Health Improvement in Radiotherapy; A strategy to develop UK practice.

A comparative analysis of Canadian health improvement provision in radiotherapy practice.

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The Winston Churchill Travel Fellowship Report 2015
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Finally this project would not have been possible without the support and enthusiasm of the departments and individuals named in the itinerary.

Short Biography

I am a Therapy Radiographer with a background of clinical working in the National Health Service, currently working for Sheffield Hallam University teaching across the Radiotherapy and Oncology courses provided by the University.

My interest in health improvement was developed through clinical practice and during the completion of my Master’s degree in Radiotherapy and Oncology. I completed my dissertation project on the current status of health improvement provision within UK Radiotherapy practice. This project provided some interesting findings that prompted the application to the Winston Churchill Memorial Trust to explore the topic further with the aim to draw on Canadian Practice to develop Health Promotion in the UK.

My current role within the University will enable the integration of Health Promotion to the Radiotherapy curriculum across undergraduate and postgraduate delivery. My links to clinical practice will support further research projects and strategies to increase the delivery of health improvement within Radiotherapy.

The role of Allied Health Professions in the delivery of healthy conversations is encouraged and supported by Public Health England.
Abbreviations

AHP - Allied Health Professions  
CCS - Canadian Cancer Society  
CPD - Continuous Professional Development  
H&WB - Health and Wellbeing  
HI - Health Improvement  
HP - Health Promotion  
MECC - Making Every Contact Count  
NHS - National Health Service  
PH - Public Health  
PHE - Public health England  
RSPH - Royal Society of Public Health  
RT - Radiotherapy  
SCOR - Society and College of Radiographers  
UG - Undergraduate

Glossary

Advanced Practice Radiographer - Expert clinical practice in specified area

Health Literacy - the personal characteristics and social resources needed for individuals and communities to access, understand, appraise and use information and services to make decisions about health

Health Promotion - The process of enabling people to increase control over, and to improve their health. It moves beyond a focus on individual behaviour towards a wide range of social and environmental interventions.

Holistic Care - Consideration of the whole person

Lifestyle Intervention - Strategy used to promote positive lifestyle change

Patient Education - All aspect of information giving during the patient pathway
Executive Summary

Project Aims

The aims of the project:

a.) Evaluate policies; local and national which have driven health improvement in Radiotherapy and compare to those in the UK

To achieve aim a.) Meet with relevant professionals to assess the implementation of health improvement education including barriers and facilitators.

b.) Explore the education and training which supports the delivery of health improvement at undergraduate and postgraduate level to evaluate how this can be incorporated and delivered within UK practice

To achieve aim b.) Hold informal discussions with practitioners to identify perspectives on the delivery of health improvement education and to identify training needs. To explore with the academic and clinical departments how they integrate health improvement within the undergraduate curriculum and how post graduate radiographers are supported with continuous professional development.

c.) Critically evaluate the practical implications of the delivery of patient education programs within a clinical environment and consider the implications for UK practice

d.) Assess strategies used to deliver health improvement education whilst maintaining patient respect and dignity and the relationship between patients and practitioners

To achieve aim c and d.) Informally observe Radiographers in practice to assess practicalities and methods used to maintain relationships with patients. Meet with patient information lead (where possible) to assess daily practicalities of delivery from an organisational perspective.

Summary of Key Findings

Health improvement is embedded within Canadian Radiotherapy practice. Although no national strategy is in place to standardise practice and therefore regional variations were observed. In departments where government agencies were supportive and promote a specific lifestyle risk factor, a more structured approach to the public health interventions was observed. Smoking cessation and diet were lifestyle strategies that were observed most frequently and a broad range of referral pathways were available for exercise support. A range of methods for smoking cessation and diet provide examples of how HI can be embedded within RT practice, with examples outlined in case studies 1 and 2. There was an absence of implementation of HI interventions on the topic of alcohol cessation, although in discussions with clinical staff alcohol was an emerging topic and may be further implemented in future practice. Patient education in Canada was reviewed in 2009 with the publication of a framework to support cancer patient education, the influence of this on clinical practice was clear across all centres visited. Similar challenges faced within UK practice were observed, with some strategies to overcome such barriers that could be applied to UK implementation.
Summary of Key Recommendations

1. Assess national approach to patient education within the UK, to include health literacy.
2. Review the need for specific lifestyle interventions for the oncology patient population.
4. Establish a working group to assess and develop the embedding of HI within UK RT practice.
5. Draw together information surrounding regional cancer support services to inform practitioners and service users of the available support.
6. Develop the undergraduate Radiotherapy curriculum to embed PH within the programmes.
7. Design a method of improving knowledge and confidence of the post graduate workforce on health improvement.
Introduction

The burden of lifestyle associated health problems is increasing. Obesity is rising in incidence. In 2012 24% of the male population were reported to be obese and 25% of females. Furthermore 42% of men and 32% of women were reported to be overweight. With the continuation of current trends a predicted 60% of males and 50% of females are likely to be obese by 2050. Factors that influence obesity are complex. Dietary habits and level of physical activity are two determinants, however the biological predisposition to weight gain and psychosocial factors are also recognised associations to obesity. The need to tackle lifestyle associated health problems is evident. The serious health implications associated with obesity include cardiovascular disease, diabetes and cancer. The financial burden for the treatment of obesity alone in 2002 was estimated to be £1000 million, approximately 2.3-2.6% of the total National Health Service (NHS) expenditure for 2001-2002.

Smoking as a public health issue is not a new concept. The introduction of the workplace and public space smoking ban in 2007 influenced changes in smoking behaviours in the United Kingdom (UK) population with a reduction in hospital admissions for myocardial infarction and increased numbers of quit attempts. Smoking however continues to cause a significant number of preventable deaths. Approximately 80 000 preventable deaths were a result of smoking in 2011. In 2011-2012 in the 35 and over adult population approximately 5% of all hospital admissions were attributable to smoking with 20% of the adult population reported to smoke in 2010. The cost of smoking to the NHS in 2005-2006 was reported to be £5.2 billion, it is likely that this figure has reduced following the smoking ban in 2007 although accurate recent data is unavailable.

The impact of alcohol misuse is reported to cost the NHS £3.5 billion per annum in England alone. Health conditions associated with alcohol misuse range from liver cirrhosis to reduced fertility and the complex health conditions often remain unrecognised for several years following alcohol misuse. The impact of alcohol on the health service is clear from the 1.2 million hospital admissions relating to alcohol in 2010-2011. Alcohol misuse is broad and ranges from longstanding dependence on alcohol to binge drinking.

