for malignancy. Joines et al. (2001) recommended either ESR +/- x-ray +/- imaging if the patient has one or more of history of cancer, age > 50 years, weight loss or failure to resolve with conservative therapy. Likewise Deyo & Diehl (1988) highlighted using ESR and x-ray as a screening tool for malignancy.

Of the three patients with a diagnosis of spinal metastasis, two of them had bloods and lumbar spine x-rays performed prior to physiotherapy assessment. Both patients results came back negative, however, further imaging did pick up spinal malignancy.
Despite ESR and x-ray alone having a relatively poor sensitivity for the detection of spinal malignancy Deyo & Diehl, (1988); Joines et al. (2001) and Henschke et al. (2007) all agree that ESR and lumbar spine x-ray are useful screening tools in patients with LBP and a history of cancer and/or age > 55 years and/or weight loss and/or a failure to respond to conservative therapy. Despite these being useful screening tools this review has shown that they are not always sensitive enough to pick up serious spinal pathology. Therefore, further imaging in the form of a whole spine MRI has been suggested to be the gold standard when spinal malignancy is suspected (Godersky, et al, 1987, Sze, 1991).

5.3 Onward Referral

The three patients with spinal metastasis as a cause of their LBP had a varied pathway to diagnosis ranging from medical admission via their GP, patient attending A&E themselves to a coincidental 6-monthly oncology review. The mean duration from onset of symptoms to diagnosis was 9 weeks, with one patient having a delay of approximately 12 weeks. This compares to the Deyo & Diehl (1988) study, were the mean time to diagnosis was 7.3 weeks, with 3 patients having delays of approximately 12 weeks. In addition, when auditing the delays in diagnosis of Malignant Spinal Cord Compression (MSCC) Levack et al. (2002) reported patients waiting on average 12 weeks before a definitive diagnosis was established. Those with a known history of cancer were diagnosed quicker, with a median of 7 weeks. The authors concluded that the patients in this review were diagnosed too late for treatment to be effective.

Since then the West of Scotland MSCC guidelines have been established following an audit by McLinton & Hutchinson (2006), developing a detailed referral pathway for patients in all care settings with suspected MSCC. However, what about patients without cord compression that have nonresolving LBP and a history of cancer? Should there be a clearer pathway established for GPs to ensure a smooth and more consistent patient journey? This in turn may potentially reduce the delay in time to diagnosis of the patient with suspected spinal malignancy.

6.0 Conclusion

In conclusion, 7% of patients with LBP and a previous history of cancer went on to have a diagnosis of spinal metastasis as a cause of their LBP. Despite this group
having twice as many red flags as the group without spinal metastasis the types of red flags were indistinguishable, with the most common red flags being age >55 years, night pain and leg weakness. Therefore, a similar retrospective review with a much larger sample size may be justified to aid clinicians and develop further the evidence base on those red flags already identified as having a strong index of suspicion (age >55 years, previous history of cancer, failure to respond to conservative management and weight loss, Deyo & Deihl, 1988).

But most importantly, further work may identify other red flags and clinical features (such as clinical judgement (Henschke, 2007) leg weakness or night pain) for which currently research is lacking, but which may in fact play an important role in allowing us to ultimately differentiate between spinal metastasis and mechanical LBP.

Finally, the patients who failed to respond to conservative management and more importantly the ones who resulted in having spinal metastasis as a cause of their LBP had a varied pathway to diagnosis, waiting on average 9 weeks for diagnosis. The majority received some sort of screening prior to physiotherapy, however, for two of the patients who developed spinal metastasis this proved ineffective. As well as an acknowledged need for clearer identification of clinical signs and red flags – is there also an equally valid need for establishing more effective screening and referral pathways for GPs?

