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**Spirit Horse: Jump for Joy**  
*Mixed media on burlap; acrylic, pen and ink, and glitter glue; 16" x 25", by Katharine Fletcher*  
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*From Katharine's ongoing Spirit Horse series, Jump for Joy expresses this pregnant mare's delight for the life she bears.*

*Photo: Eric Fletcher*



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## The quantum theory of rural practice

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**T**he large world in which we all live has 2 physics. One is Newtonian, in which the apple falls, and matter is divisible into any quantity visible to the eye. The other is that of the molecular and submolecular levels, where quantum effects rule. This is the field of probability, entangled particles, particles that act like waves and all other sorts of phenomena that amaze at the quantum scale. Rural medicine is another set of small systems that work at quantum scale.

### Quantum rule of rural practice no. 1: the quantum definition of rural

The definition of rural medicine can be debated. One approach is to define it by what rural doctors do. It doesn't take much distance from the big smoke to see a difference in practice style.<sup>1</sup> However, another approach is to describe the system and how it changes with changes in number of providers.

Rural medicine has elements of quantum theory that govern it. We truly do not work in a continuum. Losing or gaining a physician does not cause an incremental change. Rural doctors work where the change of one doctor causes a quantum state change.

One doctor too few and rural practice stalls. It is a state change. It's not just that shifts in the emergency department become hard to manage. The skill set of the person who is gone doesn't matter. Everything — emergency department shifts, inpatients, obstetrics, unattached patients, office patients —

becomes hard to manage and the perturbations affect all.

It follows that because such changes affect the entire system, the most resilient rural system is one built on rural generalists. When those left behind can handle multiple roles, one doctor leaving doesn't "break" the system. It will stress it for sure, but generalist flexibility will allow for coverage of priority needs.

### Quantum rule of rural practice no. 2: the rule of $n + 1$

The right number of doctors is an interesting challenge. We could argue for the right number, understanding that rural doctors have a scope of practice that extends both in breadth and depth so as to make urban comparisons meaningless (especially because rural doctors work to fill niches in the local need that elsewhere would be done by specialists).

Although the number that makes sense depends on who the doctors are and the medical needs of the town, I posit that if the right number is  $n$  then the stable number is  $n + 1$ . Once a minimum complement has been defined, having 1 more practitioner gives just that additional buffer that makes the community attractive to stay in (and, paradoxically, attractive to join).

### REFERENCE

1. Hutten-Czapski P, Pitblado R, Slade S. Scope of family practice in rural and urban settings. *Can Fam Physician* 2004;50:1548-50. Available: [www.cfp.ca/content/50/11/1548.long](http://www.cfp.ca/content/50/11/1548.long) (accessed 2015 Feb. 24).

# Une théorie quantique de la pratique en milieu rural

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Le vaste monde dans lequel nous vivons obéit à 2 types de lois physiques. L'une est la physique newtonienne, c'est-à-dire que la pomme tombe et que la matière est divisible en parties visibles à l'œil nu. L'autre est la physique moléculaire et subatomique, où règnent les règles des effets quantiques. C'est un monde de probabilités, de particules intriquées ou qui se comportent comme des ondes et de toutes sortes d'autres phénomènes étonnants à l'échelle quantique. La médecine rurale est un autre ensemble de petits systèmes qui fonctionnent à l'échelle quantique.

## Première règle quantique de la pratique en milieu rural: la définition quantique de rural

On peut discuter longtemps d'une définition de la médecine rurale. Elle peut être définie en fonction de ce que font les médecins ruraux. Il ne faut pas chercher très loin pour voir une différence dans le style de pratique<sup>1</sup>. Cependant, une autre approche consiste à décrire le système et comment il est affecté par les changements du nombre de fournisseurs.

La médecine rurale comporte des éléments de la théorie quantique qui la gouverne. Nous ne travaillons vraiment pas dans un continuum. Perdre ou recruter un médecin ne provoque pas un changement d'envergure correspondante. Les médecins en milieu rural travaillent dans un monde où l'ajout ou le retrait d'un médecin provoque un changement d'état quantique.

Un médecin en moins et la pratique rurale s'immobilise. C'est un changement d'état. Ce n'est pas simplement que les quarts de travail à l'urgence deviennent plus difficiles à gérer. Les compétences de la personne qui est partie n'ont pas d'importance. Tout — les quarts de travail à l'urgence, les patients hospitalisés, l'obstétrique, les patients orphelins,

les consultations au bureau — devient difficile à gérer et les perturbations affectent tout le monde.

Puisque de tels changements touchent l'ensemble du système, il s'ensuit que le système rural le plus résilient est composé de généralistes ruraux. Lorsque ceux qui restent peuvent assumer plusieurs rôles, le système ne « casse » pas quand un médecin part. Cela causera certes des tensions, mais la flexibilité des généralistes permettra de répondre aux besoins prioritaires.

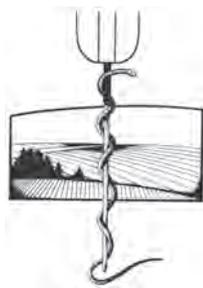
## Deuxième règle quantique de la pratique en milieu rural: la règle de $n + 1$

Déterminer le nombre adéquat de médecins constitue un défi intéressant. Nous pourrions parler du nombre adéquat de médecins, mais il ne faut pas oublier que les médecins ruraux ont un champ de pratique qui s'étend à la fois en largeur et en profondeur, ce qui rend inutiles les comparaisons avec la médecine en milieu urbain (surtout parce que les médecins ruraux cherchent à occuper des créneaux en fonction des besoins locaux, créneaux qui, ailleurs, seraient occupés par des spécialistes).

Le nombre approprié dépend certes de qui sont les médecins et des besoins médicaux de la ville, mais je pose une hypothèse: si le nombre adéquat est  $n$ , le nombre nécessaire pour assurer la stabilité du système est alors  $n + 1$ . Une fois l'effectif minimal défini, avoir 1 médecin de plus fournit une protection qui rend la communauté plus attrayante et incite à y rester (et, paradoxalement, à aller s'y installer).

## RÉFÉRENCE

1. Hutten-Czapski P, Pitblado R, Slade S. Scope of family practice in rural and urban settings. *Can Fam Physician* 2004;50:1548-50. En ligne : [www.cfp.ca/content/50/11/1548.long](http://www.cfp.ca/content/50/11/1548.long) (consulté le 24 février 2015).



