GPI Atlantic

MEASURING SUSTAINABLE DEVELOPMENT

APPLICATION OF THE GENUINE PROGRESS INDEX TO NOVA SCOTIA

EMPLOYMENT & HEALTH
PRELIMINARY ANALYSIS OF RESULTS FROM THE GLACE BAY & KINGS COUNTY COMMUNITY GPI SURVEY

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TABLE OF CONTENTS

LIST OF TABLES

1. Introduction

The purpose of this paper is to examine the relationship between health and employment in two non-urban areas of Nova Scotia - Glace Bay and Kings County. These two areas represent contrasting profiles of rural communities. Glace Bay is located in Cape Breton Island and has a history of economic insecurity and population decline. Heavily invested in the mining industry, the area has recently suffered a major economic setback with the closing of area coal mining operations. Kings County is one of the more affluent rural areas in Nova Scotia with a strong agricultural base, as well as active logging, fishing, manufacturing and service industries. The unemployment rate in Glace Bay is traditionally twice as high as the corresponding rate in Kings County and average incomes are seventy to eighty percent lower. The contrasting economic circumstances of these two areas provide an opportunity to examine the relationship between employment and health within two different community contexts.

Between 2001 and 2003, these two communities were involved in the design and implementation of a comprehensive community survey in partnership with GPI Atlantic, the Population Health Research Unit at Dalhousie University, and other partners. The purpose of the survey was to collect baseline data for the monitoring of community wellbeing and progress. The survey instrument was extremely comprehensive and included detailed questions on a variety of topics:

- Household demographics
- Labour Force Activity
- Health
- Core Values
- Caregiving
- Voluntary Activity and Community Service
- Personal Security and Crime
- Ecological Footprint
- Time Use

A total of 3,606 respondents completed the 70-page survey with 1,708 respondents from Glace Bay and 1,898 respondents from Kings County.

This paper utilized the results of this survey to conduct a preliminary examination of three issues-

- The relationship between health status and labour force activity
- The role of employment-related stress
- The relationship between stress and income.

Literature Review

Job Insecurity and Health

A variety of studies have examined the relationship between job insecurity and health.There have been fairly consistent findings which support a positive relationship between job insecurity,

stress, and a number of disease-related symptoms. (Catalano 1991, Dominighetti, D'Avanzo and Bisig 2000).

Of particular importance are a number of longitudinal studies, which examined the effects of job insecurity over time in groups of workers. A fourteen-month study among auto workers reported increased incidence of symptoms for a variety of physical problems which appeared to be accumulative over time. The longer the exposure to the stress of job insecurity, the more pronounced the effects. The authors concluded that job insecurity acted as a chronic stressor with effects that increased in potency over time (Heaney, Israel and House 1994). However, the accumulative effects of job insecurity were not found in a Finnish study, which reported an increase and leveling of symptomatology over time (Kinnunen et al. 1999).

A more recent two-year study of job insecurity in the British civil service examined the effects of both increased and decreased job security on health. Adverse effects on self-reported health and minor psychiatric morbidities were associated with job insecurity. These effects were not entirely negated by a removal of the threat. The study also found that the effects tended to increase with the chronicity of the stressor (Ferrie, Shipley, Marmot, Martikainen, Stansfeld, Davey Smith (2000).

Unemployment and Health

The relationship between unemployment and health is complex and has been studied extensively since the early findings of Brenner (1977 and 1979), which found positive relationships between mortality and unemployment in national data over periods of as much as forty years. These studies have been criticized for their interpretation of the association as causal in nature (Smith 1987, Shortt 1996).

Since Brenner's studies, however, a number of longitudinal studies using linked administrative data have supported the notion of a causal relationship between unemployment and mortality at a national level in Britain (Moser et al 1987), Denmark (Iverson et al 1987) and Finland (Martikainen and Volkonen 1996). A recent review of the literature concluded that there is convincing evidence that unemployment contributes to ill-health in the population, even after controlling for the effects of socio-economic status, poverty, and health behaviours. It noted the co-existence of a health-section effect, whereby persons with health problems may have a higher probability of becoming unemployed. (Mathers, C. and Scholfield, D. 1998).

A variety of cross-sectional studies have reported strong relationships between unemployment and stress (Smith 1987, Shortt, S., Linn et al. 1985, Frese and Mohr 1987.) Of particular relevance to the current study were the results of a British study, which found lower levels of distress among unemployed men from areas of chronically high unemployment, when compared to unemployed men in areas of lower unemployment (Jackson and Warr 1987).

2. Demographics

There were no significant differences between the two locations with respect to the gender of respondents (Table 1).

Table 1. Gender of Respondents

	Glace Bay	Kings County
Male	42.77	44.95
Female	57.23	55.05
Pearson Chi-Square= 1.7385 p<.187		

There was a significant difference in the age distribution of respondents in the two locations. The Kings County sample contained a larger proportion in their late thirties and a smaller proportion in their early twenties (Table 2).

Table 2. Age of Respondents

	Glace Bay	Kings County
15-19	3.58	5.51
20-24	5.58	2.54
25-34	10.69	10.12
35-44	19.51	24.84
45-54	24.56	22.88
55-64	16.33	16.10
65+	19.74	18.01
Pearson Chi-Square=42.29 p<.000		

There was a significant difference in the income distribution of the two sets of respondents, with a substantially larger proportion of Kings County residents in the higher income categories (Table 3).

Table 3. Household Income

Income Group	Glace Bay	Kings County
- 10,000	6.73	4.21
10,000- 19,999	18.50	9.11
20,000-34,999	26.52	19.34
35,000-49,999	17.97	20.60
50,000+	20.26	41.31
No Answer	10.01	5.43
Pearson Chi-Square=244.54 p<.000		

The Kings County respondents also had a substantially higher proportion of respondents with higher levels of educational attainment (Table 4).

