A critical perspective is presented in regard to the 2000 regional rankings of Canadian health care indices by *Maclean's* magazine, June 5, 2000. This perspective is related in format to previous analyses of the *Maclean's* rankings of Canadian universities. Several pitfalls in the health care ranking procedures are summarized. The *Maclean's* data and general criteria appear conceptually reasonable, but their inconsistencies and limited range, together with problems in interpretation of rank data, do not allow them to be logically or empirically useful in the matter of health care evaluation, that is, in the manner portrayed for readers of *Maclean's*. Using a particular set of parameters defined as health "indicators," the rank data show gratuitously that communities better endowed with certain health services, such as those with medical schools, tend to provide higher levels of care.

A B R É G É

Nous présentons une perspective critique des classements régionaux de l'an 2000 des indices canadiens des soins de santé par la revue *Maclean's* du 5 juin 2000. Cette perspective est reliée par la forme à des analyses préalables du classement des universités canadiennes par *Maclean's*. Nous résumons plusieurs lacunes des méthodes choisies pour le classement des systèmes de santé. Les données de *Maclean's* et ses critères généraux semblent raisonnables du point de vue conceptuel, mais leurs incohérences et leur portée limitée, sans compter les problèmes d'interprétation des données de classement, leur enlèvent toute utilité logique ou empirique pour l'évaluation des soins de santé, du moins sous la forme où elles sont présentées aux lecteurs de *Maclean's*. Au moyen d'un groupe de paramètres définis comme étant des « indicateurs » de santé, on montre sans justification que des localités mieux équipées en services de santé – celles qui ont une école de médecine, par exemple – ont tendance à fournir des niveaux de soins supérieurs.

Maclean's Rankings of Health Care Indices in Canadian Communities, 2000: Comparisons and Statistical Contrivance

Stewart Page, PhD, Ken Cramer, PhD

Maclean's magazine (MM) is a major Canadian mass circulation magazine, with emphasis on Canadian and, secondarily, U.S. and North American content. In its June 5, 2000 issue,¹ MM published its second annual rankings (described fully on p.18 ff), evaluating 50 regions across Canada in terms of their provision of health care services. Perhaps because of the increased popularity of notions such as cost effectiveness, the use of ranking exercises has become increasingly popular. The present study was related to several previously published analyses of data from MM,²⁻⁵ in which the magazine has calculated annual rankings of Canadian universities, based on parameters such as measures of student finance, library holdings, and so on. The present study utilized the basic approach of these previous studies to examine MM's¹ rankings of community health care.

For 2000, MM used health statistics provided by the Canadian Institute for Health Information. For these rankings, MM gathered raw data from 50 Canadian regions with populations over 100,000, representing about 85% of the Canadian population. The data were obtained from the fiscal years 1997-1998 and 1998-1999. Life expectancy data (see below), by community, were from 1996.

The 2000 health care rankings were divided by MM into three categories: 1) Communities with Medical Schools, 2) Other Major Communities, and 3) Largely Rural Communities. For the health care rankings, as described in its June 5, 2000 issue, MM converted preliminary raw data across 13 parameters to percentages, and then to ranks (first, second,

etc.). MM then derived from these an overall final rank for each of the 50 regions, and a linear rank ordering of all 50 regions considered together. The June 5, 2000 MM issue published the overall ranking results (out of 50) for each region, plus total overall scores and ranks for members of each category of community. For Communities with Medical Schools, Edmonton, Ottawa, and Saskatoon held the first three ranks, with Kingston last. For Other Major Communities, North/West Vancouver, Mississauga/Brampton/Burlington, and Victoria held the first three ranks, with St. John's, NF last. For Largely Rural Communities, Moncton/Lethbridge (tied), Nanaimo, and Trois Rivières/Drummondville/Shawinigan held the first three ranks, with Prince George, BC last.

Following previous studies, the present analyses explored several statistical aspects of the health rankings, principally, the degree to which their component parts and indices were related to final rankings, and to which they were internally consistent. We viewed the analyses as important in view of the many sources of inconsistency and unreliability identified in previous studies of MM's university ranking data, and also in view of the apparently increased use and popularity of rank-based data.

