

InspireHealth and Integrative Cancer Care Research

Background – Integrated cancer care:

Integrative cancer care integrates simple and inexpensive ways to support and improve patients' health and healing with standard cancer treatment. While standard cancer treatments focus on the cancer itself, integrative approaches address the broader context of a patient's life. Empowered to take ownership of their own health, patients are able to play an active role in their treatment while simultaneously improving their survival and reducing the risk of cancer recurrence. The result is a higher quality of life with a reduced financial and social burden to patients, families, communities and taxpayers.

The need for integrated care:

Substantial and growing evidence exists that engaging cancer patients in their own health through an integrative approach to care (i.e. exercise, healthful nutrition, stress reduction, emotional support, etc.) can substantially improve quality of life, reduce the risk of recurrence, improve survival, and reduce overall healthcare costs. This evidence suggests that support of health may be as important as standard cancer treatment in reducing risk of recurrence and improving survival. Some examples....

- Exercise is associated with a 20-50% reduction in breast cancer recurrence and death from the disease.¹
- Two studies have found that colon cancer patients who exercise regularly have a 50 - 60% reduction in cancer mortality.^{2,3}
- In a large-scale RCT, a low-fat diet combined with modest weight loss was found to reduce breast cancer recurrence by 24%.⁴
- A RCT found that healthful lifestyle changes reversed PSA progression in early prostate cancer,⁵ altering the course of this disease.
- Numerous RCT's have found that melatonin, a simple inexpensive supplement, can substantially increase survival in the context of a wide variety of advanced cancers;⁶ more than doubling one-year survival and response to chemotherapy; while, at the same time, reducing the side-effects of chemotherapy in advanced cancer.⁷
- The combination of fish oil and vitamin E (two simple inexpensive supplements) has been found to significantly improve immune system function and survival in patients with advanced cancer.⁸
- Consumption of less meat, fat, refined grains and sugar is associated with a substantial reduction (70%) in recurrence and increased survival in patients diagnosed with colon cancer.³⁹

Vitamin D supplementation is noteworthy. It was found to reduce cancer incidence by 60% (by 78% if supplementation was continued for more than one year).⁹ Three recent studies (breast cancer; colon cancer, non-Hodgkin's Lymphoma) have demonstrated that vitamin D blood level at the time of cancer diagnosis is highly correlated with survival,^{10,11,37} strongly suggesting that vitamin D has an important role, not just in cancer prevention, but in treatment as well. Patients in whom vitamin D levels were high were half as likely to have a recurrence or to die from their disease compared to patients with low vitamin D levels.

InspireHealth's programs focus on prevention and self-responsibility:

Cancer and standard cancer treatments have an enormous impact on patients and their families. Cancer patients are at substantially higher risk than the general population for developing a

second cancer as a result of the latent carcinogenic effects of chemotherapy and radiation and at substantially greater risk of developing other illnesses including diabetes,^{12,13,14,15} cardiovascular disease,¹² obesity,^{16,17,18} and osteoporosis.^{19,20,21,22} Reduced physical capacity narrows employment options²³ and is associated with other concerns including declining functional status and permanent disability.²⁴

These physical impacts, as well as the psychosocial effects of cancer and its treatments, reduce quality of life for cancer survivors, many of whom also report ongoing problems with emotional distress, fatigue, reduced energy and loss of stamina.²⁵ In short, survivors have almost twice the likelihood of experiencing a functional limitation than the general population.²⁶ The economic cost of impairment is tremendous on individuals, their families and friends, cancer care, our healthcare system, and taxpayers.²⁷

The incidence and impact of many of these health conditions can be reduced through healthful lifestyle changes, including exercise, healthful nutrition, weight management, and smoking cessation. Exercise, healthful eating and vitamin D reduce the risk of all chronic diseases (e.g., cancer, heart disease, diabetes, strokes, arthritis, etc.). During cancer treatment, regular mild to moderate exercise has been shown to improve wellbeing, increase energy, boost self-confidence, lessen anxiety and depression, stimulate immune system function and improve appetite as well as sleep patterns.^{28,29} Similarly, healthful foods also support our health and wellbeing. The ability for the body to heal is intimately related to how we nourish it –supporting the body’s immune system functions through daily exercise and a healthful diet significantly reduces the risk of cancer recurrence, increases survival, and improves long-term wellbeing.