Table 4. Highest Level of Education Attained

	Glace Bay	Kings County
Primary to Eight	10.37	5.98
Grade Nine to Twelve	50.24	40.97
Community College Diploma/Certificate	19.08	23.56
University Degree	10.66	19.28
Other	9.66	10.20
Pearson Chi-Square=86.31 p<.000		

3. Health Status Comparisons

When respondents were asked about their general health, there were no significant differences in self-reported health status between the Glace Bay and Kings County residents, after controlling for age and gender differences (Table 5). However, when asked more detailed questions about their health status, Glace Bay respondents were more likely to report having activity limitations, disabilities, high blood pressure, and diabetes. Kings County respondents were more likely to report higher stress levels, and were more likely to report that they had little or no control over important decisions that affected their lives. There was no significant difference in life-satisfaction between the two sets of respondents.

To test for the effects of differing income and educational attainment upon these health-status differentials in the two areas, the logistic regression analysis were re-run with the inclusion of income and education as independent variables (Tables 6-14). With the exception of diabetes, the significance of the locational variable did not change. In the case of diabetes the difference between the two areas was not significant after controlling for income and education.

Table 5. Selected Health Status Indicators, after controlling for age and gender

Indicator	Kings County	Glace Bay	Odds Ratio*	Difference
Health status poor or fair	18.6	20.2	.93	Not Significant
With Activity Limitation	17.9	23.4	.717	GB significantly higher (p<.000) after controlling for age and gender
With a Disability	19.9	27.3	.664	GB significantly higher (p<.000) after controlling for age and gender
High Blood Pressure	14.2	22.8	.538	GB significantly higher (p<.000) after controlling for age and gender
Diabetes	5.5	7.5	.708	GB significantly higher (p<.01) after controlling for age and gender
Heart Disease	5.7	6.4	.878	Not Significant
Reporting Life Is very or Somewhat Stressful	52.0	45.5	1.29	Kings County significantly higher (p<.000) after controlling for age and gender
Reporting Somewhat or very Dissatisfied With Life	8.06	9.25	.843	Not Significant
Reporting No or Little Control Over Decisions Affecting Life	17.97	13.88	1.33	Kings County significantly higher (p<.000) after controlling for age and gender

* For Location After Controlling For Age and Gender

Table 6. Logistic Regression Results For Self-Reported Health Status

	Number of obs=	3389
	LR chi2(5) =	250.98
	Prob > chi2 =	0.0000
Log likelihood = -1538.282	Pseudo R2 =	0.0754

hlthstatus	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
age	1.336354	.0405805	9.55	0.000	1.259138	1.418305
sex	.9318786	.0853591	-0.77	0.441	.778736	1.115138
location	1.143538	.1074252	1.43	0.153	.951235	1.374717
income	.8295352	.0255463	-6.07	0.000	.7809465	.881147
educ	.7473125	.0340201	-6.40	0.000	.6835223	.8170559

Table 7. Logistic Regression Results For Activity Limitations

Logistic regression — Number of obs = 3389
LR chi2(5) = 183.32
Prob > chi2 = 0.0000
Log likelihood = -1625.0657 — Pseudo R2 = 0.0534

limitation	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
age	1.330439	.0396168	9.59	0.000	1.255014	1.410397
sex	.8661858	.0767764	-1.62	0.105	.7280527	1.030527
location	.7842681	.071261	-2.67	0.007	.6563293	.9371461
income	.8539628	.0255756	-5.27	0.000	.8052783	.9055905
educ	.9478085	.0390071	-1.30	0.193	.8743582	1.027429

Table 8. Logistic Regression Results For Presence of Physical Disability

Number of obs = 3389
LR chi2(5) = 223.04
Prob > chi2 = 0.0000
Log likelihood = -1734.6531 — Pseudo R2 = 0.0604

disability	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
age	1.350341	.0384622	10.55	0.000	1.277023	1.42787
sex	.7811187	.0661991	-2.91	0.004	.6615741	.9222647
location	.7378969	.0641962	-3.49	0.000	.6222174	.8750829
income	.8782583	.0254002	-4.49	0.000	.8298595	.9294798
educ	.9005848	.0357941	-2.63	0.008	.8330925	.9735448

Table 9. Logistic Regression Results For Diagnosed High Blood Pressure

Number of obs = 3389
LR chi2(5) = 500.12
Prob > chi2 = 0.0000
Log likelihood = -1381.8138 — Pseudo R2 = 0.1532

Hbp	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
age	2.009996	.0810071	17.32	0.000	1.857334	2.175206
sex	.9435809	.0912969	-0.60	0.548	.7805855	1.140612
location	.5897854	.0588378	-5.29	0.000	.4850395	.7171517
income	.9824202	.0331458	-0.53	0.599	.9195571	1.049581
educ	.8828483	.0394333	-2.79	0.005	.8088469	.9636201

Table 10. Logistic Regression Results For Diagnosis of Diabetes

				Number of obs=		3389
				LR chi2(5)	=	141.36
				Prob > chi2	=	0.0000
	Log likelihood = -743.64384			Pseudo R2	=	0.0868
	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
age	1.726525	.1027034	9.18	0.000	1.536521	1.940024
sex	.6871726	.0990446	-2.60	0.009	.518059	.9114912
location	.7724771	.1152496	-1.73	0.084	.5766214	1.034857
income	.9539648	.0478358	-0.94	0.347	.8646683	1.052483
educ	.9056839	.0612835	-1.46	0.143	.7931944	1.034126

Table 11. Logistic Regression Results For Diagnosed Heart Disease

				Number of obs=		3389
				LR chi2(5)	=	257.98
				Prob > chi2	=	0.0000
	Log likelihood = -655.69505			Pseudo R2	=	0.1644
heart	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
age	2.340879	.1756445	11.34	0.000	2.02074	2.711738
sex	.5290568	.0807435	-4.17	0.000	.3922779	.7135276
location	1.033855	.1609492	0.21	0.831	.7619838	1.402729
income	.9634997	.0513824	-0.70	0.486	.8678764	1.069659
educ	.8092059	.0593872	-2.88	0.004	.700793	.9343903