METHOD

Measures used by MM

MM classified regions as: Communities with Medical Schools (N=14); Other Major Communities (N = 20), and Largely Rural Communities (N = 16).

The MM data were compiled according to six main Measures, listed below. Each Measure, except life expectancy, was comprised of several indices:

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Life Expectancy. (determined by Canadian mortality rates from 1996);

Prenatal Care. Indices within this Measure were: 1) Low Birthweight (proportions of babies weighing less than 2500 grams at birth), 2) Caesarean Sections (percentages of babies born by C-section), 3) Births After C-Section (percentages of vaginal births by women having given birth previously by C-section);

Community Health. Indices of this Measure were: 1) Hip Fractures, 2) Pneumonia and Flu (measures representing hospitalization of persons over 64);

Elderly Services. Indices were: 1) Hip Replacements, 2) Knee replacements;

Efficiencies. Indices were: 1) Possible Outpatients (measures of frequency of hospitalizations for conditions considered treatable elsewhere), 2) Early Discharge (measures of time spent in hospital relative to national standards for particular conditions), 3) Preventable Admissions (measures of hospitalization for conditions considered preventable by care in offices or clinics);

Resources. Indices were: 1) Physicians per capita (per 100,000 people), 2) Specialists per capita.

RESULTS

As in previous studies of rank data, several pitfalls were found:

1) In general, the major pitfall is that differences in ordinal ranks (rank ordering) are not amenable to quantitative or mathematical interpretation.⁶

2) Many of the 13 indices comprising the 6 main Measures (a rank being available for each Measure's component indices, each representing a different aspect of health care services) are unrelated. Spearman rank-order (ρ) correlations, which indicate the degree of association between two ranked variables, were computed for each possible pair of indices used by MM, in this instance pooling the indices over all Measures and 13 component indices. For Communities with Medical Schools ($N = 14$), of the total of 78 intercorrelations (disregarding sign) between all possible pairs of indices, 15 (19%) were significant, using an alpha criterion of $p < 0.05$. (For this p level and N ,

and for other correlational results, approximately 5% of correlations computed will likely be significant by chance). For Other Major Communities ($N = 20$), 15 intercorrelations (19%) were significant. For Largely Rural Communities ($N = 16$), 8 intercorrelations (10%) were significant. For the pooled ($N=50$) sample of communities, 18 intercorrelations (23%) were significant. Within each community type and also within the pooled sample, several of the significant correlations were negative in sign.

3) Many indices used in the 6 main health care Measures were unrelated to MM's final rankings. Spearman ρ correlations were computed between each region's final rank (as assigned by MM) and its rank on each of the indices comprising the 6 main Measures. For example, for Communities with Medical Schools, considering the 13 indices, only 2 such correlations (15%) were significant at $p < 0.05$.

4) As done in previous studies of MM's rankings of Canadian universities, cited earlier, it was assessed to what extent lower-ranking regions differed from higher-ranking ones; that is, in terms of their mean ranks on the 13 evaluative indices comprising the 6 MM Measures. The top and bottom subgroups (halves) of regions were therefore examined using the Wilcoxon Rank Sum test. This test evaluates differences in ranked data on a specified parameter, taken from two independent samples of observations (regions). Regions were thus compared by assessing whether the rank scores of the "top" (higher ranking) half on each index were significantly different from those of the "bottom" (lower ranking) half.

For Communities with Medical Schools, results from the Wilcoxon tests showed that the top and bottom groups (halves) differed significantly ($p < 0.05$ (2-tailed)) on only 2 (15%) of the 13 individual indices. For the other two regional categories, this percentage was 23%.