# President's message. Enhanced surgical services

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Is the Canadian medical system providing excellent obstetric care for rural Canadians? Increasing numbers of women must travel significant distances from home to await delivery. The financial and social costs and increased health risks to these women and babies have been recognized.<sup>1</sup> Although low-risk obstetrics without surgical backup is safe in rural communities,<sup>1</sup> declining numbers of physicians and hospitals are comfortable practising this way. We need to provide obstetric services, including operative deliveries, to women as close to home as practical.

The number of rural communities providing surgical services, including cesarean deliveries, has also been declining. Physicians providing surgical services have a variety of skills and training. Some are truly general surgeons who provide obstetric services. Some larger communities have an obstetrician–gynecologist supported by general surgeons and general practitioner surgeons (i.e., family physicians with enhanced surgical skills [FPSS]). In smaller rural communities that provide surgical services, at least in western Canada, these services are usually provided by FPSS. The training of these physicians is variable. Some are international medical graduates trained abroad; some are family doctors who have had extra training in performing cesarean deliveries or more extensive surgical training.

Along with meeting the needs of obstetric practice, these physicians increase the capacity of rural communities to recruit and retain family physicians, general practice anesthetists and other health care providers. They maintain a high level of medical competence in the community, particularly in regard to serious illness and emergency services, and increase capacity for rural education and research. Unfortunately, training programs for these skills are limited.

At the 2012 SRPC conference in Whistler, BC, a group of interested people met to consider how to improve FPSS training. From this collaboration has grown the College of Family Physicians of Canada (CFPC) Community of Practice designation; a national curriculum for FPSS; credentialing work; and a joint position paper on rural surgery and operative delivery, to be presented at this year's SRPC conference in Montréal, Que.

There will always be places too small or too remote to have surgical services. However, with recognition from the CFPC, an established curriculum and a rigorous quality-improvement program should come more FPSS training and more FPSS providing high-quality care. This will allow more rural Canadians to receive obstetric and surgical care closer to home.

### REFERENCE

1. Miller KJ, Couchie C, Ehman W, et al. Rural maternity care. *J Obstet Gynaecol Can* 2012;34:984-1000.

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# Message du président. Amélioration des services de chirurgie

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**L**e système de santé du Canada fournit-il d'excellents soins obstétricaux aux femmes des régions rurales? De plus en plus de femmes doivent s'éloigner de leur domicile pour attendre leur accouchement. Les coûts financiers et sociaux associés à cette situation ainsi que les risques accrus pour la santé de ces femmes et de leurs bébés sont connus<sup>1</sup>. Bien que les soins obstétricaux à faible risque sans couverture chirurgicale sur place soient sécuritaires dans les collectivités rurales<sup>1</sup>, de moins en moins de médecins et d'hôpitaux sont prêts à les fournir dans ces conditions. Il est pourtant impératif d'offrir aux femmes des soins obstétricaux, y compris des césariennes, aussi près que possible de chez elles.

Le nombre de collectivités rurales où l'on offre des services de chirurgie, dont des césariennes, a aussi diminué. Les médecins qui fournissent des services de chirurgie ont des compétences et des formations qui varient beaucoup. Certains sont de véritables chirurgiens généraux qui offrent des soins obstétricaux, alors que certaines collectivités plus grandes ont un gynécologue obstétricien qui travaille avec des chirurgiens généraux et des omnipraticiens chirurgiens (c.-à-d., des médecins de famille ayant des compétences avancées en chirurgie [CAC]). Dans les petites collectivités rurales où sont fournis des services de chirurgie, du moins dans l'Ouest du pays, ce sont généralement des médecins de famille formés en chirurgie qui offrent ces services. La formation pour ce type de pratique varie beaucoup. Certains sont des diplômés de facultés de médecine étrangères, alors que d'autres sont des médecins de famille qui ont reçu une formation supplémentaire pour pratiquer des césariennes ou encore une formation chirurgicale plus poussée.

En plus de combler le besoin de soins obstétriques, la présence de ces médecins améliore la capacité des collectivités ru-

rales de recruter et de fidéliser des médecins de famille, des omnipraticiens anesthésistes et d'autres fournisseurs de soins. Elle contribue à maintenir un niveau élevé de compétences médicales au sein de la collectivité, surtout pour les maladies graves et les urgences, et à accroître les capacités de recherche et d'éducation en milieu rural. Malheureusement, peu de programmes de formation permettent d'acquérir ces compétences.

Lors de la conférence annuelle 2012 de la SMRC, à Whistler (C.-B.), des participants se sont rencontrés pour discuter de façons d'améliorer la formation des médecins de famille en CAC. Cette collaboration a donné lieu à la création d'un groupe désigné des Communautés de pratique en médecine familiale du Collège des médecins de famille du Canada (CMFC), à un programme national de formation des médecins de famille en CAC, à des travaux sur les titres de compétence et à un énoncé de position conjoint sur les césariennes et les chirurgies en milieu rural, qui sera présenté à l'occasion de la conférence annuelle de la SMRC, à Montréal (Qc).

Il y aura toujours des collectivités qui seront trop petites ou trop éloignées pour avoir sur place des services de chirurgie. Toutefois, la reconnaissance du CMFC et la mise en œuvre d'un programme établi et d'un système rigoureux d'amélioration de la qualité devraient mener à la création de nouveaux programmes de formation des médecins de famille en CAC et à une augmentation du nombre de ces médecins, capables de fournir des soins de grande qualité. Ces mesures permettront à plus de Canadiennes des régions rurales de recevoir des soins obstétricaux et chirurgicaux plus près de chez elles.

## RÉFÉRENCE

1. Miller KJ, Couchie C, Ehman W, et coll. Rural maternity care. *J Obstet Gynaecol Can* 2012; 34:984-1000.

## Nurse-led diabetes management in remote locations

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**Introduction:** Nurse-led diabetes management has been shown to be effective in urban and regional general practice. We sought to test the feasibility of providing a nurse-led annual cycle of diabetes care in a remote location and to explore the factors that patients indicated were important in diabetes self-management.

**Methods:** We conducted a pilot study in 3 locations: 1 town and 2 small townships in remote Australia. A chronic disease nurse (CDN) visited each patient over the course of a year. We examined patient clinical outcomes and interview data. We estimated the cost per hour of the CDN's time, including travel time, per 1% drop in glycated hemoglobin (HbA<sub>1c</sub>).

