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Factors associated with haematological cancer survivors experiencing a high level of unmet need

## across multiple items of supportive care: A cross-sectional survey study

**Authors:** Alix Hall<sup>1</sup>(BPsych (Hons) PhD candidate), Catherine D'Este<sup>3</sup> (PhD Grad Dip Med Stat Dip ED BMATH),Flora Tzelepis<sup>1</sup>(PhD BSc(Psych)(Hons)), Marita Lynagh<sup>1</sup> (PhD Grad Dip Hlth Prom, BHMS (Hons)), Rob Sanson-Fisher<sup>1</sup> (PhD MPsych DSc AO BPsych(Hons))

## Affiliation

1. Priority Research Centre for Health Behaviour

Faculty of Health

The University of Newcastle & Hunter Medical Research Institute

Callaghan, NSW, Australia

2. Priority Research Centre for Health Behaviour and Priority Research Centre for Gender

Health & Aging

Centre for Clinical Epidemiology and Biostatistics

Faculty of Health

The University of Newcastle & Hunter Medical Research Institute

Callaghan, NSW, Australia

3. National Centre for Epidemiology and Population Health

Research School of Population Health

ANU College of Medicine, Biology & Environment

Australian National University

Acton, ACT, Australia

## Email address of all authors:

alix.hall@newcastle.edu.au Catherine.DEste@anu.edu.au flora.tzelepis@newcastle.edu.au marita.lynagh@newcastle.edu.au rob.sanson-fisher@newcastle.edu.au

## **Corresponding author:**

Alix Hall

W4-088 HMRI Building

The University of Newcastle

University Drive Callaghan NSW Australia 2308

Phone: (61 2) 40420641

Fax: (61 2) 40420044

Email: alix.hall@newcastle.edu.au

#### Abstract

**Purpose:** This study aimed to identify subgroups of haematological cancer survivors who report a "high/very high" level of unmet need on multiple (≥7) items of supportive care.

**Methods:** Haematological cancer survivors, aged 18 to 80 years at recruitment were selected from four Australian state-based cancer registries. Eligible survivors were sent a survey containing the Survivor Unmet Needs Survey (SUNS). Logistic regression analysis was used to identify characteristics associated with haematological cancer survivors reporting a "high/very high" level of unmet need on  $\geq$ 7 items of the SUNS.

**Results:** Of the 696 survivors included in this study, 175(n=25%) reported a "high/very high" level of unmet need on seven or more items of the SUNS. Survivors who: had relocated due to their cancer (OR: 2.04; 95% CI: 1.18, 3.52), had difficulty paying bills (OR: 2.42; 95% CI: 1.34, 4.38), had used up their savings as a result of cancer (OR: 1.90; 95% CI: 1.06, 3.40), and were classified as having above normal symptoms of depression (OR: 3.65; 95% CI: 2.17, 6.15) and stress (OR: 5.94; 95% CI: 3.22, 10.95) on the Depression Anxiety and Stress Scale-21 (DASS-21) had statistically significantly higher odds of reporting seven or more "high/very high" unmet needs.

**Conclusions:** Additional and intensive supportive care may be needed for this subgroup of haematological cancer survivors experiencing multiple "high/very high" unmet needs. Assistance with accessing relevant financial support and highly accessible services that provide emotional and information support, such as online and telephone peer support programs may prove beneficial in addressing the needs of this subgroup of haematological cancer survivors. It is suggested that future, methodologically rigorous intervention studies assess such strategies.