Table 12. Logistic Regression Results For Stress

				Number of obs=		3389
				LR chi2(5)	=	197.72
				Prob > chi2	=	0.0000
	Log likelihood= -2249.0479			Pseudo R2	=	0.0421
stress	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
age	.7819369	.0172455	-11.15	0.000	.7488564	.8164786
sex	1.205373	.086467	2.60	0.009	1.047275	1.387338
location	1.237226	.090441	2.91	0.004	1.072078	1.427814
income	1.013594	.0253447	0.54	0.589	.9651169	1.064506
educ	1.191588	.0395677	5.28	0.000	1.116506	1.271718

Table 13. Logistic Regression Results For Life-Satisfaction

Number of obs= 3389
LR chi2(5) = 61.17
Prob > chi2 = 0.0000
Log likelihood = -964.30811 Pseudo R2 = 0.0307

lifesat	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
age	.8236591	.0277479	-5.76	0.000	.7710308	.8798795
sex	.7316666	.0912538	-2.51	0.012	.5729952	.9342766
location	.9709188	.1235756	-0.23	0.817	.7565621	1.246009
income	.8001455	.0321806	-5.54	0.000	.7394945	.8657708
educ	1.055517	.0614252	0.93	0.353	.9417382	1.183043

Table 14. Logistic Regression Results For Decision Control

Number of obs= 3389
LR chi2(5) = 95.56
Prob > chi2 = 0.0000
Log likelihood= -1425.1636 Pseudo R2 = 0.0324

Decision	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
age	.786529	.0211117	-8.95	0.000	.7462205	.8290149
sex	.8024888	.0776167	-2.27	0.023	.6639124	.9699898
location	1.417487	.14095	3.51	0.000	1.166483	1.722501
income	.9128041	.029994	-2.78	0.005	.85587	.9735255
educ	.9814445	.0449477	-0.41	0.683	.8971867	1.073615

4. Labour Force Activity

Consistent with labour force characteristics, Glace Bay respondents were more than three times as likely as those in Kings County to report that they were unemployed at the time of the survey (Table 15).

The Glace Bay respondents were more likely to report that they were unemployed due to layoffs or a lack of suitable work. The role of health problems as a contributory factor in unemployment was not substantially different between the two areas (Table 16).

Glace Bay respondents were also significantly more likely to be pessimistic about the probability of finding work and were more likely to have been unemployed for 52 weeks or longer. Among employed respondents, the Glace Bay group was more likely to report stress due to concerns about the threat of future layoffs (Table 17).

Table 15. Labour Force Activity of Respondents

All Respondents	Glace Bay	Kings County
Employed	42.7	60.9
Unemployed	13.5	4.3
Student	8.2	8.1
Homemaker	14.1	12.9
Retired	16.8	10.1
Other	4.7	3.6

Table 16. Reason for Unemployment

Reason for unemployment	Glace Bay	Kings County
Illness/Disability	11.8	13.1
Maternity/paternity leave	5.2	5.4
Personal/family responsibilities	6.6	3.1
Returning to school	5.2	5.4
Layoff, expecting to return to work	29.8	20.9
Waiting for new job to start	8.5	10.8
No transportation	1.4	2.3
No suitable work available	26.1	20.2
Other	5.2	18.6

Table 17. Job Insecurity and Unemployment Duration

	Glace Bay	Kings County
% of Unemployed Who Consider it Very Likely They'll Find a Job In Next Six Months	17.4	30.6
Percent of Unemployed Population Who Have Been Unemployed for 52 weeks or longer	27.9	19.2
Percent of Employed Respondents reporting Stress About Threat of Lay-off	17.3	12.2

In summary, the survey results are consistent with the employment characteristics of the two areas. The higher traditional levels of unemployment and job insecurity in Glace Bay are reflected in the results that were obtained from Glace Bay respondents.

Labour Force Activity and Health Status

To examine the relationship between health status and labour force activity, after controlling for age and gender, a logistic regression was carried out which utilized health status as the dependent variable (0=good, very good or excellent;1= poor or fair health) among persons under age 65. Persons who classified themselves as unemployed, homemakers, retired or other were significantly more likely to report poor or fair health than employed persons (Table 18).

Table 18. Logistic Regression: Health Status and Labour Force Activity, Glace Bay and Kings County

Number of obs= 3585
LR chi2(7) = 284.07
Prob > chi2 = 0.0000
Log likelihood = -1619.556 Pseudo R2 = 0.0806

hlthstatus	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
Unemployed	2.465017	.4344781	5.12	0.000	1.744974	3.482176
Student	.884278	.2974341	-0.37	0.715	.4573832	1.709611
Homemaker	2.641452	.3900158	6.58	0.000	1.977703	3.527966
Retired	2.533129	.3601008	6.54	0.000	1.917139	3.347042
Other	6.776704	1.339329	9.68	0.000	4.600334	9.982692
age	1.224558	.0541062	4.58	0.000	1.122974	1.335332
sex	.9090159	.0880147	-0.99	0.325	.7518905	1.098976

When this analysis was conducted separately for Glace Bay and Kings County respondents, the relationship between labour force activity and health status was mirrored in both locations. The relationship between self-reported health status and unemployment, which has been reported in other studies was also apparent in Kings County and Glace Bay. It was notable, however, that the odds ratios for "retired" and "other" were larger in Glace Bay than Kings County (Table 19).

Although the two areas did not differ with respect to the overall health status of respondents, the relationship between health status and location varied dramatically by labour force activity for the working age population. In Glace Bay, unemployed respondents were more than three times as likely to report poor or fair health as those with jobs. In Kings County, the unemployed were 2.7 times as likely to have poor or fair health as those with jobs.

Table 19. Health Status and Labour Force Activity: Glace Bay and Kings County

	Kings Odds-Ratio With Employed	Glace Bay Odds Ratio With Employed
Unemployed	3.32 (p<.000)	2.72 (p<.000)
Student	.821 (NS)	1.15 (NS)
Homemaker	2.01 (p<.000)	4.07 (p<.000)
Retired	1.96 (p<.001)	3.77 (p<.000)
Other	3.53 (p<.000)	14.41 (p<.000)
Age	.079 (p<.000)	.079 (p<.000)
Sex	.96 (NS)	.96 (NS)

Table 20. Health Status and Labour Force Activity: Locational Effects

	Health Status Odds Ratio: Kings/ Glace Bay	P	Conclusion
Employed	1.56	<.02	Employed respondents in Kings County more likely to report poor health status.
Unemployed	1.80	<.08	Borders on significance
Student	1.14	<.8	Not significant
Homemaker	.95	<.8	Not significant
Retired	.76	<.24	Not significant
Other	.38	<.02	"Other" respondents in Glace Bay are more likely to report poor health status.