**Results:** A total of 21 patients participated in the pilot study. Clinical findings showed significant reductions in HbA<sub>1c</sub> levels after the nurse-led intervention. Patients reported that they trusted the nurse and thought her advice was pitched at their level. Patients were motivated through a process that included emotional response, change identity and acceptance. The estimated cost in CDN hours per 1% drop in HbA<sub>1c</sub> level was A\$242.95 (Can\$237.60).

**Conclusion:** Nurse-led diabetes care motivated patients to manage their diabetes and resulted in a significant improvement in diabetes management in this remote setting.

**Introduction :** En milieu urbain et en région, la prise en charge du diabète par le personnel infirmier s'est révélée efficace en médecine générale. Nous avons voulu vérifier s'il est envisageable de fournir un cycle annuel de soins infirmiers pour le diabète dans un secteur éloigné et étudier les facteurs que les patients jugent déterminants pour assurer eux-mêmes la gestion de leur diabète.

**Méthodes :** Nous avons réalisé une étude pilote à 3 endroits : 1 municipalité et 2 petits villages d'une région éloignée de la campagne australienne. Une infirmière spécialisée en maladies chroniques (ISMC) a rendu visite à chaque patient sur une période d'un an. Nous avons examiné les résultats cliniques des patients et les données des entrevues réalisées avec eux. Nous avons estimé le coût horaire du temps des ISMC, incluant leurs déplacements, par tranche de 1 % de réduction de l'hémoglobine glyquée (HbA<sub>1c</sub>).

**Résultats :** En tout, 21 patients ont participé à l'étude pilote. Les observations cliniques ont révélé des réductions significatives des taux d'HbA<sub>1c</sub> après l'intervention en soins infirmiers. Les patients ont dit faire confiance à l'infirmière et ont trouvé ses conseils bien adaptés à leur situation. Les patients ont été motivés par le biais d'une intervention axée sur les dimensions affectives et identitaires et sur l'acceptation. Le coût horaire des ISMC par tranche de 1 % de réduction du taux d'HbA<sub>1c</sub> a été estimé à 242,95 \$A (237,60 \$CA).

**Conclusion :** Les interventions en soins infirmiers ont motivé les patients à gérer leur diabète et ont entraîné une amélioration significative de sa prise en charge dans cette région éloignée.

## INTRODUCTION

Diabetes is significantly more prevalent in rural than in metropolitan areas.<sup>1-3</sup> Nurse-led models of chronic disease management can be a solution to the predicted inability of the general practitioner (GP) workforce to meet the growing demand for chronic disease care.<sup>4</sup> In Australia, “general practitioner” is synonymous with the Canadian term family physician. There is a shortage of GPs in rural and remote locations in Australia, which has led to a lack of continuity in medical supervision.<sup>5</sup> Rural residents delay seeking health care and use medical services less frequently than their urban counterparts.<sup>6-9</sup> Nurse-led programs have been proven effective in Australian urban and rural settings,<sup>10,11</sup> and in the United Kingdom.<sup>12</sup>

The Chronic Care Model identifies interventions that encourage self-management skills in patients.<sup>13</sup> Key elements include patients taking on an active role in their care and health professionals being more proactive in changing patient behaviour.<sup>13</sup> For health professionals to increase self-management rates, they need to understand the factors involved in changing patient behaviour.<sup>14-17</sup>

Recent evidence has shown that patients with diabetes who completed a cycle of care using a GP management plan had improved process and clinical outcomes.<sup>18</sup> The aim of this study was to test the feasibility of a nurse-led annual cycle of diabetes care in a remote location and to explore the factors that patients indicated were important in diabetes self-management.

## METHODS

### Intervention

The nurse-led cycle of diabetes care was developed from evidence-based protocols implemented by the chronic disease nurse (CDN) under the medical supervision of GPs in a shared care model. The same nurse visited each patient over the course of a year, from February 2013 to February 2014. Patients' weight and girth were measured at the beginning and at the end of the pilot, and advice was given about medications, diet, weight loss and exercise. In addition, lifestyle changes were reviewed at quarterly intervals by the CDN under GP supervision, thereby conforming with the diabetes management guidelines of the Royal Australian College of General Practitioners.<sup>19</sup> The study sites, which were all in New South Wales, were a remote township with outreach services and no resident nursing or medical services, a remote township with resident nursing services and outreach services,

and a town with resident nursing and medical services. Both remote townships were provided with visiting outreach nursing and medical services. Patients consented to researchers accessing their clinical records. We estimated the cost per hour of the CDN's time, including travel time, per unit drop in glycated hemoglobin (HbA<sub>1c</sub>).

### Quantitative analysis

Quarterly clinical outcomes and lifestyle changes were collected from the patient records of all patients involved in the pilot and analyzed by 2 researchers (S.K. and T.M.). Categorical variables were created for patient demographics (age, sex, living alone/with other, medications) and outcomes (HbA<sub>1c</sub> level, glomerular filtration rate, weight) for analysis. Statistical calculations of bivariate correlations were performed using SPSS version 21.

### Qualitative analysis

Patients were provided with information about the study and invited to participate. Attempts were made to contact all patients in the pilot, either by telephone or in person when they visited the clinic. One of the researchers (S.K.) conducted the interviews, which were done face-to-face in the clinic or by telephone, whichever was convenient for the patient. The interview questions covered perceptions of diabetes care before and during the nurse-led care and lifestyle adjustments necessitated by diabetes. Interview recordings were transcribed for analysis using NVivo 10. Initial coding identified emerging themes. Secondary theoretically informed analysis identified elements in the process of patients shifting from passive to active self-managers of their disease.<sup>15,16</sup> Coding was checked by an independent researcher to ensure the integrity of themes and to provide validation of the interpretation.

The University of Sydney Human Research Ethics Committee approved the study.

## RESULTS

### Quantitative results

A total of 21 patients took part in the pilot study. Three patients were from a remote township with outreach services and no resident nursing or medical services, 8 were from a remote township with resident nursing services and outreach services, and 10 were from a town with resident nursing and medical services. All

participants completed the annual cycle of diabetes care. A summary of results including patient characteristics are reported in Table 1. The program resulted in a modest but significant mean reduction in HbA<sub>1c</sub> levels of 0.7% ( $t_{20} = -2.43, p < 0.05$ ; 95% confidence interval  $-1.27$  to  $-0.10$ ; paired sample 2-tailed) but no significant differences in weight or glomerular filtration rate. Medication regimen, living alone, age, sex and patient location had no significant influence on patient outcomes (Pearson 2-tailed correlation tests  $p < 0.05$ ).