Integrated cancer care impact on Healthcare Costs:

Along with the evidence that healthful lifestyle changes can substantially reduce the risk of recurrence and improve survival of people with cancer (and thus, substantially reduce overall healthcare costs), growing evidence exists that this integrative approach to supporting health during cancer treatment has substantial benefits in reducing overall costs in other important ways. Poorly adjusted cancer patients consume 130% more medical services, including 130% more hospital days, than well-adjusted patients. Even those who are fairly adjusted consume 80% more medical services than well-adjusted patients, including twice as many hospital days, as well-adjusted patients.³⁰

This has substantial financial implications, since high distress levels are common among people living with cancer. In a recent study of over 3,000 cancer patients throughout Canada, 37% of participants met the criteria for significant distress. Another study of 386 patients from twelve US medical centers found that 35% of patients had psychological distress and an even larger study, consisting of 4,496 cancer patients, demonstrated a 35% overall rate of significant distress.³¹

Not surprisingly given the research above, interventions to support the psychological and emotional wellbeing of cancer patients have been found to substantially decrease the average length of hospital stays by 78%, decrease hospitalization frequency by 67%, and reduce emergency room visits by 45%.³² The potential cost-savings achieved by such a simple inexpensive intervention is substantial.

Nutrition and Exercise

There is a clear and strongly positive association between the number of lifestyle recommendations being met and the quality of life of breast, prostate, colorectal, bladder, uterine

and skin cancer patients;³⁶ and these benefits have substantial healthcare cost implications. Cancer patients who experience fatigue report 50% more Emergency Room visits and 400% more visits to physicians and clinics.³³ Malnourished patients experience almost twice the average length of stay in hospital when compared to normally nourished equivalents.³⁴ Cancer patients who receive nutritional counseling are able to maintain their energy intake and reduce the incidence of fatigue.³⁵ Through simple approaches to support health –including healthful nutrition, exercise and emotional/spiritual support– the incidence and severity of these symptoms (and their associated healthcare cost impact) can be substantially reduced.

Healthful lifestyle change is routinely addressed as part of the medical management of other chronic diseases such as coronary artery disease and diabetes, and comprehensive rehabilitation programs are readily available to support the integration of these safe and inexpensive self-care interventions into the treatment of these other chronic diseases. In contrast, no such routine programs exist in the context of conventional cancer treatment despite similar needs.

The cancer patient population offers an incomparable opportunity to offer primary, secondary, and tertiary strategies to target healthful behavior change on all prevention levels. An optimal comprehensive cancer control strategy must address healthy lifestyle change as a primary component of care in order to achieve optimal improved patient and health system outcomes, as envisioned in the InspireHealth expansion.

Integrative Care for Metastatic Disease:

It is not just in the prevention of cancer recurrence that integrative care can be of value; integrative care for patients with metastatic incurable cancer can improve quality of life, extend life, and reduce overall healthcare costs. A recent study published by Keith Block demonstrated a significant survival benefit of metastatic breast cancer patients who attended the integrated cancer care program at the Block Centre for Integrative cancer Treatment in Chicago, IL.³⁸ Five-year survival was 27% for Block Center versus 17% for comparison patients.

Retrospective studies of InspireHealth patients with stage 4 colon cancer (121 patients); stage 3B and 4 lung cancer (122 patients); and stage 4 breast cancer (119 patients) documented significantly longer survival associated with InspireHealth participation in comparison to standard BC survival statistics.

For example, 53% of InspireHealth inoperable lung cancer patients (i.e., stage 3B and 4) were alive one year after diagnosis, compared to 20% or 23% of patients in the standard BC or SEER (US) survival curves, respectively. At three-years after diagnosis, 16% of InspireHealth patients with inoperable lung cancer were still alive, compared to 4% and 5% in the BC and SEER standard survival curves, respectively. The survival bar graphs for the above described survival analysis are appended.