These results may result from the substantial difference between the two areas with respect to the labour force activity of persons who report poor or fair health (Pearson chi-square= 47.08. p<.000). Respondents who rated their health status as poor or fair were significantly more likely to be employed in Kings County than in Glace Bay (Table 21).

Table 21. Ill- Health and Labour Force Activity

	Percent of Working Age Persons Who Rate Their Health Status as Poor or Fair	
	Kings County	Glace Bay
Employed	45.31	17.96
Unemployed	7.76	13.06
Student	2.45	2.45
Homemaker	18.78	20.00
Retired	17.55	32.24
Other	8.16	14.29
Total	100.00	100.00

To further examine this relationship, a series of logistic regressions were developed which used employed vs. all other activities as the dependent variable and location age and gender as the independent variables. This allowed for the calculation of an "employment odds ratio" between Kings County and Glace Bay, after controlling for differences in age and gender between the two respondent groups. For all persons of working age, Kings County respondents were significantly more likely to be employed than their counterparts in Glace Bay (OR=2.11, p<.000). When the analysis was repeated for those respondents who reported their health status as good, very good or excellent, the relationship continued to be significant although the odds ratio dropped slightly (OR=1.78, p<.000). When the analysis was completed for persons who rated their health as poor or fair, the odds ratio increased substantially (OR= 3.58, P<.001). These results suggest that the "employment advantage" of Kings County residents applies to all persons, regardless of their health status but it is particularly pronounced for persons who rate their health status as poor or fair.

It is possible, therefore, that employability problems related to health status may be more acute in Glace Bay than in Kings County. A partial explanation for this difference might lie in the higher rate of physical disability among the Glace Bay respondents. If, for example, health problems in Glace Bay are more likely to involve a physical disability than health problems in Kings County, the differing levels of disability among the "unhealthy" respondents in the two locations may account for the apparent lower rate of labour force participation among working age respondents with poor/fair health in Glace Bay.

To test this possibility, the analysis was repeated for persons who rated their health as poor or fair but did not report a physical disability. Due to sample size limitations, some activity categories were collapsed for this analysis. The results suggested that the disability issue did not account for the differences noted above. Working age persons in Kings County who rated their health status as poor or fair, but did not report a disability, were still substantially more likely to be employed than their counterparts in Glace Bay (Table 22).

In noting the correlation between unemployment and poor health, analysts have sometimes speculated about the direction of causality. Is unemployment partly attributable to poor health, or vice-versa? These results indicate that poor health is not likely a generic cause of unemployment. Rather, unemployment appears likely to produce poor health.

Table 22. Disability and Labour Force Activity

	Percent of Working Age Persons Who Rate Their Health Status as Poor or Fair and Did Not Report a Disability	
	Kings County	**Glace Bay**
Employed	61.42	34.15
Unemployed	8.66	15.85
Retired and Other	11.02	24.39
Homemaker and Students	18.9	25.61
Total	100.00	100.00

Summary

The relationship between poor health and unemployment, which has been found in a number of studies, was replicated in this analysis in two different communities with substantially different employability issues. Persons who were unemployed were significantly more likely to report poor or fair health than their employed counterparts, after controlling for the effects of age and gender. This effect, however, did not translate into poorer self-reported health among Glace Bay respondents, despite their higher levels of unemployment. The two areas did not differ significantly with respect to the percentage of respondents who reported poor or fair health, after controlling for differences in age and gender between the two respondent groups. Despite the lack of differential in self-reported health status, Glace Bay respondents were significantly more likely to report disabilities and activity limitations as well as two chronic conditions - high blood

pressure and diabetes. Kings County residents were more likely to report high stress levels and lower levels of control over decisions affecting their life.

Beyond this, however, the relationship between employment and health status proved to be complex, with some interesting contrasts developing between the two communities.

Although the two communities did not differ significantly in self-reported health status, after controlling for age and gender, significant differences did arise for specific labour force participation groups. Employed persons in Kings County were significantly more likely to report poor/fair health than employed persons in Glace Bay. The same relationship appeared to exist for unemployed persons, but did not attain statistical significance. Conversely, persons who reported their activity as "other" in Glace Bay were significantly more likely to report ill-health than their counterparts in Kings County.

Further analysis suggested that the "employment advantage" of living in Kings County was particularly strong for working age persons who described their health as only poor or fair. Although both "healthy" and "unhealthy" Kings County residents were more likely to be employed than those in Glace Bay, the advantage was particularly strong in the "unhealthy" group. These differences did not appear to be due to a higher level of disability among Glace Bay respondents.

5. Employment-Related Stress

There were substantial differences between the two locations with respect to work-related stresses. Based upon a logistic regression analysis which controlled for differences between the two areas with respect to age and gender, employed Kings County respondents were significantly more likely to report stresses related to excess demands, excess hours, too little autonomy, interpersonal problems and other sources. Glace-Bay respondents were significantly more likely to report stresses related to the threat of layoffs and the potential for accidents/injuries on the job (Table 23).

All of the sources of job stress were significantly related to the respondents' reports of life-stress. For example, 42.2% of respondents who did not report "too many demands" as a source of stress reported that their lives were somewhat or very stressful, compared to seventy-nine percent of respondents who reported excess demands as a source of stress. Similar associations were found for all sources of job stress (Table 24).

Kings County respondents were significantly more likely to report that their lives were somewhat or highly stressed than the Glace Bay respondents, despite the more positive employment situation among the Kings group. When this logistic regression analysis is repeated for each labour force activity group, the possible dynamics of this association became apparent. The higher rates of stress within the Kings County group appear to be largely attributable to higher rates of stress within the employed and unemployed groups. No significant differences were found by location for students, homemakers, retired or other respondents (Table 25).