The cost per hour of the CDN's time was A\$26.92 (Can\$26.38) (Registered Nurse Level 2, Paypoint 4). The estimated cost of patient care, in terms of CDN hours per patient for the annual cycle of care, was 4 direct and 4 indirect hours of care, totaling 8 hours per patient. Indirect care refers to file notes, appointments and referrals. The estimated mean travel time per remote location was 8 hours per clinic visit, equating to 32 hours per year for the 11 patients in remote townships, or 2.9 hours per patient. The estimated average total care per patient, including travel time, was 10.9 hours in the annual cycle of care for an average drop in HbA<sub>1c</sub> levels of 0.7% or the equivalent of 15.57 hours for a drop in HbA<sub>1c</sub> of 1%. The estimated cost in nursing hours per 1% drop in HbA<sub>1c</sub> level is therefore A\$242.45 (Can\$237.60).

**Table 1: Patient characteristics and summary of clinical results, n = 21**

Variable	No. (%) of patients*
Sex, female	11 (52)
Living alone	5 (24)
Living with spouse/partner or family	16 (76)
HbA <sub>1c</sub> levels, %	
≤ 7, baseline	11 (52)
≤ 7, end of study	13 (61)
Age, yr	
> 50	15 (71)
< 40	4 (19)
41–50	2 (10)
51–60	4 (19)
61–70	7 (33)
71–80	4 (19)
Weight, mean (range), kg	
Baseline	102 (67–143)
End of study	100 (67–140)
Medications	
Insulin	6 (29)
Oral antidiabetic drugs	8 (38)
Combination insulin and oral antidiabetic drugs	2 (1)
No antidiabetic medication	5 (24)

Note: HbA<sub>1c</sub> = glycated hemoglobin.  
\*Unless stated otherwise.

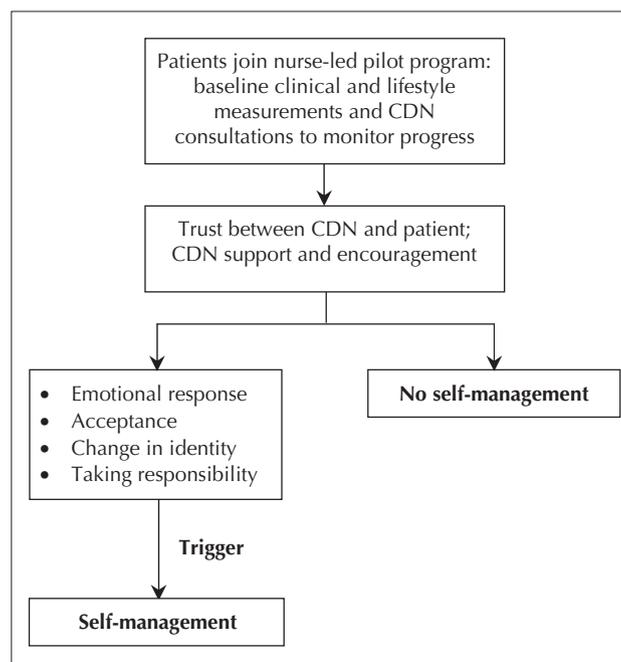
## Qualitative results

All 11 patients who were interviewed had a good relationship with the CDN and reported that her advice was easy to understand and helpful. “She ... brings it down to — well — to the layperson’s level,” said one female patient. Patients indicated that longer consultations with the CDN allowed more time for patients to absorb information.

All 11 patients interviewed reported that they trusted the CDN and that the trust was important in acting on her advice. One patient described the CDN as her “saviour.”

Patients who were self-managing their diabetes identified the CDN relationship as the trigger for self-management. One female patient stated, “... you’ve got someone who’s interested ... someone who cares. ... Well, I think it’s the motivation to do something more positive for yourself because ... no one can change things in your life except yourself.” The encouragement provided by the CDN was appreciated by patients. They were proud to report weight loss or diet change.

Patients talked about a transition in which they experienced an emotional response to living with diabetes. Some patients were able to deal with the emotions and move on. For others, it was more difficult. The elements in the process of self-management are schematically represented in Figure 1. One male patient said, “It’s when you’ve been healthy for such a long while then it hits you.”



**Fig. 1. Schematic representation of the process of patient activation. CDN = chronic disease nurse.**

Patients' transition to self-management involved accepting the condition, and changing their identity to a person with a chronic disease. Patients acknowledged the role of the CDN in their ability to accept diabetes. "I swept it under the carpet. ... I realized my health was getting worse and wouldn't improve unless I did something. It was a real eye-opener. She [the CDN] got me back on track," said one male patient.

The identity change, from healthy to living with diabetes, was difficult for some in spite of their rapport with the CDN. One patient who had had an active lifestyle before he had diabetes reported that he was disappointed in himself for not being able to adjust diet and exercise. He was unable to accept his diabetes and relinquish his previous identity:

I'm not the sort of person who can modify my food intake ... even though I've cut down a lot. ... I eat all of ... the greens and carrot and have minimal amount of potato and try to do all the right things, and then I go have my HbA<sub>1c</sub> tested and it's 9, you know, so I lose heart very quickly.

Interview data revealed that some patients made the transition to accepting and managing their diabetes within the year's cycle of care. Others, although they reported a good relationship with the CDN and had insight into their inability to address lifestyle issues, were not self-managing. Levels of HbA<sub>1c</sub> were 7% or lower in all patients who identified themselves as self-managing.

One patient had previously unrecognized low literacy and was therefore unable to read the medication instructions. The CDN arranged for the patient's family to attend the next consultation to explain the instructions.

## DISCUSSION

About two-thirds of participants in this study achieved target levels of HbA<sub>1c</sub>, compared with about half of the Australian population with diabetes.<sup>20,21</sup> In this study, a nurse-led cycle of diabetes care with GP supervision was successful in remote locations in New South Wales. Many qualitative analyses of patients living with diabetes have explored the reasons underpinning active patient self-management, but few have correlated the qualitative data with clinical data.<sup>22</sup>

For nurse-led programs to flourish, special training on the social, psychological, emotional and motivational aspects of diabetes is needed to improve the uptake of self-management.<sup>4,10</sup> The finding that positive reinforcement for lifestyle changes encouraged patients to self-manage has also been reported in other studies.<sup>23,24</sup>

Longer consultations with CDNs promoted fuller discussions and allowed for complex issues to be addressed more fully, in contrast to shorter GP consultations. In addition, the longer consultations facilitated the provision of individualized medication and lifestyle management advice and allowed time for patients to understand the advice.