Keywords: Haematological cancer survivors, supportive care needs, unmet needs, survivors

#### INTRODUCTION

Responding to the specific needs of cancer survivors is an integral component of optimal cancer care[1]. Supportive care is the provision of services to meet the physical, emotional, social, psychological, informational, spiritual and practical needs of those affected by cancer[2]. According to the *Supportive Care Framework*, all cancer survivors will require supportive care in the form of basic emotional support and symptom management [2]. However, only some will require intensive and ongoing support [2]. Understanding the risk factors associated with cancer survivors experiencing poor psychosocial outcomes is an important component of providing recommended psychosocial care[3]. Identifying subgroups of survivors who may be at risk of experiencing multiple, unmet needs of high severity will assist health care professionals in providing timely support to those survivors who require additional help. In addition, one of the first proposed steps to designing relevant and effective intervention strategies is identifying subgroups of the population most at risk of experiencing the problem of interest [4]. Identifying risk factors associated with cancer survivors reporting multiple, high severity unmet needs will help to target and tailor intervention strategies to the specific characteristics of those members of the population who require the most help.

There is an increasing amount of research assessing the unmet supportive care needs of solid tumour cancer survivors. These studies describe a number of sociodemographic, disease, treatment and psychological characteristics that have been found to be associated with some cancer survivor supportive care needs. For instance, age at diagnosis[5-9], marital status[10], employment status[10], education level[9], location of residency[10,5,9] and social support[11] are sociodemographic characteristics that have been identified by several studies as being associated with cancer survivors' of solid tumours supportive care needs. In terms of disease and treatment variables, cancer status[10,8,9], stage of cancer[11,7], cancer type[10,8], time since diagnosis[9,8] and treatment type[10,5,6,9] have been found to be associated with cancer survivors' supportive care needs. Finally, higher levels of psychological symptoms, such as anxiety[11,6,7] and

depression[11,7] have consistently been found to be related to the supportive care needs of cancer survivors with solid tumours. A number of these previous studies that have assessed the characteristics associated with cancer survivor's supportive care needs have focused on characteristics associated with survivors reporting a minimum of one unmet need [11,5,6,9]. As a result, it is likely that we are failing to capture the very specific subgroups of survivors who are experiencing a multitude of unmet needs of high severity who will require additional, intensive supportive care.

Haematological cancers differ substantially from solid tumour cancers. Haematological cancers include numerous sub-types[12], with each one differing in its symptom presentation, disease characteristics and rate of progression[13]. Some types are acute and aggressive, some are asymptomatic and others are chronic[14], relapsing over many years and requiring constant surveillance with intermittent regimens of treatment[13]. Consequently, there are multiple treatment regimens used to treat haematological cancers[15,13], with many survivors requiring a number of different treatments across their lifetime[13]. The complex nature of many haematological cancers often results in treatments that are highly complex and intensive, such as in-patient chemotherapy and bone marrow transplant[13,15]. Given the uniqueness of the haematological cancer specific research is needed to examine characteristics associated with their unmet needs.

Despite previous calls for further research on the unique experiences of under-studied cancer populations, such as haematological[16] and lymphoma[17] cancers, limited research has examined the characteristics associated with the supportive care needs of haematological cancer populations[18,19]. These studies have a number of shortcomings, including: the majority of previous studies have employed a small sample size, with samples ranging from 67 [20] to 437[19], but with most including a sample of less than 100 survivors[20-23]; lack of a comprehensive

assessment of characteristics potentially associated with survivors' supportive care needs[19]; a focus on only one or limited haematological cancer types [20,24,21,25,23], with rarer types commonly omitted; a focus on only specific areas of supportive care [20,24,21,23]; and use of researcher-derived questions[20,24,21,23] or needs assessment tools that were not developed or psychometrically evaluated in haematological cancer survivor populations [22,25]. Consequently, very limited information is available on the characteristics associated with the supportive care needs of haematological cancer survivors.

This study addressed the limitations of previous work by surveying a population-based sample of more than 600 survivors diagnosed with a range of haematological cancers and by assessing a wide range of demographic, disease, treatment, social and psychological characteristics. Understanding the characteristics associated with haematological cancer survivors reporting multiple, high severity needs will assist: (1) health care providers in identifying those members of the population who may require additional, intensive support; and (2) researchers in developing and evaluating appropriate intervention strategies tailored to the specific circumstances of the population most in need of receiving additional help. This study aimed to fill the current knowledge gap by assessing the characteristics associated with haematological cancer survivors reporting multiple ( $\geq$ 7) "high/very high" unmet needs.