The InspireHealth retrospective studies are not randomized control trials and therefore, the results must be interpreted as an association rather than definitive cause/effect. In other words, there may be alternative factors, other than participation in InspireHealth's programs that may account for at least a portion of the observed association. For example, as InspireHealth patients are 'self selected', they may be more high motivated or distinct in some other way compared to other BC cancer patients. However, the growing body of evidence in the research literature documenting the association between healthful lifestyle and improved survival in cancer patients suggests that the results of these retrospective studies are promising.

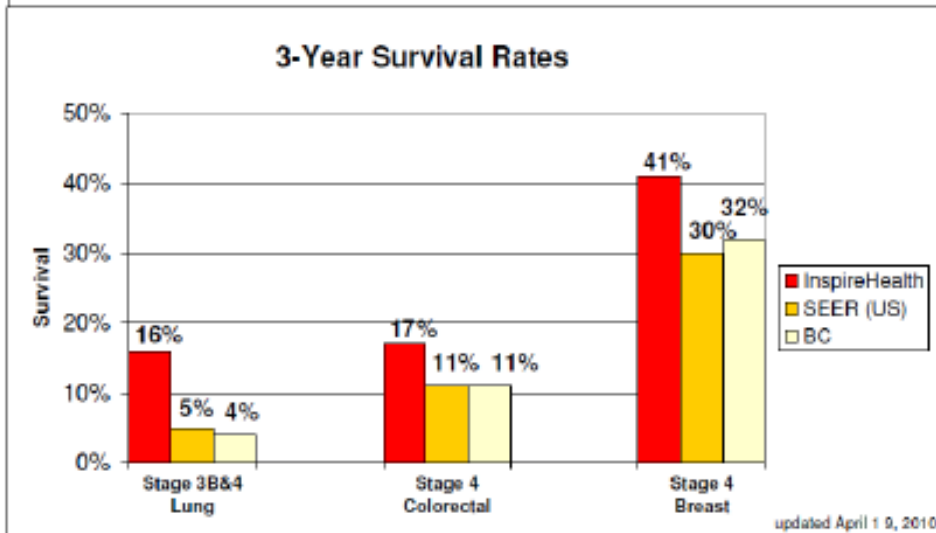
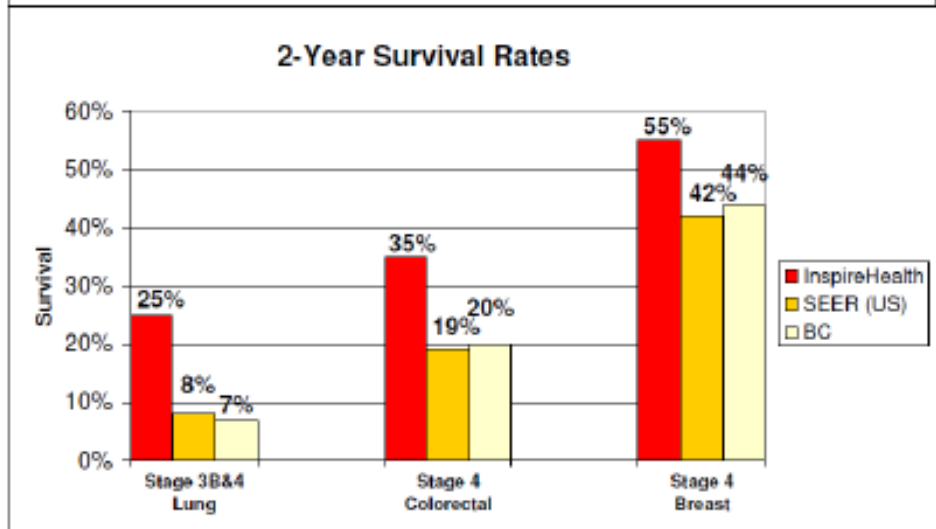
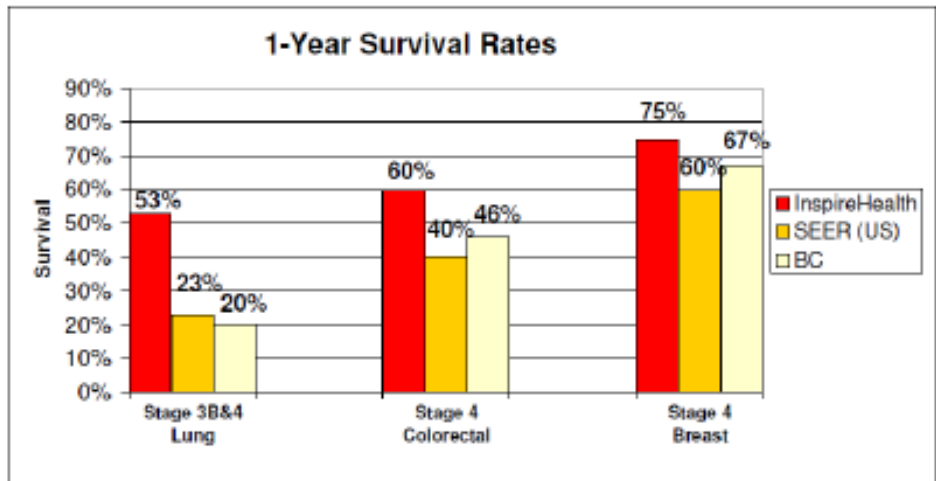
A Substantial Need:

In spite of the growing body of evidence that healthful lifestyle changes can substantially improve quality of life and reduce the risk of cancer recurrence, an integrative approach is not currently part of standard cancer care. Only a minority of cancer survivors meet even the minimum recommendations for healthful diet and exercise; only 15-19% of cancer survivors eat five or more servings of fruit and vegetables per day and only 30-47% meet minimum activity levels targets.³⁶ In spite of the evidence that supporting health can play an important role in reducing recurrence and improving survival, only 5% of cancer survivors meet all three minimum recommendations with respect to healthful diet (5-A-Day), exercise (minimum exercise targets) and smoking (non-smoking). Substantial opportunities exist to significantly improve these figures and to impact both the quality of life and survival of people with cancer.

It is widely recognized that we must move our focus from simply treating illness to engaging people in their own healthcare and promoting self-responsibility and prevention. Every case of cancer that can be prevented by engaging patients through an integrative approach likely saves at least \$10,000 - \$15,000 in healthcare costs; and every case of cancer recurrence that can be prevented through this same integration saves an even greater amount in healthcare expenditures since the most cost-intensive treatments and care is in patients with recurrent end-stage disease.

By substantially reducing the risk of recurrent disease, integrative cancer care has the potential to provide a practical cost-effective solution to the challenge of rapidly growing conventional cancer treatment costs. This does not mean, of course, that these healthful approaches should replace standard cancer treatments such as chemotherapy and radiation; it does mean though that an optimal cancer care system must include these integrative approaches to care in order to optimally support health, reduce the risk of cancer recurrence, improve survival, and lower healthcare costs.

**InspireHealth Retrospective Survival Analysis
Years 1992 - 2000
Stage 3B&4 Lung, Stage 4 Colorectal, and Stage 4 Breast Cancer**



updated April 19, 2010

References:

- 1 Holmes, MD, W. Y. Chen, D. Feskanich, C. H. Kroenke and G. A. Colditz. **Physical Activity and Survival After Breast Cancer Diagnosis** *JAMA*. 2005 May 25; 293(20): 2479-2486.
- 2 Meyerhardt, JA, E. L. Giovannucci, M. D. Holmes, et al. **Physical Activity and Survival After Colorectal Cancer Diagnosis** *Journal of Clinical Oncology*. 2006 Aug 1; 24(22): 3527-3534.
- 3 Meyerhardt, JA, D. Heseltine, D. Niedzwiecki, et al. **Impact of Physical Activity on Cancer Recurrence and Survival in Patients with Stage III Colon Cancer: Findings from CALGB 89803** *J Clin Oncol*. 2006 Aug 1; 24(22): 3535-3541.
- 4 Chlebowski, RT, G. L. Blackburn, C. A. Thomson, et al. **Dietary Fat Reduction and Breast Cancer Outcome: Interim Efficacy Results from the Women's Intervention Nutrition Study** *J Natl Cancer Inst*. 2006 Dec 20; 98(24): 1767-1776.
- 5 Ornish, D, G. Weidner, W. R. Fair, et al. **Intensive Lifestyle Changes may Affect the Progression of Prostate Cancer** *J Urol*. 2005 discussion 1069-70; Sep; 174(3): 1065-1069.
- 6 Mills, E, P. Wu, D. Seely and G. Guyatt. **Melatonin in the Treatment of Cancer: A Systematic Review of Randomized Controlled Trials and Meta-Analysis** *J Pineal Res*. 2005 Nov; 39(4): 360-366.
- 7 Lissoni, P, S. Barni, M. Mandala, et al. **Decreased Toxicity and Increased Efficacy of Cancer Chemotherapy Using the Pineal Hormone Melatonin in Metastatic Solid Tumor Patients with Poor Clinical Status** *Eur J Cancer* 1999 35(12):1688-1692.
- 8 Gogos, CA, P. Ginopoulos, B. Salsa, E. Apostolidou, N. C. Zoumbos and F. Kalfarentzos. **Dietary Omega-3 Polyunsaturated Fatty Acids Plus Vitamin E Restore Immunodeficiency and Prolong Survival for Severely Ill Patients with Generalized Malignancy: A Randomized Control Trial.** *Cancer*. 1998 Jan 15; 82(2): 395-402.
- 9 Lappe, JM, D. Travers-Gustafson, K. M. Davies, R. R. Recker and R. P. Heaney. **Vitamin D and Calcium Supplementation Reduces Cancer Risk: Results of a Randomized Trial** *Am J Clin Nutr*. 2007 Jun; 85(6): 1586-1591.
- 10 Ng, K, J. A. Meyerhardt, K. Wu, et al. **Circulating 25-Hydroxyvitamin d Levels and Survival in Patients with Colorectal Cancer** *Journal of Clinical Oncology*. 2008 Jun 20; 26(18): 2984-2991.
- 11 Palmieri, C, T. MacGregor, S. Girgis and D. Vigushin. **Serum 25-Hydroxyvitamin D Levels in Early and Advanced Breast Cancer** *J Clin Pathol*. 2006 Dec; 59(12): 1334-1336.
- 12 Brown, B.W., C. Brauner, and M.C. Minnottee, **Noncancer deaths in white adult cancer patients.** *Journal of National Cancer Institute*, 1993. 85: p.979-997.
- 13 Bines, J. and W.J. Gradishar, **Primary care issues for the breast cancer survivor.** *Compr Ther*, 1997. 23: p. 605-611.
- 14 Yoshikawa, T., et al., **Insulin resistance in patients with cancer: Relationships with tumor site, tumor stage, body weight loss, acute-phase response, and energy expenditure.** *Nutrition*, 2001. 17: p. 590-593.
- 15 Balkau, B., et al., **Hyperinsulinemia predicts fatal liver cancer but is inversely associated with fatal cancer at some other sites: The Paris Prospective Study.** *Diabetes Care*, 2001. 24: p. 843-849.
- 16 Rock, C.L. and W. Demark-Wahnefried, **Nutrition and survival after the diagnosis of breast cancer: A review of the evidence.** *Journal of Clinical Oncology*, 2002. 20: p. 3302-3316.
- 17 Chlebowski, R.T., E. Aiello, and A. McTiernan, **Weight loss in breast cancer patient management.** *Journal of Clinical Oncology*, 2002. 20: p. 1128-1143.
- 18 Nuver, J., A.J. Smit, and A. Postma, **The metabolic syndrome in long-term cancer survivors, an important target for secondary measures.** *Cancer Treat Rev*, 2002. 28: p. 195-214.