The modest estimated cost per patient per 1% drop in HbA<sub>1c</sub> levels shows that this program was cost-effective.

Although patients understood their disease and responsibilities in managing diabetes, some were unable to make diabetes management a high priority in their lives.<sup>20</sup> The patient-related factors identified in this study align with reports that patients move through an emotional response, to changing identity and lifestyle, to acceptance and self-management.<sup>15,16,25</sup> Studies have also reported that some patients need more support for self-management than others.<sup>26</sup> Failure to engage in self-management may be related to low personal resources impairing interactions with health professionals.<sup>23,27</sup> The linking of results to theoretical frameworks of self-management confers additional rigour to the study.

The pilot program has been adopted on the basis of the results of this study, across the area in which the organization provides services. The application of this model to other locations in Australia and internationally would need to take into account the contextual factors in play as specified under the Dynamic Sustainability Framework, which details the importance of consideration of local factors in translation of models developed in other locations.<sup>28</sup> The following factors may be important: the nurse's skills in chronic disease self-management, including skills in communication and coordination of care; acceptance by supervising medical officers; community and patient perceptions of the nurse-led program; and continuity of care. Service models research has focused on rural and regional settings rather than on remote settings. More research is needed to test models of care that produce improved outcomes; this will secure the evidence base for interventions that are effective in remote communities.

## Limitations

The small sample is a study limitation. However, the sparse populations of remote communities make small samples a reality of research in remote areas. Another limitation is that 10 of the 21 participants in the qualitative arm of the study could not be interviewed because they left the area, declined or

could not be contacted. A possible bias is that study participants formed a close relationship with the CDN and may have been more likely to report positive rather than negative experiences. Data collection was separated from the provision of services. There are no data on the relationship between the patient and the CDN for participants who were not interviewed. Patient factors such as health literacy and education level are relevant to considerations of self-management.<sup>22</sup> It is a limitation of this study that neither patient educational levels nor measurement of health literacy were collected. Evidence on the relation between education levels and health literacy on the ability to self-manage diabetes would be of benefit in future research.

## CONCLUSION

A nurse-led year-long cycle of diabetes care supervised by GPs achieved a significant improvement in diabetes management in this remote setting. The program resulted in a mean decrease of 0.7% in HbA<sub>1c</sub> levels. Factors important in motivating patients toward self-management were trust in the CDN, CDN support, personal resources and making lifestyle management a priority.

## REFERENCES

1. Diabetes Australia. *Diabetes map*. 2013. Available: [www.ndss.com.au/en/Australian-Diabetes-Map/Map](http://www.ndss.com.au/en/Australian-Diabetes-Map/Map) (accessed 2013 July 18).
2. *Rural, regional and remote health: indicators of health system performance*. Canberra: Australian Institute of Health and Welfare; 2008.
3. Welch N. *Understanding of the determinants of rural health*. Canberra: N.R.H. Alliance; 2000.
4. Eley DS, Del Mar CB, Patterson E, et al. A nurse led model of chronic disease care — an interim report. *Aust Fam Physician* 2008;37:1030-2.
5. *General practice activity in Australia 2004–2005*. Canberra: Australian Institute of Health and Welfare; 2005.
6. Madden J, Barnard A, Owen C. Utilisation of multidisciplinary services for diabetes care in the rural setting. *Aust J Rural Health* 2013;21:28-34.
7. Judd F, Jackson H, Komiti A, et al. Help-seeking by rural residents for mental health problems: the importance of agrarian values. *Aust N Z J Psychiatry* 2006;40:769-76.
8. Elliott-Schmidt R, Strong J. The concept of well-being in a rural setting: understanding health and illness. *Aust J Rural Health* 1997;5:59-63.
9. Beard JR, Tomaska N, Earnest A, et al. Influence of socioeconomic and cultural factors on rural health. *Aust J Rural Health* 2009;17:10-5.
10. Eley DS, Patterson E, Young J, et al. Outcomes and opportunities: a nurse-led model of chronic disease management in Australian general practice. *Aust J Prim Health* 2013;19:150-8.
11. Halcomb EJ, Davidson PM, Daly JP et al. Nursing in Australian general practice: directions and perspectives. *Aust Health Rev* 2005;29:156-66.
12. Harris DI, Cracknell P. Improving diabetes care in general practice using a nurse-led, GP supported clinic: a cohort study. *Pract Diabetes Int* 2005;22:295-301.
13. Wagner EH, Austin BT, Davis C et al., Improving chronic illness care: translating evidence into action. *Health Millwood* 2001;20:64-78.
14. Lorig KR, Sobel DS, Stewart AL, et al. Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization a randomized trial. *Med Care* 1999;37:5-14.
15. Kirby SE, Dennis SM, Bazeley P, et al. Activating patients with chronic disease for selfmanagement: comparison of self-managing patients with those managing by frequent readmissions to hospital. *Aust J Prim Health* 2013;19:198-206.
16. Kirby SE, Dennis SM, Bazeley P, et al. What distinguished clinicians who better support patients for chronic disease self-management? *Aust J Prim Health* 2012;18:220-7.
17. Hibbard JH, Mahoney E. Toward a theory of patient and consumer activation. *Patient Educ Couns* 2010;78:377-81.
18. Wickramasinghe LK, Schattner P, Hibbert MR, et al. Impact on diabetes management of General Practice Management Plans, Team Care Arrangements and reviews. *Med J Aust* 2013;199:261-5.
19. Goals for optimum diabetes management. Royal Australian College of General Practitioners; 2013. Available: [www.racgp.org.au/download/Documents/Guidelines/Diabetes/201107diabetesmanagement\\_targets.pdf](http://www.racgp.org.au/download/Documents/Guidelines/Diabetes/201107diabetesmanagement_targets.pdf) (accessed 2013 Nov. 18).
20. Greenfield C, Gilles M, Porter C, et al. It's not just about the HbA<sub>1c</sub>, Doc! Understanding the psychosocial is also important in managing diabetes? *Aust J Rural Health* 2011;19:15-9.
21. *Diabetes: the silent pandemic and its impact on Australia*. Diabetes Australia; 2012.
22. Ahola AJ, Groop PH. Barriers to self-management of diabetes. *Diabet Med* 2013;30:413-20.
23. Hinder S, Greenhalgh T. "This does my head in". Ethnographic study of self-management by people with diabetes. *BMC Health Serv Res* 2012;12:83.
24. Martin L, Leveritt MD, Desbrow B, et al. The self-perceived knowledge, skills and attitudes of Australian practice nurses in providing nutrition care to patients with chronic disease. *Fam Pract* 2014;31:201-8.
25. Kahn LS, Vest BM, Karl R, et al. Living with diabetes on Buffalo, New York's culturally diverse West Side. *Chronic Illn* 2013;9:43-56.
26. Protheroe J, Brooks H, Chew-Graham C, et al. 'Permission to participate?' A qualitative study of participation in patients from differing socio-economic backgrounds. *J Health Psychol* 2013; 18:1046-55.
27. Easton P, Entwistle VA, Williams B. How the stigma of low literacy can impair patient-professional spoken interactions and affect health: insights from a qualitative investigation. *BMC Health Serv Res* 2013;13:319.
28. Chambers DA, Glasgow RE, Stange KC. The dynamic sustainability framework: addressing the paradox of sustainment amid ongoing change. *Implement Sci* 2013;8:117.