Lifestyle related health problems as a result of diet, lack of physical activity, smoking and alcohol are complex. Often negative lifestyle choices such as the factors identified here are not observed in isolation and links are made between factors including increased heavy alcohol consumption in smokers and correlations between obese individuals conducting less physical activity and demonstrating reduced preference for healthy food choices. The complexity of lifestyle and behavioural traits that impact on health often make this a taboo topic that can be difficult to manage.

Health promotion can be defined as “The process of enabling people to increase control over, and to improve their health, it moves beyond a focus on individual behaviour towards a wide range of social and environmental interventions.” Although health promotion is an umbrella term, the ultimate goal is to improve the overall health and wellbeing of the public through a range of strategies. A key strategy to health promotion is through health education, this is any combination of learning experiences designed to facilitate voluntary actions conducive to health. Settings for health include health promoting hospitals and as health promotion becomes an integral part of the health care process it is essential that health promoting activities become embedded in the health systems framework. The Department of
Health and Public Health England have published a broad range of white papers to recognise and address the impact of lifestyle associated health problems and the burden on the NHS. The National Health Service and Public Health England have promoted the “Making Every Contact Count” campaign as a method of promoting healthy conversations with patients in the healthcare setting. The Society and College of Radiographers; the professional body for Radiography have identified that both Diagnostic and Therapeutic Radiographers have a role in the delivery of health promotion and this is further supported by a recent publication from the Royal Society for Public Health and Public Health England.

A project to assess Health Improvement Provision in Radiotherapy: A Survey of UK Therapy Radiographers completed by the author highlighted that Health Promotion is recognised as part of the role of a Therapy Radiographer and there are areas of good practice ongoing within UK Radiotherapy departments. The survey also demonstrated large variations in practice between health professionals completing the questionnaire. Rationale for variations in practice could be explained by uncertainty surrounding responsibility, insufficient knowledge and training (including referral pathways), confidence levels and health professional perceptions surrounding patient needs. The aim of this project was to visit centres of excellence in Canada (clinical and academic) to undertake a comparative analysis of how health promotion is delivered to support patients undergoing Radiotherapy and compare practice with the UK model to make recommendations for education, training and changes in clinical practice.
Methods

The method used to gather information during the project involved informal discussions and observations in practice to assess strategies used to support the delivery of Health Improvement. Objectives were achieved using informal discussions with patient education practitioners, clinical Therapy Radiographers, academic staff and project leads in the provincial setting. In addition to informal discussions, observations of clinical practice including the delivery of health Improvement in the Radiotherapy setting was a further method of obtaining information that took place across a range of the clinical sites visited. Observations and discussions were recorded (omitting any confidential data) using a brief observation form to assist in the analysis of the findings of the project upon completion. To support the delivery of health improvement the departments often provided patients and carers with supportive literature, the relevant resources were gathered to support the project and consider recommendations for published resources to support the delivery of health improvement.

On initial enquiry to visit clinical departments, a range of research processes were followed that were specific to each centre and as a result a research protocol was developed to meet the requirement of specific departments. This protocol was approved by the author’s employer to demonstrate that the project had undergone research ethics approval from a UK academic institution. For some departments further rigorous research processes were required, some were completed however in other departments this was not feasible due to the unavailability of support from the department. In this case one department was visited briefly for an overview but with the omission of any observations or discussions and a further department was visited but the informal observations and discussions cannot be reported as part of the project.

The research protocol stated the aims of the project and the requirements of any person taking part, including potential risks and benefits and clear information surrounding confidentiality. Although some departments asked to see the research protocol in preparation for the visit, no department required formal completion of the paperwork to undertake observations.

Upon completion of the project all observations, discussions and resources were reviewed. Thematic analysis was used to identify emerging patterns within the data gathered and to present findings as key themes from the research. The emergent themes from the project are patient education, lifestyle change strategies, academia and the wider Public Health Agenda and challenges.
Findings

Patient Education

General Approach to Patient Education

Patient education is an essential component of Radiotherapy practice and takes various forms throughout a patient’s course of treatment. The recent questionnaire used to report Radiotherapy patient experience in the UK focused several questions on information and communication and identified that most departments are providing excellent or satisfactory experiences for patients. However a small number of respondents highlighted that there was a need to improve in this area. The importance of patient education and communication between staff members, patients and carers was further identified by the independent cancer taskforce in which it was identified that staff involved in the care of patients with a cancer diagnosis should undertake mandatory communication skills training where appropriate to support empowering patients to self manage.

The concept of staff training is essential in the integration of health promotion into practice as a form of empowering patients in self-management. During clinical observations it was evident that some clinical staff were confident to deliver health promotion messages as routine practice during patient education sessions. The delivery of health promotion was observed most frequently in departments with a structured hospital wide approach to a particular lifestyle change, for example smoking cessation. With a structured program in place mandatory staff training to deliver health promotion is a likely reason for the successful implementation into practice. Across several departments smoking cessation was standard practice within the first Radiotherapy patient education session.

The use of a symptom screening tool also prompted discussion surrounding healthy conversations, where utilised during a patient education discussion in the Radiotherapy setting. This did not take place in all departments and was dependent on the individual patient pathway. It should be noted that in all centres visited all new patients were allocated specific time for patient education or first day teaching, although approaches to this varied between centres.

In departments without a structured approach to particular health promotion topics or with the absence of tools to prompt discussion observations demonstrated that the delivery of health promotion was based on local or individual practices. To some clinical staff conversations surrounding smoking and alcohol cessation also formed part of the patient education discussion and where observed the discussions surrounding cessation were related to both the side effects of Radiotherapy treatment and related to the future benefits of improved lifestyle choices. A mixed approach was observed both between the various centres and local practices within a specific centre, some staff members recognised that this is part of their role, others in discussion stated that this was not the case and in some discussions named other professional groups who had more of a responsibility or who they felt already had such conversations with patients.