Table 23. Job-related Stresses for Employed Respondents: Kings vs Glace Bay

Source of Stress	Kings County	Glace Bay	Odds-Ratio, Controlling for Age and Gender Kings/Glace Bay
Too many demands	41.39	30.78	1.60 p<.000
Too many hours	20.17	9.86	2.29 p<.000
Not enough autonomy	14.15	10.20	1.43 p<.03
Risk of accident or injury	8.3	12.1	.64 p<.01
Interpersonal problems	19.01	9.35	2.31 p<.000
Possible layoffs	12.25	17.35	.670 p<.007
Other	8.66	6.12	1.44 p<.07

Table 24. Job-Related Stress and Life-Stress

Source of Work-Related Stress	Percent of Low Work Stress Respondents Reporting Life Stress as Very or Somewhat	Percent of High Work Stress Respondents Reporting Life Stress as Very or Somewhat	Chi-Square
Too many demands	42.2	79.1	292.21 p<.000
Too many hours	46.0	80.26	130.91 p<.000
Not enough autonomy	46.7	79.91	96.51 p<.000
Risk of accident or injury	47.2	78.72	70.74 p<.000
Interpersonal problems	46.93	72.04	64.98 p<.000
Possible layoffs	46.96	69.87	58.15 p<.000
Other	47.89	69.05	28.71 p<.000

Table 25. Stress Odds-Ratios For Activity Groups By Location

	Stress Odds-Ratio for Location, controlling for age and gender	Significance
All Respondents	1.29	P<.000
Employed	1.51	P<.000
Unemployed	1.88	P<.03
Students	1.31	P<.31 NS
Home-makers	.927	P<.68 NS
Retired	.929	P<.63 NS
Other	.740	P<.42 NS

Employed persons within Kings County experience higher levels of job stress than their counterparts in Glace Bay from excess demands, excess hours, too little autonomy and interpersonal problems. Glace Bay respondents were more likely to report stresses due to potential layoffs and the risks of injury.

In summary, the various job-related stresses included in this survey were strongly related to respondents' ratings of general life-stress. The higher concentration of "stressed" persons in the Kings County group appeared to be largely attributable to higher rates of job stress within the

employed population and higher rates of stress associated with unemployment in Kings County, when compared to Glace Bay respondents.

The lower stress rates associated with unemployment in Glace Bay may be partly due to residents there being more accustomed to being unemployed and less socially marginalized by unemployment status, than in an area like Kings County where employment is a more essential condition for social integration.

This conclusion would be consonant with Marie Jahoda's work on the social and psychological functions of employment and consequences of unemployment. Jahoda's seminal studies of the 1930s Depression showed that employment provides far more than income (Jahoda 1982):

> "Employment makes the following categories of experience inevitable: it imposes a time structure on the waking day; it compels contacts and shared experiences with others outside the nuclear family; it demonstrates that there are goals and purposes which are beyond the scope of an individual but require a collectivity; it imposes status and social identity through the division of labour in modern employment; it enforces activity.…"

Logically, however, a community with chronically high rates of unemployment may be more likely to establish compensatory or alternative mechanisms for some of these functions than one in which employment is relied on for these basic experiences.

To examine the relationship between life-stress and a variety of employment-related issues, a logistic regression analysis was carried out which used the binary stress variable (life is not at all/not very stressful vs somewhat/very stressful) as the dependent variable for working age respondents (Tables 26 - 28). All of the job-related stresses, with the exception of interpersonal problems, showed a significant relationship with reported life stress. "Too many demands showed the strongest relationship, followed by "too many hours" and "risk of injury". Working shifts and being unemployed did not show a significant relationship with life-stress while age and "being female" showed significant positive relationships. The latter finding accords with results from Statistics Canada's time use surveys, which find women (particularly working mothers) to be significantly more time-stressed than men.

Similar results were obtained for both Glace Bay and Kings County respondents.

The potential health impacts of the life-stress and job-stress factors noted above have been well documented in the epidemiological literature. For example, in a wide ranging review of the literature, the *American Journal of Health Promotion* found that stress was the most costly of all modifiable risk factors – including smoking, obesity, physical inactivity, high blood cholesterol, and high blood pressure (Goetzel 2001).

A very different set of relationships was found when "life-satisfaction" was utilized as the dependent variable. In this case, a binary variable was constructed whereby 1=somewhat/very dissatisfied with life and 0= somewhat/very satisfied with life. As presented in Table 29, only two of the job-related stresses arose as significant predictors - risk of injury and interpersonal problems. In contrast to the results pertaining to life-stress, working shifts, being unemployed

and age also emerged as significant predictors. With the exception of the significance of "risk of injury" in both cases, the results pertaining to life-satisfaction were the reverse of the results pertaining to life-stress.

Table 26. Predictors of Life-Stress For All Respondents: Logistic Regression

Number of obs= 2914
LR chi2(11) = 307.10
Prob > chi2 = 0.0000
Log likelihood= -1852.8095 Pseudo R2 = 0.0765

Stress	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
Threat of layoffs	1.571103	.2249705	3.16	0.002	1.18664	2.080131
Too many demands	2.936889	.3488778	9.07	0.000	2.326869	3.706834
Too many hours	1.941183	.3190214	4.04	0.000	1.40662	2.678898
Too little autonomy	1.594438	.3032866	2.45	0.014	1.098237	2.31483
Risk of Injury	1.946284	.3826708	3.39	0.001	1.323873	2.861318
Interpersonal	1.080182	.1732897	0.48	0.631	.7887544	1.479286
Other worries	1.538491	.2814862	2.35	0.019	1.074872	2.202079
Working shifts	.9469325	.0843128	-0.61	0.540	.795298	1.127478
Being Unemployed	1.267077	.1824497	1.64	0.100	.9555128	1.680234
Age	9304198	.0243807	-2.75	0.006	.8838408	.9794536
Being female	1.428801	.1149016	4.44	0.000	1.220449	1.672722