## Vancomycin use in a rural hospital: a 3-year retrospective study

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reviewed.

**Introduction:** Urban centres often perform audits of vancomycin use as they face outbreaks of resistant organisms. We undertook this study to understand the indications and duration of intravenous vancomycin in a rural setting.

**Methods:** We conducted a retrospective chart audit for all patients who received intravenous vancomycin over a 3-year period at a rural hospital in northwestern Ontario.

**Results:** Vancomycin was used intravenously in 180 patients during the study period. It was used for short courses (median 3 d), and serum levels were below target 72% of the time.

**Conclusion:** High rates of invasive methicillin-resistant *Staphylococcus aureus* bacteremia and limited antibiotic choices in the field likely contributed to short courses of this antibiotic. Further study on clinical severity and antibiotic choice is needed. Additionally, weight-based dosing may result in target serum levels being achieved more frequently.

**Introduction :** Les centres urbains effectuent souvent des vérifications de l'utilisation de la vancomycine en raison du risque d'éclotions d'infections causées par des agents pathogènes résistants. Nous avons entrepris cette étude pour comprendre les indications et la durée de l'antibiothérapie par vancomycine intraveineuse en région rurale.

**Méthodes :** Nous avons procédé à une analyse rétrospective des dossiers de tous les patients qui ont reçu de la vancomycine intraveineuse sur une période de 3 ans dans un hôpital rural du Nord-Ouest de l'Ontario.

**Résultats :** La vancomycine a été administrée par voie intraveineuse chez 180 patients durant la période de l'étude. Elle a été utilisée pendant de courtes périodes (durée médiane 3 jours) et les taux sériques étaient inférieurs aux taux ciblés 72 % du temps.

**Conclusion :** Les taux élevés de bactériémie invasive à *Staphylococcus aureus* méthicillino-résistant et le choix limité d'antibiotiques sur le terrain ont probablement contribué à la brièveté des antibiothérapies avec cet agent. Des études plus approfondies sur la gravité des cas cliniques et le choix des antibiotiques s'imposent. De plus, l'établissement de la dose en fonction du poids corporel pourrait favoriser l'atteinte plus fréquente des taux sériques cibles.

### INTRODUCTION

Antibiotic stewardship is an increasing prerogative in all clinical settings. The discussion often focuses on tertiary care centres. However, rural hospitals face their own inherent issues concerning available antibiotics, diagnostic resources, and patient and geographical factors. In clinical practice, the initial choice of antibiotic is usually empiric. Also, in settings without an on-site

laboratory facility, there may be delays in receiving microbiological results, thereby requiring clinicians to use local bacterial prevalence to guide therapy.

In northwestern Ontario, there has been a dramatic increase in community-associated methicillin resistant *Staphylococcus aureus* (CA-MRSA) infections.<sup>1</sup> These infections, which are most often in skin or soft tissue, are almost universally susceptible to sulfamethoxazole-trimethoprim, clindamycin or doxycycline, but

more invasive infections of suspected MRSA are often treated with vancomycin.<sup>2</sup> We have documented a rise in life-threatening invasive CA-MRSA bacteremia, with cases occurring monthly in our region.<sup>3</sup> A 6-week course of vancomycin is the treatment of choice for these invasive infections, which can have a death rate as high as 23%.<sup>4-6</sup> Vancomycin is an effective antibiotic in certain life- and limb-threatening infections. However, its widespread use is implicated in an increasing incidence of vancomycin-resistant enterococcus,<sup>7</sup> and it has inherent toxicities.

The Meno Ya Win Health Centre in Sioux Lookout serves a primarily First Nations population of 28 000 people in northwestern Ontario. The population lives in 31 remote communities that are distributed across 385 000 km<sup>2</sup> (an area half the size of Ontario) and linked by fixed-wing air transportation and seasonal winter roads.<sup>8</sup> Communities typically receive their medical services from in-community nurses, with monthly physician visits. Poor housing, overcrowding, food and water insecurity, and a pandemic of intravenous drug use are contributing factors to high rates of illness due to infectious diseases.<sup>3</sup> Patients are often triaged “at a distance” by telephone communication between a community nurse and a Sioux Lookout physician. Antibiotic therapy can be started in the community by physician order and blood samples drawn but then shipped to the hospital for processing. Without road access, community nurses “medevac” patients in the case of serious illness. Ornge, which manages the air ambulance service, stocks only vancomycin and ceftriaxone as antibiotics. The Sioux Lookout Meno Ya Win Health Centre has an on-site microbiology laboratory, but until recently was not capable of on-site testing of vancomycin trough levels.

We undertook a 3-year retrospective clinical audit of our use of vancomycin to assess what clinical diagnoses were being treated with the antibiotic, to evaluate our dosing and monitoring, and to examine what eventual culture results were obtained to tailor the antibiotic regimen.