#### Materials and methods

#### Study Design

A cross-sectional, self-report survey of adult haematological cancer survivors recruited from four Australian state cancer registries.

#### Survivors

Eligible survivors were identified and initially approached by each cancer registry. Eligible survivors

were diagnosed with a haematological cancer, including leukaemias, lymphomas and myeloma, and aged between 18 and 80 years at the time of recruitment. Survivors were eligible to take part regardless of their disease or treatment status. Survivors who were uncontactable, had previously indicated to the cancer registry that they were not interested in taking part in research or were deceased were ineligible.

#### Recruitment procedures

The standard recruitment procedures and eligibility criteria of each cancer registry were used. The standard recruitment procedure employed by Registry A was a direct patient contact model of recruitment. This involved Registry A contacting all eligible survivors directly via a mailed questionnaire package. Non-responders were mailed a second questionnaire package approximately four weeks later. The recruitment procedures and eligibility criteria used by this registry are reported in-depth elsewhere[26].

The standard recruitment procedure employed by Registries B, C and D was a passive clinician consent model of recruitment, whereby the clinician of each eligible survivor was first contacted by the registry and asked for permission to contact their patient. If the clinician consented to the registry or did not respond to the registry's request within approximately four weeks, survivors were mailed a letter from the registry asking for consent to have their contact details released to the researchers. Consenting survivors were sent a study package from the researchers. Non-responders were mailed a second questionnaire package approximately four weeks later and contacted via telephone after a further four weeks.

Return of a completed survey was taken as voluntary consent to participate in the study. Ethics approval was granted by the University of Newcastle Human Research Ethics Committee and the relevant human research ethics committees associated with each cancer registry.

#### Study measures

#### Primary outcome

The Survivor Unmet Needs Survey (SUNS) assesses cancer survivor unmet supportive care needs over the last month, using 89-items, across five domains: *Financial Concerns* (11 items); *Emotional Health* (33 items); Access and Continuity of Care (22 items); Information (8 items); and Relationships (15 items)[27]. Each item is scored from zero (no unmet need) to four (very high unmet need)[27]. The psychometric properties of the SUNS were originally assessed with a large, heterogeneous sample of Canadian cancer survivors[27]. The SUNS demonstrates acceptable levels of validity and reliability [27]. Despite potential response burden previous research has shown that it was highly acceptable to survivors and took on average less than 26 minutes to complete[27]. In the current study, four items were reworded to ensure clarity and acceptability of the survey to the Australian context[19]. The amended version of the SUNS has shown evidence of face, content, construct and convergent validity, as well as some support for internal reliability and test-retest reliability for use with haematological cancer survivors (Hall et al, under review).

#### Independent variables

Factors previously found to be associated with supportive care needs in haematological and/or general cancer survivor populations or characteristics that may potentially influence cancer survivors' access to supportive care services were assessed and are listed in Table 1.

*Survivor, disease, treatment and social characteristics* including age at diagnosis, sex, cancer type, postcode/location at diagnosis and date of diagnosis were obtained directly from the cancer registries. Cancer survivors aged from 15-39 years have previously been categorised together based on their unique experiences and developmental stage [28]. Using this classification we categorised survivors' aged 15-39 years at diagnosis together. Other characteristics, including marital status,

education level, employment status, treatments received, cancer recurrence, relocation due to cancer, travel time to treatment, health insurance status, financial impacts as a result of cancer, and participation in home care and/or support group services, were obtained from the self-report survey.

The *Depression, Anxiety and Stress Scale (DASS-21)* is a 21-item measure of anxiety, depression and stress, with seven items assessing each of the three sub-scales[29]. Domain scores are calculated by summing all items in a domain and multiplying by two[29]. Domain scores were only calculated for those survivors who answered at least six of the seven items in each domain[30]. Using the severity ratings outlined in the DASS scoring manual the three domains were dichotomized into normal versus above normal levels of depression (score above 9), anxiety (score above 7), and stress (score above 14) [31].