The Clinical Specialist Radiation Therapist is the Canadian equivalent of the UK Advanced Practice Radiographer. The integration of the CRST into practice may support the future delivery of health improvement. Although it is beyond the scope of this project the potential role of the CSRT was observed in practice in a sexual health role, the focus here was for male patients undertaking Radiotherapy, interestingly the role was developing as a result of patient requirements. The uptake and
demand for this particular CSRT really highlighted the potential for the education specialist. It could be considered that with the addition of further site specialist CSRT/Advanced Practice Radiographers the integration of health promotion could be tailored to specific needs of patient populations, for example the needs for patients with Head and Neck Cancer may differ to the needs of patients receiving treatment for Breast Cancer. Individual patient needs could also be assessed and this approach would further support the integration of self-management and lifestyle change based on a needs assessment, linked to the newly developed Macmillan recovery package. In addition to individual practitioners in education roles some departments were also supported with patient education through an oncology patient education centre. In some clinics this took the form of a staffed library, in other areas the patient education centre also provided education for patients and carers. Patient education centres were observed as part of the project, investigation into the provision of health improvement information proved to be a key topic covered. Discussion with library staff highlighted that patients and carers were seeking information on lifestyle change, mostly related to dietary changes. A range of resources were available on all topic areas assessed by the project with the exception of alcohol cessation however discussion with one centre revealed that a patient leaflet on the topic of alcohol cessation was currently in production. In further support of the integration of health promotion into education support services, several centres offered classes to provide education and strategies for lifestyle changes. One particular centre offered a range of classes and events to support health, wellness and cancer survivorship and examples include dietary recommendations and exercise programmes (case study 3). Further to support services offered in the hospital environment patient education was also supported through external holistic care services offering a range of programs including nutrition and exercise (case Study 4). Observations highlighted that in some regions the support networks outside of the Radiotherapy department were not fully understood by the clinical staff in the Radiotherapy clinics.

There were some individual challenges in relation to patient education that may also be experienced in UK practice. A particular issue related to the availability of patient education materials in the diverse range of languages required to serve the Canadian population. In addition to this patient education teaching was also limited due to communication barriers and this was observed during clinical visits. In the scenario without translators available only information deemed “essential” was passed to patients with the absence of health promotion information. Furthermore due to the geography of Canada there were incidents in which patients travelled substantial distances for treatment although several departments provided some form of residential stay for patients living substantial distances from the clinic. The distance had no impact on the patient education during a patient’s course of treatment but did inhibit access to support services that provided support with lifestyle changes, for example exercise programs or smoking cessation education programs. Innovative methods of overcoming such barriers were presented in some scenarios, the use of an automated telephone smoking cessation service for example however the practicalities of providing an accessible holistic care service for such patients would not be feasible when living in remote regions of Canada.

In addition to the geographical and language based challenges with patient education, observations also demonstrated the Canadian approach to health literacy. Health literacy can be defined as; “the personal characteristics and social resources needed for individuals and communities to access, understand, appraise and use information and services to make decisions about health”27. Health literacy is taken into consideration in the design of patient education materials, this topic emerged across multiple departments through conversations with patient education specialists. Staff training for health literacy was discussed in some areas through a train the trainer approach and through online modules and courses.
The term making every contact count (MECC) was not mentioned during visits to any Canadian centre however the fundamental principles to this UK based public health concept were embedded across a range of oncology settings. Observations taking place within Radiotherapy (to be discussed further under lifestyle strategies theme) demonstrated the MECC technique, brief interventions were also observed in chemotherapy, with specialist nursing staff, dieticians and staff in resource centres delivering brief messages. This demonstrated that in specific hospital settings the concept of lifestyle changes is embedded into oncology practice.
Lifestyle Change Strategies

The four key lifestyle topics addressed with the project are; smoking and alcohol cessation, physical activity and diet. A range of strategies to promote and support healthy lifestyle changes were observed during clinical visits. It is beyond the scope of this report to list every approach observed during the six week project, this would also result in repetition as several departments utilised very similar approaches.

In summary all departments offered a range of methods to support positive lifestyle changes. Some were delivered in more structured formats, others dependent on individual staff approach as discussed above. Across all centres the most observed face to face support systems were associated with smoking cessation, followed by diet and exercise. In most cases exercise was offered through holistic and supportive care services and although a significant amount of literature was available in departments these strategies were not integrated as well into Radiotherapy practice. Smoking cessation and dietary support were topics widely implemented into Radiotherapy practice. Throughout all Radiotherapy centres there was an absence of information surrounding alcohol cessation, where this did feature information was very minimal, usually in written format (with the exception of one particular staff observation) and in many cases not discussed as routine practice during patient education sessions. There was a clear correlation between a lack of resources available for alcohol cessation in patient information lounges and the delivery of cessation strategies during face to face opportunities.

Smoking Cessation

Several departments offered smoking cessation through a range of strategies and the method observed that was integrated most effectively into practice was through a brief interventions programme described in case study 1. This method was highly effective in ensuring that all patients were screened for smoking status, all staff were trained on the intervention used and materials were available to support information giving and referral. It should be noted that the department were also supported by a hospital smoking cessation team for support and training and this should be a consideration when planning for the implementation of a smoking cessation strategy. The smoking cessation method in this example was also supported by the use of the 5 A’s as a tool for brief intervention. This method is a widely adopted method for smoking cessation and has been used as a tool for smoking cessation research. The region in which this strategy was observed had clear provincial support and guidance for smoking cessation and the impact of provincial agencies on health promotion is further discussed under the wider public health agenda theme. Other models of smoking cessation were also used in practice, including a 3 step approach specifically used in the “getting back on track” pathway for Head and Neck Cancer patients. This process involved the patient meeting with an educator, assessment of lung function and the use of pharmacotherapy. This strategy was the only site specific approach to smoking cessation that was observed. Additional smoking cessation strategies observed include the Ottawa Model, this model of cessation has been adapted to multiple sites across Canada and is included in this discussion as a potential tool that could be used in UK practice. The model consists of five key stages, to include brief intervention and advice followed by pharmacotherapy, the model recognises that advice delivered by a healthcare practitioner increases patient motivation to quit smoking. The brief intervention and advice would fit within the first day chat opportunity in UK practice and the role of the UK Pharmacist could support the pharmacology component to this strategy. As discussed in the patient education section there are challenges surrounding follow up and survivorship for patients living a distance away from the treatment centre, a method of smoking cessation deployed to overcome this is through the use of an automated telephone service and a review of evidence to assess the effectiveness of mobile phone based interventions highlighted that such methods do increase long term quit rates.
The use of technology and social media for health communication is a current topic of interest, there is opportunity for models of clinical smoking cessation within the oncology setting to incorporate the use of technology, this could be an area where further research could contribute to evidence based practice.