## METHODS

### Chart audit

A retrospective chart audit was conducted for all patients who received intravenous vancomycin at the Sioux Lookout Meno Ya Win Health Centre between June 1, 2010, and June 1, 2013. Audit information included patient demographics, clinical

diagnosis, and specific information regarding vancomycin dose and course. Concurrent antibiotics; monitoring parameters, including vancomycin trough level (before the fourth dose) and serum creatinine; culture results; sensitivities; and patient disposition were also included. Initial serum trough levels were the only ones recorded in our audit, because the research focus was on antibiotic initiation. Target vancomycin levels were deemed to be 15–20 mg/L. There are 3 common dosing methods for vancomycin for adult patients with normal renal function: 1) 1 g intravenously every 12 hours; 2) 15 mg/kg intravenously every 12 hours; 3) loading dose of 25–30 mg/kg, followed in 12 hours by one of the above doses every 12 hours. We typically used the first method.

### Data analysis

Data were collected in a Microsoft Excel spreadsheet and imported into IBM SPSS (version 21.0 for Windows) for statistical analysis. The data were analyzed descriptively, including means and standard deviations (SDs) for continuous data, and frequencies and percentages for categorical data. Analysis was done for the entire sample in subsets, as appropriate.

The research review committee of the Sioux Lookout Meno Ya Win Health Centre and the Lakehead University’s Research Ethics Board gave ethics approval.

## RESULTS

Between June 2010 and June 2013, intravenous vancomycin was ordered for 180 inpatients, all of whom were included in this chart audit. Half of the patients were male (50.8%). Patient age ranged from 8 days to 93 years, with a mean of 45.4 (SD 19.8) years. The frequency of  $\beta$ -lactam allergies was 15.0% (27 patients), with only one being a documented anaphylactic reaction.

Most of the infections treated with vancomycin were skin and soft tissue infections (34.4%), followed by bone and joint infections (Table 1).

### Prior and concomitant antibiotic use

Antibiotics had been used in the preceding 24 hours in 43.2% of patients. The most commonly used antibiotics were ceftriaxone (19.2%) and clindamycin (11.4%). Another antibiotic was used concomitantly with vancomycin in 77.6% of cases, most commonly ceftriaxone (33.3% of total cases).

## Dosing and length of treatment

In the initial dosing of the 104 adults with normal renal function, the vancomycin dose was empiric in 77.6% of cases, with 1 g given intravenously every 12 hours. Weight was recorded or estimated 43.3% of the time (78/180 patients). Weight-based dosing in adults occurred in 27 patients but was not statistically associated with achieving the target range of vancomycin levels (3 patients had levels within the target range, 8 had levels below the target range and 3 had levels above the target range) because many of these patients did not have vancomycin levels listed in their charts (13/27). Serum creatinine values were recorded in most charts (89.4%, 161/180), and 13.7% (22/161) had a degree of renal failure (estimated glomerular filtration rate < 90 mL/min).

The duration of treatment with vancomycin ranged from 1 to 90 (mean 6.59, SD 10.16) days. Data were skewed because 1 patient received treatment for 90 days; the median length of treatment was 3 (interquartile range 2–7) days. For skin and soft tissue infections, half of the patients took vancomycin for 3 days or less (Fig. 1). Patients transferred to other facilities were not counted.

## Drug monitoring

Serum vancomycin trough levels were reported for 60.0% (108/180) of patients receiving intravenous vancomycin. The levels of 13.3% (24/180) of patients could not be accessed because they had already discontinued the medication before the timing of the fourth dose. Of the patients with trough levels, only 12.0% (13/108) of those levels fell within the ideal target range, whereas 72.2% (78/108) were suboptimal. There was no record of trough levels in the chart in 30.8% (48/156) of patients who received at least 4 doses (Table 2).

## Culture results

Of patients given vancomycin, 65.6% had blood cultures done. Blood cultures were performed for all cases of endocarditis and most cases of respiratory and central nervous system infection. Blood cultures were not done for 53.2% of cases of skin and soft tissue infection (Table 3).

In the 35 patients with positive results on blood culture, methicillin-resistant *S. aureus* (MRSA) was grown with a frequency of 31.4% (11/35), methicillin-susceptible *S. aureus* was found in

14.3% of cases (5/35), and group A *Streptococcus* in 20.0% of cases (7/35) (Tables 3 and 4).

More than half (58.3%) of the patients had a nonblood culture. These cultures were positive 62% of the time, showing a greater frequency of a positive culture result from a source other than blood (30%) (Table 5).

Culture results were stratified by syndrome into the following categories: skin and soft tissue, bone and joint, diabetic foot, respiratory, endocarditis, central nervous system and other infections.

**Table 1: Suspected infection as indication for vancomycin, n = 180**

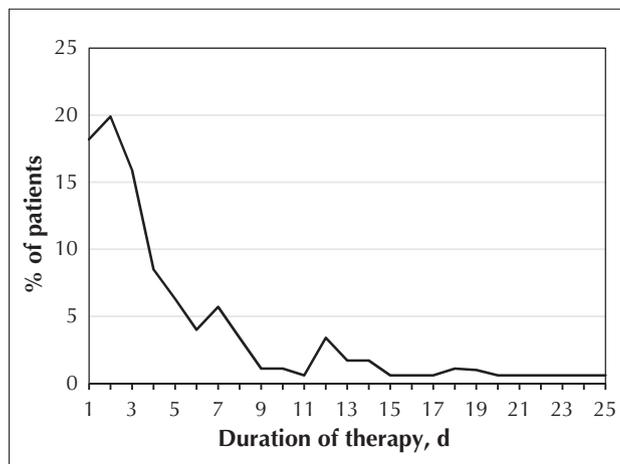
Infection site	No. (%) of patients
Skin and soft tissue*	62 (34.4)
Bone and joint†	30 (16.7)
Respiratory	41 (22.8)
Diabetic foot	18 (10.0)
Central nervous system‡	6 (3.3)
Endocarditis	6 (3.3)
Other§	17 (9.4)

\*Included cellulitis, abscess and necrotizing fasciitis.

†Included osteomyelitis and septic arthritis.

‡Included meningitis and suspected brain abscess.

§Included gastrointestinal and genitourinary infections, febrile neutropenia, dialysis line infections, bacteremia without a known source, septic otitis media, pancreatitis and some postoperative treatment.



**Fig. 1. Duration of therapy in 180 inpatients given intravenous vancomycin.**

**Table 2: Measured trough levels, n = 108\***

Initial trough level, mg/L	No. (%) of patients
< 5	16 (14.8)
5–10	44 (40.7)
10.1–15	18 (16.7)
15.1–20 (target range)	13 (12.0)
> 20	17 (15.7)

\*Levels were not measured in 72 patients.