#### Non-responder data

De-identified data relating to non-responders' age at diagnosis, cancer type, postcode or rural/urban location at diagnosis and sex were collected from the cancer registries.

#### Statistical analysis:

Responder and non-responder characteristics were compared using Chi-squared analysis. Observations with missing values were excluded from analyses.

There is no pre-established clinically relevant cut-point associated with the SUNS, therefore in this study we calculated the total number of items each participant indicated was an area of "high/very high" unmet need. Survivors reporting seven or more "high/very high" unmet needs items equated to the upper quartile of the distribution of the total number of items of "high/very high" unmet needs. The outcome variable for this study was a dichotomous variable where participants were

categorised into one of two groups: (1) survivors reporting multiple ( $\geq$  7) "high/very high" unmet needs; or (2) survivors reporting < 7 "high/very high" unmet needs. Only participants who answered more than 70% of all 89 unmet needs items were included in this analysis.

Logistic regression modelling was undertaken to identify demographic, disease, treatment, social and psychological characteristics associated with survivors reporting multiple ( $\geq$  7) "high/very high" unmet needs. Variables with a *p*-value of 0.2 or less on Chi-squared analyses were included in the logistic regression analysis. A backwards stepwise method was used to remove variables if they had a *p*-value of 0.1 or more on the likelihood ratio test. Due to concerns of a high correlation existing between the variables depression, anxiety and stress, several models containing different combinations of these three variables were conducted and compared in order to identify the most appropriate final model. To determine the most appropriate model nested models were compared using the maximum likelihood ratio test and non-nested models were compared using the Aikaike Information Criterion. The Hosmer-Lemeshow goodness of fit test was used to assess how well the final model fit the data, with a *p*-value more than 0.05 indicating an appropriate fit.

## **Results:**

A total of 1,957 eligible survivors were contacted by the four cancer registries. Of these 1,280 were sent a questionnaire package and 715 returned a completed survey (Figure 1) (response rate = 37%). A total of 696 (97%) answered more than 70% of all unmet needs items and were included in this study (Figure 1).

Table 2 details the demographic characteristics of all survivors included in this study.

There were statistically significant differences between responders and non-responders on agegroup at diagnosis (p<0.001) and cancer type (p=0.011). Survivors aged 60 to 69 years at diagnosis (41%) recorded the highest response rate and those 15 to 39 years at diagnosis (24%) the lowest. Response rates were highest for leukemia survivors (40%) and lowest for other lymphoma (25%).

Missing values for all 89-items of the SUNS ranged from 0% to 3.2%.

Approximately 25% (n=175) of survivors reported a "high/very high" level of unmet need on seven or more items of the SUNS. Therefore, a total of 175 (25%) survivors were dichotomised as experiencing multiple "high/very high" unmet needs and 521 (75%) were classified as experiencing <7 "high/very high" unmet needs.

Based on univariate analyses the variables listed in Table 3 were included in the logistic regression analysis.

The variables that remained in the final logistic regression model are detailed in Table 4. Survivors who reported relocating due to their cancer (OR: 2.04; 95% CI: 1.18, 3.52) and survivors who had difficulty paying their bills as a result of cancer (OR: 2.42; 95% CI: 1.34, 4.38) had more than twice the odds of reporting a "high/very high" level of unmet need on  $\geq$  7 items, compared to those survivors reporting no such difficulties. Survivors reporting having used up their savings due to cancer (OR: 1.90; 95% CI: 1.06, 3.40) had almost twice the odds of reporting a "high/very high" level of unmet need on  $\geq$  7 items compared to survivors who did not use up their savings as a result of cancer. Survivors classified as reporting above normal levels of depression (OR: 3.65; 95%CI: 2.17, 6.15) and stress (OR: 5.94; 95%CI: 3.22, 10.95) had over three and five times respectively the odds of reporting multiple "high/very high" unmet needs, compared to survivors classified as having normal levels of depression and stress (Table 4). Results from the Hosmer-Lemeshow goodness of fit test indicated that the final model adequately fit the data (*p*=0.3055).