A broad range of smoking cessation resources were viewed during the course of the project. The Canadian Cancer Society has produced a range of materials that feature in several clinics across Canada. The focus of the CCS materials is cancer prevention with some materials focusing on this from the pre-diagnosis stage, for example the “preventing cancer” literature, others focus on prevention as part of the survivorship agenda, for example the “life after cancer” literature. In addition to leaflets provided by the CCS, smoking cessation campaigns were also observed across several hospitals. This included a range of notice boards and display areas to highlight the CCS and local strategies. In all areas where campaigns were observed staff were not specifically designated to the display area, patients and carers would therefore seek support at their own discretion. This method could be integrated into UK practice with the use of the MECC technique as the display board and support resources could form part of the referral process. In addition to the CCS resources available across many centres, local smoking cessation resources were also in use across most centres. The smoking cessation strategy identified by case study 1 was supported by a comprehensive range of resources collated to assess individual patient need. Within the package provided to patients in the Sunnybrook Smoking Cessation strategy is information surrounding the quit journey, local and national resources and further information surrounding accessing support and benefits of quitting. This method could support a UK approach to a brief intervention and provides all relevant information in one contained file, preventing the need for patients and carers to self-source materials.
Case Study 1:

Smoking Cessation Model, Sunnybrook Radiation Therapy

Background:

A range of smoking cessation strategies were observed during the Fellowship; however this particular model of cessation was fully integrated into Radiotherapy practice and is an excellent example of how brief interventions can become standard practice in Radiotherapy departments.

Description:

This model of cessation initially begins with assessment of smoking status of all new patients. On occasion this has already been identified at previous patient appointments within other departments in the hospital. Following assessment of smoking status the Therapy Radiographer then proceeds with the discussion accordingly. For patients who do not smoke, no further discussion will take place. For patients who identify that they do smoke the conversation will then proceed depending on patients choice to consider quitting smoking or not. In the instance of patients wishing to seek support for smoking cessation a variety of methods will be discussed. This could take the form of written resources containing the smoking cessation helpline or a conversation with a smoking cessation counsellor. In the event that a patient wishes to have a conversation with the smoking helpline the counsellors or therapists are able to directly refer patients to the service. This then prompts a phone call from the smoking cessation telephone service to the patient. This has the potential to reduce patients choosing to not follow up the call to the helpline. The patients preferred method of quitting smoking will then be discussed and an individual plan created.

In the instance where a patient does smoke but requests that they do not wish to quit, patients are still provided with a range of literature to take away and read. The literature contains information directly targeting patients who smoke but do not wish to quit. This includes information surrounding where to start with quitting and information on the health benefits of quitting smoking. Should patients select the option that they do not wish to quit this will be annotated on the electronic system and revisited with patients later on during their oncology care. At this point patients will again be asked if they wish to quit or not quit and the process followed out as per the patient's decision. The strength of this model includes therapists and other clinical staff within the hospital receiving training on the smoking cessation techniques and having a full understanding of the need to integrate this service into practice. Resources were readily available for staff to hand out to patients selecting either wishing to quit or not wishing to quit and a clear referral pathway was identified.

Considerations:

In order to implement this technique into UK practice it would be necessary to have a core group of clinical staff to draw together the resource packs for patients. In addition to this it would be essential to conduct staff training for all clinical staff within the oncology department. This would be a large task and support of the senior managers would be required. Smoking cessation counsellors and the integrated telephone service would also be necessary in addition to pharmacology support. It would be essential to evaluate the referral numbers following implementation of this technique and to audit the assessment of smoking cessation at intervals during the oncology pathway.
Dietary Support

Dietary support was offered across all departments observed in the project. Practice was similar to UK departments in relation to dietary support for the “at risk” patients; patients identified as at risk are those undergoing treatment for Head and Neck cancer and in most case Upper Gastrointestinal Cancers. For such patients the toxicity received from treatment and in some cases the nature of the disease results in side effects and symptoms that can impact on the patient’s ability to eat and drink to a level required for continued and maintained nutritional status. As per UK Practice all at risk patients are identified prior to, or during a course of Radiotherapy and are reviewed by dieticians throughout treatment to provide support and advice to reduce the impact of treatment on nutrition. Although some interesting observations were made for patients in the at risk category, the focus of the project was based around dietary interventions related to positive lifestyle change in contrast to management of treatment related weight loss and malnutrition.

Through discussions and observations of practice a range of strategies to support patients with lifestyle related dietary advice was recorded. Several methods observed were hospital wide strategies to support patients at all stages of their pathway and as a result were often provided by the patient education services such as ELLICSR as explained in case study 3. Discussion based sessions were the most commonly observed method of delivering advice surrounding healthy eating and diet, the format varied between structured sessions with some teaching content and open sessions to enable patients and carers to ask questions on the topic. In most departments the nutrition talks were open to patients undergoing treatment for all cancer types however observations highlighted that some site specific groups were seeking support more than others. A clear example of this was with patients receiving treatment for Breast Cancer and some departments have responded to the demand for support for this particular patient group by holding specific drop in sessions and seminars for dietary advice or healthy eating following a diagnosis of Breast Cancer. In one particular centre a 2 hour introduction session took the format of open questions for this patient group with additional resources made available for follow up support. In addition to Breast Cancer patients the demand for nutritional support was also higher in the Prostate and Colorectal Cancer treatment groups and occasional sessions were held for patients receiving treatment for Prostate and Colorectal Cancer based on demand. Support resources also followed a similar trend, a range of generic materials were available to support patients with healthy eating choices though patient education lounges and hospital library facilities. Similar resources are provided in UK practice but it is the author’s understanding that the seminars are less available. This could be a potential method to support the brief intervention and advice approach that could be adopted in UK practice. Discussions surrounding healthy eating could also form part of the initial screening tool at the first day appointment to assess areas in which individual patients wish to make positive lifestyle choices and how we can support this within Radiotherapy practice.

One method of dietary support observed that was fully integrated into Radiotherapy practice involved the use of a nutritional screening tool to score patients on nutritional status and make recommendations based on the outcome. At risk patients were required to be reviewed at regular intervals as per other clinical departments and UK practice. However this method was used for all patients at the first appointment. During observations patients were then asked at specific treatment fractions how they were finding nutrition and if their status had changed, at this point side effects of treatment resulted on some patients wishing to be reviewed for dietary support; in other cases patients were requesting support to consider making changes to their diet following treatment. During observations, it was interesting to see a large percentage of patients wishing to receive support and advice for this subject across a range of treatment sites. This approach ensured all patients were offered support based on any nutritional needs that they had and this would be an excellent strategy to apply to
UK practice. However it should be considered that this approach would have a significant impact on dietetic services and workload has the potential to significantly increase should all patients be offered support. Methods to manage workloads and take into consideration the financial implications of this would need to be assessed prior to implementation. The use of group seminars and support materials could reduce the demand on dietician services whilst enabling all patients support if required.