Table 27. Predictors of Life-Stress For Glace-Bay Respondents

Number of obs= 1366
LR chi2(11) = 111.27
Prob > chi2 = 0.0000
Log likelihood= -891.18912 Pseudo R2 = 0.0588

stress	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
Threat of layoff	1.553129	.3034785	2.25	0.024	1.058972	2.27788
Too many demands	2.998021	.5851816	5.63	0.000	2.044981	4.395214
Too many hours	1.674608	.5075187	1.70	0.089	.9245745	3.033084
Too little autonomy	1.170511	.3753134	0.49	0.623	.6243751	2.194347
Risk of injury	2.095512	.5704298	2.72	0.007	1.229081	3.572728
Interpersonal	1.060281	.3355857	0.18	0.853	.5701773	1.971658
Other worries	1.554135	.461681	1.48	0.138	.8682112	2.781967
Working Shifts	1.071916	.1466631	0.51	0.612	.8197785	1.401603
Being Unemployed	1.19522	.2058612	1.04	0.300	.8527852	1.675161
Age	.9254562	.0358304	-2.00	0.045	.8578283	.9984156
Being Female	1.421565	.165584	3.02	0.003	1.131407	1.786137

Table 28. Predictors of Life-Stress For Kings County Respondents

					Number of obs=	1548
					LR chi2(11) =	183.88
					Prob > chi2 =	0.0000
	Log likelihood= -956.67191				Pseudo R2 =	0.0877
stress	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
Threat of layoff	1.663336	.3587164	2.36	0.018	1.089957	2.538346
Too many demands	2.866829	.4347842	6.94	0.000	2.12965	3.859182
Too many hours	1.964907	.389583	3.41	0.001	1.332213	2.898078
Too little autonomy	1.818784	.4362513	2.49	0.013	1.136614	2.910377
Risk of injury	1.931261	.5557429	2.29	0.022	1.098748	3.394565
Interpersonal	1.018179	.1917018	0.10	0.924	.7039803	1.472609
Other worries	1.505941	.3525352	1.75	0.080	.951798	2.382709
Working shifts.	8891505	.1057672	-0.99	0.323	.7042425	1.122609
Being unemployed	1.680116	.4829152	1.81	0.071	.956486	2.951208
Age	.9344278	.0334274	-1.90	0.058	.8711553	1.002296
Being female	1.432244	.1608911	3.20	0.001	1.149204	1.784993

Table 29. Predictors of Life-Satisfaction for All Respondents

					Number of obs=	2914
					LR chi2(11) =	106.73
					Prob > chi2 =	0.0000
	Log likelihood= -866.38477				Pseudo R2 =	0.0580
lifesat	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
Threat of layoff	.9548752	.202332	-0.22	0.827	.630351	1.446475
Too many demands	.921243	.175924	-0.43	0.668	.6336152	1.339439
Too many hours	.7595337	.1825597	-1.14	0.252	.4741921	1.216578
Too little autonomy	.8964785	.2325288	-0.42	0.674	.5392063	1.490475
Risk of injury	2.072845	.47146	3.20	0.001	1.327286	3.237197
Interpersonal	2.240573	.4764965	3.79	0.000	1.47685	3.39924
Other worries	1.293353	.3419193	0.97	0.331	.7703496	2.171432
Working shifts	2.068514	.3447475	4.36	0.000	1.492085	2.867632
Being unemployed	2.74938	.4852582	5.73	0.000	1.94536	3.885702
Age	.8916645	.0363615	-2.81	0.005	.8231709	.9658573
Being female	.8267891	.1084145	-1.45	0.147	.6394096	1.06908

Once again, the results were similar for both Glace-Bay and Kings County respondents (Tables 30 and 31).

Table 30. Predictors of Life-Satisfaction For Glace-Bay Respondents

				Number of obs=		1366
				LR chi2(11)	=	44.26
				Prob > chi2	=	0.0000
Log likelihood= -431.52318				Pseudo R2	=	0.0488
lifesat	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
Threat of layoff	.5832401	.1952713	-1.61	0.107	.3025947	1.124174
Too many demands	.9472967	.3015635	-0.17	0.865	.5075906	1.767903
Too many hours	.8853312	.3852864	-0.28	0.780	.3772873	2.077492
Too little autonomy	.9391909	.4571231	-0.13	0.897	.3617903	2.438096
Risk of injury	2.115401	.7264615	2.18	0.029	1.079138	4.146756
Interpersonal	.99694	.4975755	-0.01	0.995	.374828	2.651588
Other worries	1.313999	.5734619	0.63	0.532	.558611	3.090869
Working shifts	1.888908	.4989785	2.41	0.016	1.125526	3.170051
Being unemployed	2.838345	.6275139	4.72	0.000	1.840254	4.377767
Age	.9494415	.0579084	-0.85	0.395	.8424646	1.070002
Being female	.9045354	.1684143	-0.54	0.590	.6279737	1.302896

Table 31. Predictors of Life-Satisfaction For Kings County Respondents

				Number of obs=		1548
				LR chi2(11)	=	76.05
				Prob > chi2	=	0.0000
Log likelihood= -427.24054				Pseudo R2	=	0.0817
Lifesat	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
Threat of layoffs	1.608391	.4519552	1.69	0.091	.9272682	2.789831
Too many demands	.960103	.2342917	-0.17	0.867	.5951152	1.54894
Too many hours	.6814812	.1997437	-1.31	0.191	.3836761	1.210439
Too little autonomy	.8510147	.2661639	-0.52	0.606	.4610147	1.570939
Risk of injury	2.27744	.7186546	2.61	0.009	1.227007	4.227141
Interpersonal	2.824236	.6968986	4.21	0.000	1.741251	4.580791
Other worried	1.272438	.4300627	0.71	0.476	.6560616	2.467905
Working shifts	2.222034	.4866906	3.65	0.000	1.44648	3.413413
Being unemployed	2.850048	.9101783	3.28	0.001	1.52411	5.329519
Age	.8434892	.0471642	-3.04	0.002	.7559343	.9411849
Being female	.73253	.1379385	-1.65	0.098	.5064547	1.059523

These results strongly suggest that different employment-related factors affect life-stress and life-satisfaction. Whereas stress was predicted by job-related problems such as too many demands and too many hours, life-satisfaction was not. By contrast, working shifts or being

unemployed did not appear to predict life-stress but arose as important predictors of life-satisfaction. Job stressors such as "too many demands" were not predictive of life-satisfaction.