#### DISCUSSION

The purpose of this study was to provide a comprehensive investigation of those haematological cancer survivors who are most likely to require and benefit from additional and perhaps tailored supportive care. This information can be used to assist health care providers in quickly identifying those haematological cancer survivors most at risk of experiencing multiple unmet needs of high severity, which in turn should ensure timely and efficient support is delivered to this vulnerable group. This information can also be used to assist in the development of intervention strategies tailored towards the specific circumstances of haematological cancer survivors most at risk of experiencing multiple unmet needs, a process that has been identified as the first step in designing relevant and potentially effective health interventions [4]. Haematological cancer survivors who have had to relocate due to their cancer, have had difficulty paying bills or used up their savings as a result of their cancer and/or report increased symptoms of depression and stress may be at risk of experiencing a "high/very high" level of unmet need across multiple unmet needs items. Compared to other haematological cancer survivors this subgroup of survivors is likely to require additional, intensive supportive care across multiple domains. Services that aim to relieve financial stress and psychological symptoms, which are highly accessible, may be most beneficial for this subgroup of survivors.

It is highly likely that the added burden of relocation brings about unique and additional needs for survivors, which may help to explain why this subgroup of haematological cancer survivors report higher odds of experiencing multiple "high/very high" unmet needs. Such unique concerns may include feelings of isolation and reduced access to their available support network[32]. Survivors having to relocate may also experience significant financial burden, with previous reports of reductions in wages[32,33], employment issues[33] and additional out-of pocket expenses[33]. Returning home will also likely cause a separate set of concerns, including a lack of continuity of

care, problems with availability and accessing professional support, lack of information, and difficulties in returning to normal life[34]. Services specifically targeted towards the unique circumstances of haematological cancer survivors having to relocate due to their diagnosis should be provided. For instance, the Leukaemia Foundation[35] in Australia offers services for survivors who have to relocate due to their haematological cancer, including free accommodation[36,37]. Previous studies assessing the impact of relocation as a result of a haematological cancer have demonstrated that the provision of such support helped to buffer some of the short term financial impact experienced as a result of having to relocate due to their cancer[33]. Given the financial benefit associated with such services, they may also help to address some of the needs of haematological cancer survivors who are experiencing increased financial burden; which is yet another subgroup of haematological cancer survivors identified in this study as having higher odds of reporting multiple "high/very high" unmet needs.

Survivors experiencing increased financial burden as a result of their diagnosis, in the form of difficulty paying bills and having used up their savings as a result of their cancer, reported higher odds of experiencing multiple "high/very high" unmet needs. This finding is in line with our previous study assessing the unmet needs of Canadian and Australian haematological cancer survivors, which found that haematological cancer survivors who experienced a personal expense in the last month as a result of their cancer had higher odds of reporting higher unmet needs across multiple domains of the SUNS [19]. It is suggested that increased financial burden may affect survivors' ability to access services that may otherwise prove beneficial in addressing their current needs. There have been a number of financial support services[37] available for cancer survivors in Australia, including assistance with accommodation[36,37] and travel costs[38,37]. Unfortunately previous research has identified a lack of awareness and difficulties in accessing such services by haematological cancer survivors[38]. To help reduce the financial burden experienced by survivors, health care providers

should ensure that haematological cancer survivors have access to relevant information and assistance with accessing available financial support. This may involve advertising available services in treatment centres as well as providing written information about the specific financial support available.