As per smoking cessation, a broad range of paper materials were viewed for nutritional support. The CCS produced a range of materials on dietary advice to cover support both during treatment and post treatment, in addition to the prevention strategies. In addition to the CCS materials a range of site specific resources were available. The focus of such materials was mostly for Breast Cancer patients with three individual pieces of literature for healthy eating following Breast Cancer. These resources were very detailed and included meal plan examples, advice on diet change and emotional eating and target setting. A review of these resources would be useful in addition to the available resources within the UK to develop evidence based site specific materials to introduce to practice.

The holistic care centres provided some excellent sources of support for patients and carers on the topic of diet. In several of the holistic and wellbeing centres visited, a fully functioning kitchen was used to demonstrate recipes for healthy recipes on a regular basis. On some occasions sessions were run as a course for patients and others were delivered as one off sessions. During observations these free classes were very popular and were mostly attended by patients following treatment for Breast Cancer, although not exclusively. It should be considered that although this facility would be excellent for UK practice many of the wellbeing centres were funded separately or through charitable donations and it is therefore unlikely that such facilities could be funded through the National Health Service.
Case Study 2:  
Assessment of nutritional status and dietary requirements, Carlo Fidani  
Regional Cancer Centre

**Background:**

A range of interventions to assess nutritional status of at risk patients were observed during the project. However across several departments dietary support and advice was mostly available for at risk patients only and not patients wishing to make dietary lifestyle changes. In this particular centre support was available for both at risk patients and those wishing to seek dietary advice based on weight loss or healthy eating following a diagnosis of cancer.

**Description:**

This model of nutritional assessment is initiated during a discussion with the patient at the pre-treatment stage of Radiotherapy. Patients are asked a series of questions that then provide a score with regards to their nutritional status. Patients that are identified as at risk are immediately referred to a dietician support for the duration of their treatment. This enables patients who do not immediately identified as at risk as a result of their diagnosis to be identified and to seek support for nutrition. In addition to the opening questions at the pre-treatment stage patients are also asked about their nutritional status at various points during treatment. It is at this stage where the therapist will broaden conversations to ask the patient if there is any support that they wish to seek from a dietician during treatment. It is highlighted to patients that this is not necessarily only issues directly relating to side effects of treatment for those who are at risk of malnourishment but also to seek advice on general diet and healthy eating information that they may wish to take forward following their treatment. During observations as part of the project, several patients were keen to seek support from dietetic services on this topic. The most common patient groups observed seeking support were patients receiving treatment for Prostate Cancer and Breast Cancer. These treatment sites would not typically be referred for dietary support as radiotherapy is unlikely to cause side-effects that would impact on nutritional status. Patients wishing to seek support are provided with a contact telephone number for the dietetics services to schedule a one-to-one appointment. Although dietary support services were available in other centres there was no process of the therapist holding scheduled discussions with patients to encourage dietary support and the review of non at risk patients on a one-one basis.

**Considerations:**

This process involves an initial assessment of patient nutritional status. Similar to smoking cessation case study one it would be essential to integrate a method of screening at the initial radiotherapy discussion. The process of following up and rescheduling a brief discussion with patient surrounding nutrition and dietary support would also need to become part of standardised practice. In addition to the training and timing of the intervention during Radiotherapy it must be considered that this intervention is resource dependent on the dietician services. In several UK departments the availability of dietician services is limited due to the vast services that they cover. This would therefore incur financial and work loading challenges that would need to be addressed.
Exercise

Current exercise status was assessed in some departments through the symptom screening tool used in first day discussions. Although there were no practices observed in which interventions were offered during Radiotherapy treatment, signposting to resources and support systems was observed. One particular method of exercise support involved the site specific “getting back on track” programme for Head and Neck Cancer patients. In this model patients were encouraged to use the FITT model for exercise, with advice related to frequency and types of activity. This programme was integrated into the supportive care follow up package to support healthy lifestyle changes following treatment. The focus of the rationale for exercise includes the benefits to overall health and also as a method to reduce cancer related fatigue and depression. This method of promoting exercise could be adapted to UK practice to support the issue of cancer related fatigue, reported to impact on 70-90%\textsuperscript{31} of patients with cancer.

Several of the referral pathways for exercise involve the use of exercise prescriptions, tailored to individual patients. This is important to consider for oncology patients who might also be undergoing rehabilitation following cancer or treatment related effects. In some departments with fewer facilities patients were offered classes in a “gym” style environment. Such methods may increase confidence and support continuation of exercise following treatment. Other hospital based approaches include the WE-Can (the wellness and exercise for cancer survivors) method; open to all patients, this method involves a fitness test and advice on how to exercise safely followed by an exercise plan for patients to carry out safely at home. The intervention level for this approach is minimal but requires expertise in the design of individual exercise programmes. In this particular example the oncology services were supported through the holistic and wellbeing centre and access to a kinesthesiologist, this would need to be considered if this strategy was implemented into UK practice. A further method discussed in the Radiotherapy setting was the HEALTH (health exercise active living therapeutic lifestyle) model. This model was a region wide rehabilitation strategy, offering patients support over a 6 month period. It is possible that similar models exist in UK practice and with the exploration of available services outside of the oncology setting this could broaden referral pathways and offer a wider range of support networks for service user access. The challenge to overcome would be to update staff in outpatient oncology services of the referral pathways. Observations highlighted that within Canadian practice, a range of staff awareness of holistic and wellbeing services occurred both within the immediate hospital based setting and regionally through other support services.

Where exercise regimes were supported by holistic and wellbeing services, programmes were much more extensive. Examples here include a 30 week patient specific schedule, with access to a gym with relevant equipped and staffed gym and in some settings exercise regimes were offered alongside nutritional support. As with previous holistic care services patients were able to access the exercise programmes free of cost but in all areas observed there was a time limit to then encourage activity levels to increase without the support of the H&WB centres. A wide range of resources were available to support exercise related lifestyle change. Similar to the resources available for diet and nutrition some resources focused on general advice, including material provided by the CCS “move more” leaflet and a survivorship handbook provided by the BCCA. The site specific materials again focused around Breast Cancer (with the exception of the Head and Neck Cancer getting back on track programme). Many of the materials for Breast Cancer combined nutritional advice with exercise; the resources viewed included rationale for exercise to include regaining energy and as a potential method to reduce recurrence for disease. Although the resources contain advice on developing routines and goal setting, this method of support would ideally follow up to an assessment or exercise prescription that takes into considerations each individual patients ability to exercise safely.
Case study 3: Cancer survivorship centre. ELLICSR, Princess Margaret Hospital Toronto

Background:

Cancer centres within UK practice often house a cancer support service. In many hospitals this is in the form of a Macmillan or a Maggie's centre although local variations do exist. Such centres provide support and holistic care to patients and carers during treatment.