7.0 Study Limitations

With such a small sample size the results of the study should be generalised cautiously. Significance testing between the two groups could not be adopted due to the small study population. Secondly, a number of patient’s details were unknown due to either the patient being deceased or because they are still currently receiving ongoing investigations. Thirdly, not all medical notes were accessible to the auditing physiotherapists, this meant having to rely on other medical professionals to ascertain audit data. This resulted in some specific information on patient investigations and pathways to diagnosis not being as detailed as we would have hoped.
8.0 Acknowledgements

I would like to thank my GGBPS colleagues who helped with the data collection part of the study; Lorna Breslin, Claire MacKelvie, Derek Tobin, Donald Sinclair & Bernie MacDonald.
9.0 Reference Section


10.0 Appendix 1
Patients with LBP & a History of Cancer Audit Form

Information from Initial Physiotherapy Assessment

I. Age: ......................... Year of Assessment: .........................

II. Sex: Male Female (please circle)

III. Current symptoms: .................................................................

IV. Duration of symptoms: ............................................................

v. Onset of Symptoms: trauma insidious (please circle)

vi. Behaviour of Symptoms: better worse same (please circle)

VII. Previous History of LBP: Yes, please specify ......................... No (please circle)

VIII. Type of Primary Cancer & Date of Diagnosis: .................................................................

IX. Any investigations since onset of LBP: Yes, please specify ......................... No (please circle)

X. Red Flags on initial assessment: (please circle)

- Unexplained weight loss
- <20>55 years old
- Thoracic pain
- Severe reduction in lumbar flexion
- Night Pain
- Constant mechanical Pain
- History of Trauma
- HIV/Drug Use
- Widespread neuro symptoms
- Cough/Sneeze
- Leg Weakness/Gait Disturbance
- Systemically Unwell

XI. Red Flags developed on subsequent visits: (please state)

.................................................................................................................................

XII. Patient Outcome: (please circle)

- Symptoms resolved with physiotherapy
- Symptoms failed to resolve referred back to GP (review medical notes for outcome)
- Other, please specify ........................................................................................................

Information from Medical Notes

a. Diagnosis: (please specify) .................................................................

b. Pathway to Diagnosis: Ortho Oncology Neurosurg (please circle)

Other, (please specify) ...................................................................................................

c. Investigations performed: .........................................................................................

d. Duration of Onset to Diagnosis: ....................................................................................
## Appendix 2 - Demographics and Clinical Features of Patients Diagnosed with Spinal Metastasis

<table>
<thead>
<tr>
<th>Age</th>
<th>Sex</th>
<th>Primary Tumour</th>
<th>Date of Diagnosis</th>
<th>Symptoms at Onset</th>
<th>Duration (weeks)</th>
<th>Onset Behaviour</th>
<th>No. of Red Flags</th>
<th>Type of Red Flags</th>
<th>Investigations pre physio</th>
<th>Investigations post physio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient 1</td>
<td>57</td>
<td>M</td>
<td>Bowel/Liver</td>
<td>2006/08</td>
<td>R buttock &amp; leg pain referred to ankle</td>
<td>3</td>
<td>Insidious unchanged</td>
<td>3</td>
<td>Age &gt;55 constant nonmechanical pain night pain</td>
<td>none, routine oncology review due</td>
</tr>
<tr>
<td>Patient 2</td>
<td>60</td>
<td>F</td>
<td>Breast</td>
<td>2004</td>
<td>L LBP &amp; leg pain, L5 distribution</td>
<td>8</td>
<td>Insidious worse</td>
<td>5</td>
<td>Age &gt;55 severe restriction lumbar flexion night pain leg weakness widespread neuro</td>
<td>bloods/lumbar spine x-ray -ve</td>
</tr>
<tr>
<td>Patient 3</td>
<td>67</td>
<td>M</td>
<td>Kidney</td>
<td>1973</td>
<td>Central LBP and bilateral anterior thigh pain</td>
<td>72</td>
<td>Insidious worse</td>
<td>3</td>
<td>Age &gt;55 Weight loss Leg weakness</td>
<td>bloods/lumbar spine x-ray -ve</td>
</tr>
</tbody>
</table>