Consistent with previous research assessing the supportive care needs of cancer populations, higher levels of psychological morbidity (e.g. depression and stress)[11,39,7,25] were associated with haematological cancer survivors reporting supportive care needs. Due to the cross-sectional design of this study it is difficult to conclude whether high unmet needs lead to higher levels of psychological symptoms or vice versa. However, psychological distress is potentially modifiable through intervention [39,3,40], with guidelines recommending several evidence-based strategies in helping to manage cancer survivors' psychological symptoms[3,40]. To help reduce the unmet needs of this subgroup of haematological cancer survivors we recommend that evidence-based psychological interventions, such as those outlined in clinical practice guidelines [40], are offered to survivors experiencing elevated psychological symptoms. Providing such services may also help to address survivors' emotional needs, which has previously been identified as an area of high unmet need for haematological cancer survivors [19].

The subgroup of survivors identified in this study as reporting multiple "high/very high" unmet needs are likely to require additional and perhaps intensive supportive care across multiple areas. In a previous study we conducted the greatest area of needs experienced by Australian and Canadian haematological cancer survivors were in the domains of information and emotional health [19]. Based on this data it is suggested that support services that aim to address haematological cancer survivors' emotional and information needs, may be most beneficial to this vulnerable subgroup. In

addition, a number of the risk factors identified in this study may be related. For instance relocation typically brings about additional financial burden[33]. Consequently, the support services that are believed to most likely improve the supportive care needs of these vulnerable survivors are those that: (1) are tailored towards the specific characteristics identified in this study as being related to haematological cancer survivors reporting multiple unmet needs; and (2) target areas previously identified as the areas of greatest unmet need by haematological cancer survivors. Peer support programs may be one such service. Previous research has reported emotional, social and informational benefits of peer support programs with cancer survivors [41-43]. Including an educational component in such support programs may further help to address information needs. Peer support programs can also be tailored for survivors who have to relocate due to their cancer or have limited financial resources by providing access to free online and telephone support programs. However, due to the lack of intervention research in this area methodologically rigorous intervention studies are needed to assess the effectiveness of peer support programs in reducing the unmet needs of haematological cancer survivors.

#### Limitations

Extensive efforts were made to maximise survivor response rates, including conducting a randomised controlled trial to assess a strategy to increase participation among survivors recruited from Registry A [26], and the inclusion of two follow-up reminders with non-responders from Registries B, C and D. Despite these efforts the response rate (37%) for all four registries remained low. However, it is comparable to some previous cancer registry-based studies, which have also recorded response rates less than 50% [39,27,24]. Second, responders and non-responders differed with regard to age at diagnosis and cancer type. Compared to older survivors a higher percentage of younger haematological cancer survivors may be eligible for more intensive treatment[44]and younger survivors may also be more likely to have competing priorities, such as young families and

work commitments. Consequently, younger survivors may been less likely to respond due to increased treatment side effects or competing time demands. A number of survivors from Registry A reported that they did not respond to the survey as they were experiencing no or limited unmet needs and felt the survey was not relevant to their situation [26]. As a number of haematological cancer types may be more likely to be treated with less intensive treatment types compared to other haematological cancers [13] it is possible that such cancer types may experience fewer unmet needs and therefore impact on their choice to participate. However, it was not possible to test these assumptions in this study. Further research should assess the reasons contributing to survivor's nonresponse.

There is currently no clinically standardised cut-point for use with the SUNS to help determine which cancer survivors would benefit most from additional intervention. Future research should strive to identify clinically meaningful definitions of what constitutes a high overall level of unmet needs. Finally, despite assessing a large number of characteristics, there is a possibility that we failed to include some variables associated with haematological cancer survivors' unmet needs. For instance, time since treatment completion may be an important factor impacting on haematological cancer survivors unmet needs. To ensure that timely and appropriate care is provided to those haematological cancer survivors experiencing multiple unmet needs future research should continue to refine and assess the potential risk factors associated with haematological cancer survivor unmet needs.