Description:

This health, wellness and cancer survivorship Centre opened in 2010. The aim of this service is to improve the cancer experience and to develop new survivorship communities and initiatives. A particular focus of this centre is in the adoption of healthy behaviours. As a result of this a range of services that this centre provides are related to lifestyle interventions. Although offering a wide range of services for patients two of the services that are of interest to the project are the WeCan and the ELLICSR kitchen programs.

The WEcan program is the wellness and exercise for cancer survivors program. The WEcan program is open to patients who have been treated for a range of cancer types. The program enables participants to learn more about exercise and to assess their current fitness levels and how they can improve and continue to exercise safely. The ELLICSR service does have a designated gym to hold exercise classes. However the program also provides an exercise plan for patients to continue to complete at home, this promotes the integration of exercise into normal day-to-day activities and is indicative of a full lifestyle change. This is a particular strength of this project to encourage patients to complete exercise as part of their normal lifestyle following a specific intervention that may be provided through their hospital. In addition to the practical aspect of the services being delivered the ELLICSR service also conduct research into the lifestyle interventions that they promote. This is a particularly unique aspect to this health and well-being support service. In addition to the WEcan program the ELLICSR centre also houses its own kitchen. The ELLICSR kitchen hosts a variety of dietary support sessions ranging from overall healthy eating recipes and information to more specific nutritional requirements. During observations the kitchen were preparing for a specific seminar and demonstration for patients with a stoma. These are only a small range of the services that the kitchen and the centre have to offer and whilst supporting patients into the survivorship transition period the centre are promoting of self management and improving lifestyle for patients.

Challenges:

During observations in the Radiation Therapy department only a few members of staff mentioned the ELLICSR services when discussing lifestyle changes for patients. This highlights that there may be scope to conduct some promotion activities within the rest of the oncology services to enable staff to refer patients to the vast range of resources that are available. Several of the hospitals in the UK have a support service although the size and facilities may limit some of the specific programs that are offered. In addition to this there are financial implications of staffing a department with qualified and registered exercise specialists, nutritionists and dietician services and this could impact the feasibility of expanding UK services.
Case study 4:

Wellspring Westerkirk house at Sunnybrook Hospital

Background:

Wellspring at Westerkirk house is a unique holistic care centre for patients, available during and following cancer treatment. There are several wellspring centres across Canada; some centres are housed on hospital grounds others are not. The centres are not directly associated or affiliated with the hospitals.

Description:

Westerkirk house provides a calming and safe environment for patients to discuss any issues that they may feel in relation to cancer including fear, anxiety and pain for example. Specialist support staff are available for counselling should patients wish to access this. In addition to this, and the rationale for the inclusion of this department as a case study is the rehabilitation and nutritional program is that Wellspring have to offer.

One example of a support service offered through Wellspring is a 30 week cancer exercise program. Within this program patients are supervised by experienced cancer exercise specialists and will receive a personalised assessment and exercise plan. This is essential to ensure that individual requirements are taken into consideration as patients may have specific mobility issues directly related to the cancer or any treatments that they may have experienced. Patients are then encouraged to attend supervised group exercise classes on a twice weekly period for a 10 weeks and then a supervised exercise class once a week for 20 weeks. This approach hopes to encourage participants to include exercise as part of their daily lifestyle and duration of 30 weeks hopes to ensure that this is sustainable. Following the 30 week programme in which participants can attend the classes at the Wellspring gym patients are then supported with an individual plan to transition from attendance to independent exercise at home or in public gymnasiums.

In addition to the exercise program observed at Westerkirk house, Wellspring also offer a nutritional course ranging in cooking sessions and education sessions. During observations the nutritional classes were very popular and included a demonstration of a particular recipe in some cases, just as a general healthy eating advice and in other cases focusing on particular ingredients. The services available at Wellspring even though not related to the hospital were available to patients at no cost. During observations it was clear the positive impact of the Wellspring centre on patients that attended.

Challenges:

The support services were not directly related to a hospital environment, as a result of this knowledge and awareness of clinical staff in hospitals may be limited. This could lead to lack of knowledge of referral pathways that patients may find beneficial during and following treatment. In addition to this it should be considered that any centres outside of hospital environment should be fully regulated for safety and accuracy of information provided to patients.
Academia and the Wider Public Health Agenda

The role of undergraduate education in the delivery of public health within the AHP workforce is a key topic of interest at the time of this project. A report published in October 2015 set out the current contribution to the public health agenda through undergraduate curriculum and highlighted some interesting trends. Although some excellent examples demonstrate that public health is integrated into UG AHP curriculum, Radiography as a profession is an area requiring further support suggesting there is scope for further integration of PH into education. Although this area is essential in the development of the future workforce, the author also recognises that there is a large percentage of the current workforce that also has training and development needs in this area.

Departments with a fully integrated smoking cessation programme supported the ongoing training of staff through in house CPD, however no formal academic training was observed for post qualification clinical staff. Although some variation was observed, undergraduate education in Canada follows a similar format to UK practice consisting of both clinical and academic learning. Curriculum design in both academic institutions observed differed to include a large block of clinical training in the final year of the course in contrast to UK practice where this is more evenly split across all years of the programme. Differences observed here included the use of simulation of clinical practice in the academic setting in which some public health material is integrated.

In one academic institution, simulation of patient education discussions included the understanding behind patient advice surrounding alcohol and smoking cessation during Radiotherapy. Although no formal teaching was provided on this topic it is standard practice that patients are advised on this topic and this is embedded within patient education simulation. Learners are assessed in this format using actors to pose as patients to re-enact the unpredictability of a real life discussion. In further support of the PH agenda one course included a dietician as an external speaker to facilitate learning of nutrition and oncology. The opportunity to speak with clinical co-ordinators in one of the centres responsible for training students also revealed that students have the opportunity to attend a talk from dieticians in the clinical setting. On the topic of alcohol and smoking cessation, clinical coordinators stated that this was not taught in the University setting or in the clinical environment. Upon discussion at the academic institution the director outlined that this is an area that they are considering adding into the curriculum as nationally smoking cessation is gaining momentum. Students in this setting were however encouraged to promote healthy eating and exercise to patients, and were provided with learning opportunities to facilitate knowledge in this area. In addition to the dietician support in year 1 of the programme students are able to learn about the survivorship agenda, including the role of exercise and were supported by tutorials in local departments on nutrition and exercise.