Additional comparisons

For each community category, the Spearman correlations showed generally strong, though not perfect, relationships between a community's final ranking within its own category and its ranking within

TABLE I
Primary Clusters of Communities
Found in Cluster Analysis

Cluster One	Overall MM Rank
Markham	14
Surrey	27
Burnaby	21
Mississauga	2
Kitchener-Waterloo	7
Saskatoon	6
London	10
Hamilton	11
Winnipeg	16
Edmonton	4
Halifax	23
Cluster Two	
Joliette	36
St. Jérôme	40
Trois-Rivières	30
Chicoutimi	42
Regina	26
Yarmouth	35
Calgary	9
Granby	33
Sherbrooke	24
Cluster Three	
Brantford	22
Red Deer	34
Antigonish	46
St. Catharine's	19
Windsor	25
Lethbridge	18
Cluster Four	
Peterborough	31
Owen Sound	39
Kingston	29
Saint John	41
North Bay	47
Prince George	50
Moncton	17
Fredericton	44
Hull	45
Sudbury/Sault Ste. Marie	49
Chilliwack	37
Thunder Bay	38
Prince Edward Island	48
Cluster Five	
Vancouver/Richmond	13
Nanaimo	32
Vancouver/North West	1
Victoria	3
Lévis	12
Laval	20
Ottawa	5
Toronto	8
Quebec City	15
Montreal	28
St. John's	43
Means of Overall MM Ranks For Communities in the Five Primary Clusters	
Cluster 1; M=12.81	
Cluster 2; M=30.55	
Cluster 3; M=27.33	
Cluster 4; M=39.61	
Cluster 5; M=15.45	

the pooled sample of communities ($N=50$). Each category represented a mostly nonoverlapping range of final ranks within the overall sample. Largely rural communities, for example, occupied roughly the lower third of final ranks with-

in the pooled sample, with Moncton, NB, ranked first in this category, but 17th in the pooled sample.

Similar to findings in previous studies cited earlier, the rank data showed several anomalous relationships when compared to those for 1999. For example, Calgary ranked 12th in 1999, yet “improved” to 5th in 2000. For Communities with Medical Schools, their rank in the 1999 MM Health Care rankings was not significantly correlated with their rank in the 2000 data ($\rho=0.282$, $p > 0.05$).

Finally, in view of the small differences shown between communities on many of the indices, we subjected the pooled 2000 rank data ($N=50$) to cluster analysis^{7,8} in order to examine the pattern of interrelationships among communities. This analysis identified unique families or clusters of communities in which the similarity of each member’s corresponding profile was maximized and in which intercorrelations among members were high. That is, the procedure grouped communities with highly similar profiles using the 13 indices, so that members were highly similar within a cluster, but dissimilar to members outside their cluster. Only 6 indices were significant in terms of discriminating between the clusters found. These were: births after Caesarean delivery, hip fractures, hip replacements, life expectancy, pneumonia and flu, and preventable admissions. The remaining 7 indices thus were ones on which the communities did not appear to differ significantly across clusters. Members of the five primary clusters identified are listed in Table I, including their final rank as assigned by MM.

The lower portion of Table I presents the mean of the overall MM ranks given to communities in each cluster. Clusters 1 and 5 are similar in terms of characteristics and overall ranking; cluster 4 is “worst” in terms of overall rank, and clusters 2 and 3 are intermediate. There is considerable variance in which indices are most adequately addressed by each cluster. Clusters 1 and 5, for example, score relatively well in terms of overall rank on life expectancy, preventable admissions, and other indices generally, while cluster 4 scores relatively poorly on virtually all indices. As shown in the table (see also MM’s tables of overall

rankings, June 5, 2000, p. 22 ff), MM’s community classification scheme does not totally reflect the configuration of regions found by the cluster analysis. For example, Nanaimo, St. John’s, and Montreal are members of the same cluster as Vancouver/North West (the overall “winner” among all regions), yet these regions score relatively poorly in terms of overall rank. Also, Calgary belongs to the same cluster with 8 others that do poorly in terms of overall rank, yet it does well (9th) in overall rank. Less urban regions tended, however, to be found in clusters doing relatively less well in terms of the overall ranks of their members. For clusters 2, 3, and 4 considered together, 3 (11%) were in MM’s category of Communities with Medical schools; for clusters 1 and 5 considered together, 12 (54%) were in this category. Kingston was an exception, in that no other community with a medical school was included in its cluster.