- 19 Schultz, P.N., et al., **Health profiles in 5836 long term cancer survivors.** Int Journal Cancer, 2003. 104: p. 488-495.
- 20 Twiss, J.J., et al., **Bone mineral density in postmenopausal breast cancer survivors.** Journal Am Acad Nurse Pract, 2001. 13: p. 276-284.
- 21 Ramaswamy, B. and C.L. Shapiro, **Osteopenia and osteoporosis in women with breast cancer.** Semin Oncol, 2003. 30: p. 763-775.
- 22 Diamond, T.H., et al., **Osteoporosis in men with prostate carcinoma receiving androgen-deprivation therapy: Recommendations for diagnosis and therapies.** Cancer 2004. 100: p. 892-899.
- 23 Hewitt, M., N. Breen, and S. Devesa, **Cancer prevalence and survivorship issues: Analyses of the 1992 National Health Interview Survey.** Journal of the National Cancer Institute, 1999. 91: p. 1480-1486.
- 24 Demark-Wahnefried, W., et al., **Riding the crest of the teachable moment: Promoting long-term health after the diagnosis of cancer.** Journal of Clinical Oncology, 2005. 23(24): p. 5814-5830.
- 25 Broeckel, J., et al., *Quality of life after adjuvant chemotherapy for breast cancer.* Breast Cancer Research and Treatment, 2000. **62**: p. 141-150.
- 26 Hewitt, M., J.H. Rowland, and R. Yancik, *Cancer survivors in the United States: Age, health, and disability.* J Gerontol A Bio Sci Med Sci, 2003. 58: p. 82-91.
- 27 Chirikos, T.N., A. Russell-Jacobs, and P.B. Jacobsen, *Functional impairment and the economic consequences of female breast cancer.* Women Health, 2002. 36: p. 1-20.
- 28 Cramp, F and J. Daniel. **Exercise for the Management of Cancer-Related Fatigue in Adults** *Cochrane Database of Systematic Reviews.* 2008 2: 006145.
- 29 McNeely, ML, K. L. Campbell, B. H. Rowe, T. P. Klassen, J. R. Mackey and K. S. Courneya. **Effects of Exercise on Breast Cancer Patients and Survivors: A Systematic Review and Meta-Analysis** *CMAJ.* 2006 Jul 4; 175(1): 34-41.
- 30 Browne, Arpin, Corey, Fitch and Gafni. (1990). **Individual Correlates of health Service Utilization and the Cost of Poor Adjustment to Chronic Illness.** Med Care. 28:43-58.
- 31 Carlson, Linda E and Bultz, Barry D. (2004). **Efficacy and Medical Cost Offset of Psychosocial Interventions in Cancer Care: making the Case for Economic Analyses.** Psycho-Oncology 13:837-849.
- 32 Kaiser Permanente study (Sobel, 2000) cited in Calson, Linda E and Bultz, Barry D. (2004). **Efficacy and Medical Cost Offset of Psychosocial Interventions in Cancer Care: making the Case for Economic Analyses.** Psycho-Oncology 13:837-849.
- 33 Ashbury, Findlay, Reynolds, and McKerracher. (1998). **A Canadian Survey of Cancer Patient's Experiences: Are their Needs being Met?** Journal of Pain & Symptom Management. 16:298-306.
- 34 Smith, Smith, and Toan. 1989.
- 35 Radford, Woods, Lowe, and Rogers. (2004). **A UK Multi-Centre Pilot Study of Speech and Swallowing Outcomes Following Head and Neck Cancer.** Clinical Oncology & Allied Sciences. 24:376-381.
- 36 Blanchard, CM, Courneya, KS, Stein, K. Cancer Survivors' Adherence to Lifestyle Behavior Recommendations and Associations with Health-related Quality of Life: Results from the American Cancer Society's SCS-II. J Clin Onco 2008 **26**(13):2198-2204.
- 42 Drake, MT. et al. **Vitamin D Insufficiency and Prognosis in non-Hodgkin's Lymphoma.** *J Clin Oncol.* 2010 Sep 20;28(27):4191-8
- 43 Block KI, Gyllenhaal C, Tripathy D, Freels S, Mead MN, Block PB, Steinmann WC, Newman RA, Shoham J. **Survival impact of integrative cancer care in advanced metastatic breast cancer.** Breast J. 2009 Jul-Aug;15(4):357-66..

44 Meyerhardt, JA, D. Niedzwiecki, D. Hollis, et al. **Association of Dietary Patterns with Cancer Recurrence and Survival in Patients with Stage III Colon Cancer.** *J Am Med Assoc.* 2007 15 Aug; 298: 754-764.