Further work with the Community GPI database is required to assess the health implications of these findings and to determine the degree to which job stress, life stress, and life satisfaction are related to particular health outcomes. Future research using the Community GPI database might therefore *compare* the health outcomes linked with job stress, life stress, and life satisfaction with a view to understanding the relationships among different variables. For example, it is possible to hypothesize here that people who like their jobs (and therefore have higher levels of life satisfaction) are also tempted to put in too many hours at those jobs and therefore be highly stressed. These and other hypotheses based on the preliminary results provided here merit further investigation.

6. Income and Stress

Stress and income were related in a non-linear fashion, with the highest rates of stress reported among the highest and lowest income groups. This relationship may suggest an optimal income range for low stress. This connection between stress and income bracket was apparent among both the Kings County and Glace Bay respondents but appeared to be stronger among the former.

Table 32. Percentage of Each Income Group Reporting That Life Is Somewhat or Very Stressful

	Total	Glace Bay	Kings County
-10,000	55.90	54.78	57.50
10,000-19,999	47.65	50.00	43.35
20,000-34,999	42.87	38.85	47.96
35,000-49,999	52.44	50.81	53.71
50,000+	53.19	47.4	55.74

To test for locational differences across income groups, the income data were re-categorized into three groups and logistic regression analysis was carried out for each group, using the binary stress variable as the dependent variable (0= life is not very or not at all stressed, 1= life is somewhat or very stressed) (Tables 33 – 35). The higher levels of stress in Kings County were only apparent in the middle and higher income groups. There was no significant difference between Glace Bay and Kings County in the reported life-stress of persons with a household income of less than twenty thousand dollars.

Given the important relationship between job-stresses and life-stress, a subsequent analysis was conducted of employed respondents that examined the weight of each job-related stress within the three income groups. As presented in Table 36, there were substantial effects. Significant differences arose between the income groups with respect to demands, hours and interpersonal relationships. There were no significant differences in autonomy, risk, fear of lay-offs or "other".

In the case of "too many demands", the middle and higher income groups reported similar levels of stress, which were higher than the lower income group. A similar result emerged with respect to the interpersonal-conflict stressor. The significant relationship between income group and the "too many hours" stressor was more linear in nature, with a substantial increase in stress with each increase in income.

Table 33. The Relationship between Location and Life-Stress For Respondents With a Household Income of Less Than $20,000; Logistic Regression

Number of obs= 682
LR chi2(3) = 27.78
Prob > chi2 = 0.0000
Log likelihood= -458.83416 Pseudo R2 = 0.0294

stress	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
age	.8051482	.0353315	-4.94	0.000	.7387941	.8774619
sex	1.247175	.2040007	1.35	0.177	.9050989	1.718536
location	.8829991	.1432984	-0.77	0.443	.6424246	1.213664

Table 34. The Relationship between Location and Life-Stress For Respondents With a Household Income of $20,000 to $34,999: Logistic Regression

Number of obs= 818
LR chi2(3) = 47.20
Prob > chi2 = 0.0000
Log likelihood= -534.85463 Pseudo R2 = 0.0423

stress	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
age	.7621722	.0337513	-6.13	0.000	.6988103	.8312791
sex	.9626648	.1417569	-0.26	0.796	.7213262	1.28475
location	1.462246	.2135805	2.60	0.009	1.098224	1.946927

Table 35. The Relationship between Location and Life-Stress For Respondents With a Household Income of $35,000 and Over; Logistic Regression

Number of obs= 1818
LR chi2(3) = 72.41
Prob > chi2 = 0.0000
Log likelihood= -1221.1868 Pseudo R2 = 0.0288

stress	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
age	.8027086	.0256538	-6.88	0.000	.7539705	.8545972
sex	1.393538	.1338496	3.45	0.001	1.154412	1.682198
location	1.331644	.1332368	2.86	0.004	1.094515	1.620147

Table 36. Job Stresses and Income

Source of Work-Related Stress	Percent of Employed Respondents With Household Income of Less Than 20,000 Reporting Source of Stress	Percent of Employed Respondents With Household Income of 20,000-34,999 Reporting Source of Stress	Percent of Employed Respondents With Household Income of 35,000+ Reporting Source of Stress	Chi-Square
Too many demands	22.73	37.32	39.69	12.25 p<.002
Too many hours	8.18	12.68	18.22	10.8 p<.004
Not enough autonomy	8.18	12.32	13.60	2.71 p<.257
Risk of accident or injury	11.82	12.68	8.97	3.89 p<.143
Interpersonal problems	8.18	13.41	16.93	7.05 p<.029
Possible layoffs	15.45	14.49	14.06	.1755 p<.916
Other	4.55	6.88	8.70	2.94 p<.230

7. Conclusions

This series of analyses yielded a variety of interesting results that will contribute to the understanding of the dynamics of work and health. The opportunity to address these issues in two rural communities with very different employment contexts has yielded valuable results.

Somewhat unexpectedly, the traditional economic problems of Glace Bay, relative to Kings County, did not express itself in lower self-reported health status or higher stress levels. There was some indication of more frequent health problems in Glace Bay (activity limitations, disabilities and some chronic diseases) but these differences were not reflected in lower ratings of self-reported health status.

Important differences did arise, however, with respect to specific labour force activity groups. Most notably, there was a significantly higher proportion of employed persons with poor or fair health in Kings County than in Glace Bay. In addition, a substantially higher proportion of persons with poor/fair health were employed in Kings County. It appeared, therefore, that the "employment advantage" of residing in Kings County was particularly strong among persons who rated their health as poor or fair. This effect did not appear to be due to problems of physical disability among persons of poor health.

The study confirmed the results of a number of other studies concerning the relationship between poor health status and unemployment. Unemployed persons in both Glace Bay and Kings County were more likely to report poor or fair health than employed persons.