Implications

For the 2000 Health Care rankings, as in previous studies cited earlier, many of the Measures and component indices are not clearly or strongly related, conceptually or empirically. Many regions do “well” in terms of achieving relatively high final rankings, for example, yet do relatively poorly on several specific indices – and vice versa. We note here again that, in several cases, doing “well” on one index or Measure was associated with doing “poorly” on another.

MM does acknowledge that many community comparisons show little variation in raw scores.¹ That is, many of the observations are trivially different from each other, and thus reflect normally expected variance in a distribution of scores. MM nevertheless proceeds to discuss many of these variations as if clear differences exist, and implies that health services in certain communities are superior to those of lower ranking regions. Attention from MM is given, for example, to health services in Victoria, whose overall (percentage-based) score was 85.5. Yet, Kitchener-Waterloo achieved virtually the same score (83.6). Six other regions, within the same community category, achieved scores within 5 points of Victoria’s. In communities with

medical schools, for example, the difference in overall health services score (a preliminary non-rank measure, interpreted by MM as a percent) is 4.90 points between regions ranking 1st and 11th.

MM’s rankings effectively confirm that regions with better health care services tend to achieve higher ranks, although the rankings are currently limited to simple parameters that cannot reflect the multidimensionality of treatment effectiveness indices or health care environments as these exist in the real world. Moreover, MM included no psychiatric indices, a major aspect of health care service. We note here the substantial relationship between many types of community stressors and the prevalence/incidence of both psychiatric and nonpsychiatric medical disorders.⁹⁻¹³ Communities cannot, however, be comprehensively evaluated as individual or distinct units. Many are represented and interrelated in clusters, as determined by their pattern of scores on particular indices. While some indices discriminate between clusters, most are ones for which many communities are not particularly different. An important future issue will concern the contrast between support for areas with substantial medical services, such as those identified in our cluster analysis, compared to that for areas with lower levels of overall care and sociocultural status.

AUTHORS’ NOTES

Our purpose in this paper has been to examine interrelationships within MM’s published data and rankings, and to comment only within limits allowed by our own analyses. The conceptual goal for each analysis reported herein was to explore a different aspect of the published data, following the format, framework, and general idiom for these data as supplied by MM. We take no position on the overall goals of MM, the future potential ability of future ranking systems to evaluate health care services, or the question of whether such future exercises should be carried out at all, or by whom.

All analyses summarized herein were based on data published in the June 5, 2000 issue of MM. In each analysis, outcomes were corrected for ties and for miss-

ing cases, where these occurred in the MM data. Due to space limitations, not all p values, etc., are included herein. Additional information regarding statistical or other issues relating to the present study are available from either author upon request.

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COMING EVENTS ACTIVITÉS À VENIR

To be assured of publication in the next issue, announcements should be received by **September 15, 2001** and valid as of **October 31, 2001**. Announcements received after **September 15, 2001** will be inserted as time and space permit.

Pour être publiés dans le prochain numéro, les avis doivent parvenir à la rédaction avant le **15 septembre 2001** et être valables à compter du **31 octobre 2001**. Les avis reçus après le **15 septembre 2001** seront insérés si le temps et l'espace le permettent.

National Polio Survivors' Reunion/Rénion pour les survivants de la polio
Organized by the Ontario March of Dimes/Organisée par la Marche des dix sous de l'Ontario
7-14 September/septembre 2001
Geneva Park, Orillia, ON

Contact/Contacter : Kim Sialtsis
National Post Polio Coordinator/
coordonnatrice nationale du programme post-polio
Tel/Tél. : 416-425-3463, ext. 240
1-800-263-3463
E-mail/Courriel : polio@dimes.on.ca

International Conference on Technology and Aging
Organized by Sunnybrook & Womens' College Health Sciences Centre
12-14 September 2001
Toronto, ON

Contact:
International Conference on Technology and Aging
c/o Absolute Conferences & Events Inc.
Fax: 416-979-1819
www.icta.on.ca