Despite these limitations, this study exhibits a number of strengths: the largest sample we are aware of, of haematological cancer survivors recruited to date to assess characteristics associated with the supportive care needs of haematological cancer survivors; use of a standardised and

psychometrically validated needs assessment tool; and investigation of a wide range of characteristics associated with haematological cancer survivors' unmet needs. The findings provide important and timely information for improving the supportive care of this unique, growing and historically under-studied population. Acknowledgements: This grant No. 569290 was awarded through the Priority-driven Collaborative Cancer Research Scheme and co-funded by *beyondblue* and the Australian Government through Cancer Australia. Infrastructure support was provided by the University of Newcastle and Hunter Medical Research Institute. Miss Hall was previously funded by an Australian Postgraduate Award and a 2012 Asia Australia Prime Minister's Endeavour Award. Dr Flora Tzelepis was supported by a Leukaemia Foundation of Australia and Cure Cancer Australia Foundation Post-Doctoral Research Fellowship. The authors are grateful for all the hard work and assistance of the registry staff, Ms Sandra Dowley and Miss Clara Davis for data entry; Miss Ally Logatchova, Dr Emily Cameron, Miss Hannah Small and Miss Lara Ryan for assistance with data cleaning. They would also like to acknowledge the time and effort provided by the survivors who took part in this research; the authors greatly appreciate their involvement as without their assistance this research would not be possible.

## **Conflict of interest**

The authors declare no financial disclosures or conflict of interests. The authors also have full control of the primary data and agree to allow the journal to review the data if requested.

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Figure 1. Number and percentage of survivors at different stages of recruitment

<sup>a</sup>One survivor from Registry B was not contacted by the registry prior to having a survey sent to them by the researchers, as this survivor had previously self-nominated to the registry to take part in this study.

 Table 1. Demographic, disease, treatment, social and psychological characteristics included in

 initial Chi-squared analyses

Demographic variables			
Registry			
Sex			
Location at residency (urban or rural)			
Age group at diagnosis (years)			
Education level			
Employment status			
Marital Status			
Disease and treatment variables			
Time since diagnosis (months)			
Cancer type			
Currently receiving cancer treatment			
Cancer recurrence			
Diagnosed with another type of cancer			
Social variables			
Relocation due to cancer			
Travel time to treatment			
Private health insurance			
Had to take time off work due to cancer			
Had less income due to cancer			
Had to stop work or close business			
Had difficulty paying bills			
Used up savings due to cancer			
Had trouble meeting day-to-day expenses due to cancer			
Live with others			
Received home care services in the last month			
Participated in a support group in the last month			
Psychological variables			
Depression			
Anxiety			
Stress			

Characteristics <sup>b</sup>	Sample included in analysis (n = 696)ª	
	n	%
Sex		
Female	268	41%
Male	382	59%
Location at diagnosis		
Urban	470	72%
Rural	180	28%
Cancer type		
Non-Hodgkin's Lymphoma (NHL)	380	58%
Leukemia	124	19%
Myeloma	105	16%
Hodgkin's lymphoma	41	6.3%
Age at diagnosis		
15-39	53	8.2%
40-49	70	11%
50-59	170	26%
60-69	227	35%
70+	130	20%
Approximate time since diagnosis (months)		
1-12	94	15%
13-24	115	18%
25-36	121	19%
37-60	214	34%
60+	80	13%
Marital status		
Single (never married, separated, widowed or divorced)	166	24%
Partnered (married or living with a partner)	525	76%
Education		
High school or below	263	38%
Vocational training or other	254	37%
University	170	25%
Employment		
Currently employed	277	40%
Not currently employed	410	60%
Currently receiving active treatment (including chemotherapy,		
radiotherapy, stem cell/bone marrow transplant and/or		
hormone/drug therapy)		<b>2</b> 201
Yes	151	22%
No	532	78%

## Table 2: Demographic and disease characteristics of haematological cancer survivors included

<sup>a</sup>Total number of survivors who completed 70% of the 89 items of the Survivor Unmet Needs Survey <sup>b</sup>Totals may not equal sample size due to missing values