The relationship between work and stress emerged as more complex. When asked to rate the level of stress in their lives, the Kings County respondents were significantly more likely to report that their lives were somewhat or very stressful than the Glace Bay group, despite the superior economic circumstances of the Kings County respondents. The elevated stress levels were predominantly apparent in employed and unemployed respondents in Kings County. These results suggested that the higher rates of stress in Kings County were due to both higher levels of job stress and a higher level of stress associated with unemployment.

A series of subsequent analyses confirmed the tentative conclusions pertaining to job stresses. Employed Kings County respondents were significantly more likely to report stresses related to excess demands, excess hours, too little autonomy, interpersonal problems and other sources. Glace-Bay respondents were significantly more likely to report stresses related to the threat of layoffs and the potential for accidents/injuries on the job. Overall, Kings County residents reported more job-related stress than Glace-Bay respondents, and levels of job-stress were strongly related to reported levels of life-stress.

Unemployment or shift work was not strongly related to stress but both emerged as important predictors of life-satisfaction, while the job-related stress factors were not related to satisfacation. These results strongly suggest that different employment-related factors affect life-stress and life-satisfaction. Whereas stress was predicted by job-related problems such as too many demands and too many hours, life-satisfaction was not. By contrast, working shifts or being unemployed did not appear to predict life-stress but arose as important predictors of life-satisfaction. Job stressors such as “too many demands” were not predictive of life-satisfaction. In fact, the results may indicate that people who like their jobs (and thus have higher levels of life satisfaction) also overwork and thus experience high stress. This possible relationship requires further investigation.

The analysis also identified a complex relationship between income and stress within these two communities. In both groups, the relationship was U-shaped, with the highest levels of reported stress occurring at the lowest and highest income groups and the lowest level of stress reported in the middle-income group. The higher levels of stress in Kings County were only apparent in the middle and higher income groups. There was no significant difference between Glace Bay and Kings County in the reported life-stress of persons with a household income of less than twenty thousand dollars.

To some extent, the income-stress distribution at the upper end of the income spectrum appeared to be attributable to job-stresses. Significant differences arose between the income groups with respect to demands, hours and interpersonal relationships, with the middle and higher income groups reporting higher levels of stress. There were no significant differences in autonomy, risk, fear of lay-offs or “other.” In each of the significant stressors, the higher income group reported somewhat higher rates of stress than the middle group, but the most pronounced difference

between the groups was in "working too many hours," – with each increase in income related to a significant increase in stress due to apparent overwork.

The results might account for the upper half of the U-shaped relationship between stress and income. In other words, as income increases, the demands and pressures of work also increase. If this were the only factor at work, the relationship between stress and income would be linear in nature, with lower income persons experiencing the least stress. In reality, their reported levels of stress are as high as the upper income respondents but the sources of this stress do not appear to be related to work demands. Clearly, there a variety of other poverty-related stresses which are operating at the lower end of the income spectrum.

In light of the serious demonstrated health consequences of stress, the results indicate a need to consider the trade-offs that occur when people work longer hours to earn more money. They also demonstrate the need to consider new policy options that have been successfully tried in Europe – like a redistribution of work hours that can reduce the hours of the over-worked while making more hours available to the unemployed and underemployed.

Further research needs are also indicated by the results. This analysis represents the first systematic use of the rich, new Community GPI database for Glace Bay and Kings County. Further investigation should examine issues like:

- the relationship between job stress, life stress, life satisfaction and health outcomes;
- the health status of the *under*employed, particularly involuntary part-time workers;
- the health status of the unemployed when the official definition of unemployment is expanded to include discouraged workers and others who want a job but have not looked for one in the previous four weeks;
- the relationship between actual hours of work (including paid and unpaid overtime) and health outcomes, to determine whether short and/or long hours are associated with stress and health status;
- whether those who are currently overworked want to reduce their work hours in order to alleviate stress;
- the relationship between unemployment, overwork, job stress and other employment characteristics on the one hand and health behaviours on the other. For example, as several studies have correlated smoking with stress, it will be interesting to investigate the degree to which those working long work hours and experiencing high levels of work demand manifest unhealthier lifestyle behaviours.
- the degree to which intervening variables, like strong social supports and social networks, may ameliorate potentially adverse health outcomes due to high unemployment and job insecurity in Glace Bay.
- the degree to which unpaid care-giving obligations exacerbate life or work stress, and impact life satisfaction and health outcomes.
- the degree to which voluntary community commitments exacerbate life or work stress, and impact life satisfaction and health outcomes.

Data on these and many other employment characteristics, unpaid work activities, and work schedules, as well as a wide range of health behaviours, health outcomes, and other variables, are all contained in the Community GPI database. In fact, this initial analysis and the many

provocative hypotheses that flow from it indicate the extraordinary value and remarkable utility of this new community-level data source in elucidating the pathways between key social determinants of health and particular health outcomes.

The database is unique in that the same respondents answered questions on a wide range of employment characteristics, health outcomes, and other aspects of wellbeing at the community level – thus allowing careful investigation of correlations that are more elusive in surveys that focus more exclusively on either labour force activity, health, or other issues in isolation. Because Statistics Canada sample sizes are generally insufficient to provide this level of detail at the community level, this is the first community-level survey in Canada that allows for in-depth investigation of these relationships.

In addition, it is hoped that this and future analyses will provoke consideration of policy implications and new policy options at the community level. For example, if the unemployed and those in fear of layoff both have poorer health status, this indicates that a very substantial portion of the Glace Bay population (more than 30%) may be at significant health risk. If discouraged workers and involuntary part-timers are found to manifest similar results and are added to the calculation, the percentage could be even higher. This would seem to indicate that both job creation and enhanced job security are potentially important investments in population health that could avoid substantial future health costs.

As well, the U-shaped income-stress curve, indicating higher stress among both the poor and rich than among middle-income groups, has important implications for the potential role of greater income equity in improving health outcomes. Policies, such as those in the Netherlands, which have sought to redistribute work hours by reducing the hours of the overworked and making the additional hours available to the unemployed and underemployed, may be highly relevant here. Such policies have not been as prominent on North American policy agendas as in Europe, but the results demonstrated here indicate that they may be worthy of consideration.

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