Aiming for Prevention: International Medical Conference on Small Arms, Gun Violence and Injury
Hosted by International Physicians for the Prevention of Nuclear War (IPPNW)
28-30 September 2001
Helsinki, Finland
Contact: Brian Rawson, Program Coordinator
Tel: 617-868-5050, ext 208 Fax: 617-868-2560
E-mail: brawson@ippnw.org www.ippnw.org

La santé des jeunes
73e congrès-exposition de l'Association des médecins de langue française du Canada (AMLFC)
11-12 octobre 2001
Montréal, Qc
Contacter : AMLFC
Tél : 514-388-2228 Fax : 514-388-5335
Courriel : info@amlfc.org

Building Sound Investments
5th Annual Health, Work & Wellness Conference 2001
21-23 October 2001
Calgary, AB
Contact: Conference 2001
Tel: 604-605-0922 or Toll-free: 1-877-805-0922
Fax: 604-689-4486
E-mail: workwell@healthworkandwellness.com

Creating Conditions for Health/Créer les conditions de la santé
CPHA 92nd Annual Conference/92e Conférence annuelle de l'ACSP
21-24 October/octobre 2001
Saskatoon, SK
Contact/Contacter : CPHA Conference Department
Tel: 613-725-3769 Fax: 613-725-9826
E-mail: conferences@cpha.ca www.cpha.ca

52nd Annual Ontario Public Health Association Conference/52e conférence annuelle de l'Association pour la santé publique de l'Ontario
Harvesting Health: Embracing Tradition and Change/Récolter les fruits de la santé : célébrer la tradition et le changement
5-7 November/novembre 2001
Kitchener, ON

Contact: Ontario Public Health Association
Tel: 416-367-3313 Fax: 416-367-2844
Toll-free: 1-800-267-6817 (Ontario only)
Email: info@opha.on.ca www.opha.on.ca

8th Canadian Conference on International Health (CCIH)/ 8^{ème} Conférence canadienne sur la santé internationale (CCSI)
Child and Youth Health: Action, Research and Advocacy/ Pour un plan d'action, de recherche et de promotion sur la santé de l'enfant
18-21 November/novembre 2001
Ottawa, ON
Organized by the Canadian Society for International Health, with funding support from the Canadian International Development Agency, and the Pan-American Health Organization

Contact/ Contacter :
CCIH Secretariat/ Secrétariat de la CCSI
Tel: 1-877-722-4140
Outside/ Hors Canada: 1-613-722-4140, ext. 224
E-mail/ Courriel : ccih@ag-cdn.com
http://www.csih.org/index_e.html ou
http://www.csih.org/index_f.html

2001: A TB Odyssey
Sponsored by the Ontario Ministry of Health
5-6 December 2001
Toronto, ON
Contact: Michelle Wilson
Eventives Conference and Event Management
Email: eventives@hotmail.com
Fax: 905-619-1761

The Early Years: Building Family Capacity/Building Supportive Communities
Sponsored by Interprofessional Continuing Education, University of British Columbia and BC Association of Infant Development Consultants
31 January-2 February 2002
Vancouver, BC
Contact: Elaine Liao, Director
Interprofessional Continuing Education, UBC
Tel: 604-822-4965 Fax: 604-822-4835
E-mail: elaine@cehs.ubc.ca

APPEL DES COMMUNICATIONS / CALL FOR ABSTRACTS

6^e Conférence mondiale sur la Prévention et contrôle des traumatismes / 6th World Conference on Injury Prevention and Control
Traumatismes, suicide et violence : construire un savoir, des politiques et des pratiques pour promouvoir un monde en sécurité / Injuries, Suicide and Violence: Building Knowledge, Policies and Practices to Promote a Safer World
12-15 mai/May 2002
Montréal, QC
Contact / Contact: Congress Secretariat
Tel: 514-848-1133 or 1-877-213-8368
(Canada & US) Fax: 514-288-6469
E-mail: trauma@coplanor.qc.ca
www.trauma2002.com

Date limite pour la soumission des communications / Deadline for submission of abstracts: 1 septembre / September 2001