A newly developed Radiation Therapy course at the University of Alberta incorporate PH messages at various points within the course, an example of this was within one module in which a learning outcome involved understanding behind nutrition, including understanding to the essential nutritional rules as defined by the Canadian Food Guide. Within a different module learners are required to understand models of health and understand the theory behind patient education. Although not specific to PH topics, the embedding of this within the curriculum could support practitioners in the clinical setting with the delivery of PH messages, overcoming some of the barriers identified to provision. Although no specific curriculum content outlined smoking or alcohol cessation, students complete a task in which they chose a cancer prevention strategy to research and present as a poster, this method of assessment allows learners to explore a relevant topic are in line with the prevention arm of PH. One of the programme outcomes at the University of Alberta is social responsibility and citizenship; learners are
expected to have an understanding of the importance of protection and enhancing of the health and wellbeing of individuals, communities and diverse populations".

There was an absence of post graduate academic support for PH topics; all training relating to the delivery of PH took the form of in house update training ) online training for smoking cessation for example). Topics related to patient education were more widely available for post graduate completion, again in the form of local training in contrast to through academic institutions. Health inequality is an area identified as requiring focus in Canada as the gap between the health of rich and poor is increasing\textsuperscript{32} methods to address this feed directly into the PH agenda and as a result of this one area of focus of many training programmes surrounding patient education was health literacy. Recent studies completed in Canada demonstrated that almost 50\% of adults have low literacy levels for reading. Here the focus is to train staff to recognise the factors that might contribute to health literacy levels and the impact this might have on patient education.

The impact of Government advisory bodies on the delivery of PH interventions was evident during the project. Cancer Care Ontario is one example of a Government advisory body for cancer services. CCO are responsible for a range of cancer prevention and screening programmes including smoking cessation. Case study 1 highlights the integration of a smoking cessation strategy through the support of CCO and in the region of Ontario smoking cessation strategies were more evident collectively across the departments observed in contrast to other provinces visited. A project completed in 2012 made a series of evidence based recommendations to reduce risk factors for chronic disease in Ontario\textsuperscript{33}. Population level interventions included tobacco control, alcohol consumption recommendations, physical activity and healthy eating recommendations. Recommendations for both smoking and alcohol risk reduction include the role of the hospital based setting and the paper states that smoking cessation strategies should be broadened and extended to integrate tobacco cessation programmes to be offered across all hospital settings, this could be rationale for the development of the smoking cessation team at the Sunnybrook hospital in Ontario. The paper also recommends that there should be increased access to brief counselling interventions including in hospitals for moderate to high risk drinkers. Although this was not observed in Radiotherapy practice this approach could be implemented into UK practice however a method of screening for those who fall into the moderate high risk category would be required. A further driver for the support of interventions to promote positive lifestyle change in the Ontario region is a result of a report published by the Health council of Canada to recommend that all health systems across Canada should support patients with self-management with a focus on chronic conditions, as a result of this report the Ontario ministry for health and long term care funds several self-management programs across the region\textsuperscript{34}.

Discussions in the academic and clinical setting in Alberta also revealed the potential impact similar health drivers with the recently circulated tobacco screening and treatment guidelines for adult cancer patients. The draft guidance document was circulated very shortly prior the authors visit to Alberta and therefore prompted discussions in the academic setting surrounding the potential to add smoking cessation theory and strategies to the undergraduate curriculum as a result of the document.
Challenges

Observations throughout the project highlighted some similar challenges in the field of health promotion to those in UK practice. Variations in practice were observed with some departments having a focus on diet but not on other HP topics and others focusing more on smoking cessation for example. The health care system differs significantly in Canada to the UK practice and this could provide rationale for the variations in local practice observed. Although not all key PH topics were observed in practice some exceptional examples were identified. The Ontario region is well known for its tobacco cessation schemes and this was evident with the smoking cessation methods observed in this region. Provincial support and guidance is a key indicator for some of the success identified in this region and highlights that with the absence of this the driver for change in the PH arena is reduced. Similar practices are faced with UK practice, so many guidelines and recommendations are revealed in the health and social care setting and without this on the PH topic it is, likely that the focus will remain on other areas.

In addition to the varied government support observed, individual staff opinion was also similar to UK practice. It would not be possible to make a direct comparison however observations reveal that even within a single department staff opinion on the delivery of brief interventions for PH differs, without mandates in place and department or province wide guidelines the variation in practice increased. In centres where specific training was offered for example case study 1 or 2, PH interventions were common practice and staff opinion was that the messages delivered were part of standard practice and were not questioned.

Canada faces some geographical challenges with some departments treating 65% of patients living outside the region of the hospital. Survivorship initiatives and follow up programmes have adapted in some regions to account for geographical challenges and there is scope to assess strategies used such as automated services for smoking cessation to address cost implications for some patients travelling to access survivorship support systems. In addition to this there is scope to further assess support resources that patients and carers are provided with in contrast to face to face support to overcome the potential issues with staffing and cost in UK practice.

The collective approach across the oncology professions was evident in many areas of practice, this may help to overcome the challenge of freeing up staff time and potential cost implications to expand the role of services. For support groups and seminars a range of professions shared the role of supporting the delivery, ultimately reducing the workload requirements and sharing responsibility. This approach could be used in UK practice through the sharing of common goals and service improvement.
Discussion

The project was designed to evaluate policies that contribute to and influence the PH agenda, to explore the education and training that supports the delivery of HI in the undergraduate and postgraduate setting, to evaluate the implications of the practical implementation of health improvement within Radiotherapy practice and to assess the strategies used for the delivery of HI in clinical practice. All project aims were achieved and information will be used to make recommendations for the development of UK practice.

The literature highlighted the need to target lifestyle associated health impacts and with recent developments in PHE, RSPH and local professional organisation guidelines the expectations for the AHP workforce and therefore the Radiography workforce are increasing. With the drivers for change clear, the project has been essential in outlining how HI can be embedded into practice with a broad assessment to highlight examples of best practice that can be developed within the UK.

Overall Canadian practice highlights a focus on patient education with a wide range of resources to support this. It was evident through observations that time for patient education discussions at the start of a course of Radiotherapy treatment is imperative to practice, supported through the framework for achieving excellence in the provision of cancer patient education in Canada published in 2009.

Education and development on the topic of patient education was observed and supported through government advisory bodies such as CCO however formal postgraduate academic support for specific HI was not observed, with HI embedded further into clinical practice and undergraduate provision it did not appear that there was demand for this as with UK practice. Some strategies for the inclusion of PH material into undergraduate provision were observed and can be taken forward for UK practice; provision is also likely to increase with specific oncology guidance in publication surrounding smoking cessation and adult cancer patients.