Variable	Chi-squared analysis			
	$\geq$ 7 "high/very high" unmet needs n (%) (n=175)	< 7 "high/very high" unmet needs n (%) (n=521)	Test statistic (df), <i>p-value</i>	
Demographic variables				
Sex			2.61 (1), 0.106	
Male	87 (53%)	295 (61%)		
Female	76 (47%)	192 (39%)		
Age group at diagnosis (years)			27.96 (4), <0.001	
15-39	14 (8.6%)	39 (8.0%)		
40-49	28 (17%)	42 (8.6%)		
50-59	57 (35%)	113 (23%)		
60-69	48 (29%)	179 (37%)		
70+	16 (9.8%)	114 (23%)		
Disease and treatment variables				
Cancer recurrence			4.80 (1), 0.028	
Yes	49 (30%)	105 (21%)		
No/Don't know	117 (70%)	390 (79%)		
Social variables				
Relocation due to cancer			26.81 (1), <0.001	
Yes	54 (31%)	70 (14%)		
No	120 (69%)	445 (86%)		
Travel time to treatment			7.17 (1), 0.007	
1-2hours	136 (82%)	440 (90%)		
>2 hours	30 (18%)	50 (10%)		
Private health insurance			2.52 (1), 0.112	
Yes	110 (63%)	359 (70%)		
No	64 (37%)	156 (30%)		
Had less income due to cancer			15.46 (1), <i>&lt;0.001</i>	

## Table 3. Characteristics identified at the p ≤ 0.2 level on Chi-squared analysis and included in multiple logistic regression analysis

Yes	70 (41%)	130 (25%)	
No	100 (59%)	383 (75%)	
Had to stop work or close business			8.93 (1), 0.003
Yes	32 (19%)	52 (10%)	
No	138 (81%)	461 (90%)	
Had difficulty paying bills due to cancer			75.19 (1), <0.001
Yes	69 (41%)	56 (11%)	
No	101 (59%)	457 (89%)	
Used up savings due to cancer			55.98 (1), <i>&lt;</i> 0.001
Yes	71 (42%)	75 (15%)	
No	99 (58%)	438 (85%)	
Had trouble meeting day-to-day expenses due to cancer			67.47 (1), <0.001
Yes	46 (27%)	25 (4.9%)	
No	124 (73%)	488 (95%)	
Participated in a support group in the last month			1.73 (1), 0.189
Yes	14 (8.0%)	27 (5.3%)	
No	161 (92%)	485 (95%)	
Psychological variables			
Depression			168.57 (1), <i>&lt;</i> 0.001
Yes	113 (66%)	76 (15%)	
No	58 (34%)	437 (85%)	
Anxiety			129.92 (1), <0.001
Yes	104 (60%)	80 (16%)	
No	69 (40%)	431 (84%)	
Stress			192.52 (1), <0.001
Yes	91 (54%)	33 (6.4%)	
No	78 (46%)	481 (94%)	

Table 4. Multiple logistic regression results describing demographic, disease, treatment, social and psychological characteristics associated with haematological cancer survivors reporting a "high/very high" level of unmet need on seven or more items of the SUNS

Variable	Multiple regression analysis		
	Odds Ratio (95% CI)	Likelihood ratio $\chi^2(df)$ , <i>p</i> - <i>value</i>	
Social variables		•	
Relocation due to cancer		6.27 (1), <i>0.0123</i> °	
Yes	2.04 (1.18, 3.52)*		
No	1		
Had difficulty paying bills due to cancer		8.42 (1), 0.0037°	
Yes	2.42 (1.34, 4.38)*		
No	1		
Used up savings due to cancer		4.59 (1), 0.0321 <sup>c</sup>	
Yes	1.90 (1.06, 3.40)*		
No	1		
Psychological variables			
Depression		22.83 (1), <0.001°	
Yes	3.65 (2.17, 6.15)*		
No	1		
Anxiety		2.97 (1), 0.0849°	
Yes	1.64 (0.94, 2.86)		
No	1		
Stress		33.31 (1), <0.001°	
Yes	5.94 (3.22, 10.95)*		
No	1		

\*Variables statistically significantly associated with haematological cancer survivors reporting ≥ 7 "high/very high" unmet needs on the Survivor Unmet Needs Survey