Strategies to embed PH interventions into practice without damaging the therapeutic relationship between the service user and Therapy Radiographer were observed. One method that could be applied to UK practice is through the use of a symptom screening tool at the start of treatment, used to devise individual care package plans for patients based on discussions prompted by the tool. Oncology wide embedding of PH throughout services demonstrates to patients and carers that the assessment of lifestyle behaviours is part of standard practice within the health setting and supports the PHE and RSPH publication in which it is revealed that patients expect to, and are happy to receive such information from AHP staff.

Although there was the absence of a national PH strategy within Radiotherapy practice excellent examples of specific interventions were observed. The most commonly observed topic was smoking cessation although many departments also offered interventions for dietary and nutritional support. A range of strategies were observed to support lifestyle changes and examples of good practice can be disseminated through to UK practice. The impact of government advisory groups in the long term sustainability of projects was also demonstrated and should be considered in the design of future practices in the UK. Observations demonstrated that where there is a strategic approach to HI provision, in a particular department or hospital setting individual staff opinion did not influence provision. Discussions around signposting to exercise support or nutrition or smoking cessation was seen to be part
of standard practice and delivered as part of the role of the Therapy Radiographer. In areas where there is less structure and no practice embedded within the department for HI delivery, provision was dependant on individual staff preferences with some staff members offering some support and advice, others stating that this was not part of their role. The need for a strategic, departmental wide approach to ensure sustainable implementation was evident.

The interprofessional approach within the oncology sector was also observed as a facilitator for provision. The sharing of responsibility of the delivery of patient education classes and seminars on HI topics was observed and the burden of adding further responsibility to already complex job roles is therefore reduced. The sharing of information giving and ensuring shared goals across services also sends out a clear message to patients and carers that HI provision is not used to target individuals or nag but as a method to aid self-management, improve quality of life and symptom and side effects occurring as a result of their diagnosis or treatment.

Several departments had a range of resources to support patients with lifestyle change. Some departments that were rich in resources had a large network of referral pathways, in contrast other centres had smaller, concise resources available for patients and carers. Observations highlight that the availability of resources and number of referral pathways did not always correlate to the amount of HI related discussions taking place with Radiotherapy departments. In some centres that were not resource rich, staff had an excellent awareness of surrounding support services, discussed specific HI topics with patients and provided relevant support materials to patients and carers where appropriate.
Conclusions and Recommendations

The rationale for health improvement provision is evident when considering the burden of lifestyle associated disease and the specific impact on a patient following a diagnosis of cancer. The role of AHPs in the delivery of brief interventions to support and promote positive lifestyle change is on the increase and as a profession, Radiography must respond. As a workforce that builds excellent rapport with patients as a result of multiple appointments, Therapy Radiographers are well positioned to deliver HI whilst maintaining the therapeutic relationship developed with patients and carer. It is fully understood that there are economic difficulties and the health service within the UKs under stress to consistently improve services and respond to guidance and policy. This project has revealed strategies to deliver HI, whilst maintaining the relationship with service users and have a limited impact on staffing levels and time restraints. In order to facilitate the wider implementation of health improvement within Radiotherapy the following recommendations are made as a result of the project.

Recommendations for UK practice:

1. Network with patient education/information specialist practitioners in the UK Radiotherapy workforce to assess national approach to patient education within the UK, to include health literacy. This would ensure opportunities are available for time to deliver brief interventions and advice on the topic of health improvement and to ensure this is routinely discussed in practice. This could result in the development of national guidelines for patient education with the support of the professional organisation.

2. Review the need for specific lifestyle interventions for the oncology patient population through a systematic review of evidence. To include a review of impact of disease prevention (secondary malignancy and recurrent disease) and the impact on quality of life following a diagnosis. This should be shared with the oncology workforce to further highlight rationale for lifestyle changes following a diagnosis and to provide an update of current evidence to practicing Therapy Radiographers.

3. Review strategies for lifestyle interventions already utilised in oncology practice (not just Radiotherapy) to enable sharing and development of any current UK practice. Following this a working group can be established to assess and develop the embedding of HI within UK RT practice and appropriate materials for training and support of staff and resources to provide to service users. The support of the professional organisation and Public Health England would be desirable. In addition to this Macmillan Cancer
Support may also be able to share examples of good practice and are well placed to network and disseminate.

4. Draw together information surrounding regional cancer support services to inform practitioners and service users of the available support. Discuss with patient education and information specialists the methods of dissemination and review.

5. Continue to develop the undergraduate Radiotherapy curriculum to embed PH within the programmes. Sharing of practice with other AHP undergraduate courses may support this. The support of the education stream of the SCOR will be required.

6. Design a method of improving knowledge and confidence of the post graduate workforce on health improvement. This could take the form of an online module or CPD tool. This recommendation would benefit from the support of the SCOR, the Radiotherapy managerial workforce and PHE to devise a feasible and timely strategy.

The achievement of these recommendations will be important to support the Radiotherapy workforce in the implementation of HI into current practice. A wide range of key policy stakeholders will also be essential to share knowledge and expertise.
Itinerary

Toronto:

Radiation Therapy Department, Odette Cancer Centre Sunnybrook Hospital
(Special thank you to Krista Dawdy)

Wellspring Centre, Sunnybrook Hospital

Radiation Therapy Department, Michener Institute/University of Toronto
(Special thank you to Cate Palmer)

Cancer Care Ontario
(Special thank you to Zarah Ismail and Maria Rugg)

Radiation Therapy Department, Princess Margaret Hospital Toronto
(Special thank you to Angela Cashell)

ELLICSER, Princess Margaret Hospital, Toronto

Radiation Therapy Department, Mississauga Hospital
(Special thank you to Maria Rugg)

Edmonton:

Radiation Therapy Department, University of Alberta
(Special thank you to Susan Fawcett and the whole team)

Radiation Therapy Department, The Cross Cancer Centre

Prince George:

Radiation Therapy Department, Prince George Hospital
(Special thank you to Lindsey Baker and the whole team)

Vancouver:

The Cancer Prevention Centre, University of British Columbia
(Special thank you to Dr Caroline Gotay)

Victoria Cancer Centre
(Special thank you to Kelly Earnshaw)

Vancouver Cancer Centre
(Special thank you to Amanda Bolderston and Jenny Soo)

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32. Canadian Institute for Health Information. 2015. Richer, poorer; In sickness and health.  