There was considerable variability in the frequency of cultures performed, including 31.7% of respiratory cultures, likely reflecting the limited utility of sputum cultures in a non-intensive care setting. In suspected infections of the central nervous system, cerebrospinal fluid was sent for culture in 83.3% of cases; 1 patient with known lung cancer and bone metastases was transferred with headache for advanced imaging before lumbar punc-

ture in a tertiary care centre. A substantial number of swabs were done for diabetic foot infections, all of which showed positive results for a wide variety of potential pathogens. This may demonstrate colonization rather than true infection due to these organisms.

We had no reported cases of resistance to vancomycin for gram-positive organisms from any source in these 180 patients.

**Table 3: Results of blood cultures, by site of infection**

Infection site	% (no.) of patients		
	Blood culture performed	Positive result	Most frequent culture isolates
Bone and joint	60.0 (18/30)	44.4 (8/18)	MSSA (2/8)
Skin and soft tissue	46.8 (29/62)	24.1 (7/29)	MRSA, group A <i>Streptococcus</i> (3/7 each)
Respiratory	82.9 (34/41)	26.5 (9/34)	MRSA (4/9)
Diabetic foot	66.7 (12/18)	25.0 (3/12)	MRSA, viridans streptococci, group B <i>Streptococcus</i> (1/3 each)
Endocarditis	100.0 (6/6)	33.3 (2/6)	MSSA, <i>Streptococcus salivarius</i> (1/2 each)
Central nervous system	83.3 (5/6)	33.3 (2/6)	MSSA, group A <i>Streptococcus</i> (1/2 each)
Other	76.5 (13/17)	30.8 (4/13)	—
Total	65.6 (117/180)	29.7 (35/118)	—

MRSA = methicillin-resistant *Staphylococcus aureus*; MSSA = methicillin-susceptible *Staphylococcus aureus*.

**Table 4: Bacterial isolates from positive blood cultures, n = 35**

Bacteria isolated	% (no.) of patients
MRSA	31.4 (11)
MSSA	14.3 (5)
Group A <i>Streptococcus</i>	20.0 (7)
<i>Streptococcus viridans</i>	8.6 (3)
<i>Streptococcus pneumoniae</i>	8.6 (3)
Group B <i>Streptococcus</i>	2.9 (1)
Gram-negative bacteria	5.7 (2)
<i>Bacillus</i> species (likely contaminant)	2.9 (1)
Coagulase-negative <i>Staphylococcus</i>	8.6 (3)

MRSA = methicillin-resistant *Staphylococcus aureus*; MSSA = methicillin-susceptible *Staphylococcus aureus*.

**Table 5: Results of nonblood cultures, by site of infection**

Infection site	% (no.) of patients		
	Culture performed	Positive result	Most frequent culture isolate(s)
Bone and joint	76.7 (23/30)	65.2 (15/23, 3 mixed)	MRSA (7/18)
Skin and soft tissue	61.3 (38/62)	60.5 (23/38, 9 mixed)	MRSA (14/32), group A <i>Streptococcus</i> (11/32)
Respiratory	31.7 (13/41)	27.3 (3/11 sputum), 0.0 (0/2 pleural fluid)	1/3 each MRSA, MSSA and <i>Haemophilus influenzae</i>
Diabetic foot	83.3 (15/18)	100.0 (15/15, 6 mixed)	Gram-negative (7/21), MRSA (6/21)
Endocarditis	0.0 (0/6)	NA	—
Central nervous system	83.3 (5/6)	60.0 (3/5)	1/3 each MSSA, group A <i>Streptococcus</i> , <i>Bacillus</i>
Other	64.7 (11/17)	36.4 (4/11)	Gram-negative (2/4)
Total	58.3 (105/180)	63.0 (66/107)	—

MRSA = methicillin-resistant *Staphylococcus aureus*; MSSA = methicillin-susceptible *Staphylococcus aureus*; NA = not applicable.

## Disposition

Most patients (73.2%) were eventually discharged home, and 20.8% were transferred to a facility with an intensive care unit. Three patients died of their infection: a neonate with invasive group A streptococcal meningitis, a 19-year-old with pneumonia without positive cultures and a 73-year-old with osteomyelitis who later had respiratory failure secondary to aspiration pneumonia. Three patients with bone and joint infections required amputations of the infected site.

After culture results were returned, vancomycin was discontinued in 28.4% of cases. Of 101 patients with a positive result on blood or tissue culture, excluding those who died or were transferred, 38.2% of patients were stepped down to another antibiotic and 61.8% continued taking vancomycin. Severity of infection was not assessed in our study, so it is unknown whether daptomycin or a more commonly used antibiotic such as sulfamethoxazole–trimethoprim, tetracycline or clindamycin would have been acceptable alternatives. The high incidence of MRSA in tissue cultures (42.4% [28/66]) demonstrates the need for one of the above therapies, including vancomycin, where antibiotics were clinically warranted.

## Toxicity

Nephrotoxicity (a serum creatinine increase of > 50%) occurred in 3.9% of patients (7/180). Of those 7 patients, 3 had trough levels above the therapeutic range (> 20 mg/L), 2 had levels below the range and for 2 patients the trough levels were unknown. The initial mean dose for patients who had nephrotoxicity was 1021.43 (SD 107.46) mg. One patient had a possible case of red man syndrome (a vancomycin-related dermatologic reaction requiring a slowing of the infusion rate). There were no reports of ototoxicity found in this audit. There was 1 case of possible vancomycin-induced neutropenia; the patient's medication was then changed to cefazolin for coverage of postoperative endocarditis following pacemaker insertion.

## DISCUSSION

Four main findings arise from this clinical audit of vancomycin use: below-target dosing, short duration of use, inadequate monitoring of serum trough levels and blood cultures done for 65.6% of cases with vancomycin use.

## Dosing

Serum levels were subtherapeutic 72% of the time in our audit.

Initial doses should be based on actual body weight, even for obese patients, to achieve target therapeutic concentrations. Weight was recorded or estimated in only 43.3% of patients. This is not a standard procedure in our hospital, and it provides an additional barrier to ordering a weight-based dose. The traditional dose of 1 g every 12 hours is likely inadequate for an adult patient with normal renal function and serious MRSA infections. This has been reinforced by several large American studies.<sup>9–11</sup>

Even use of a larger loading dose (25–30 mg/kg) appears to be safe and potentially leads to faster achievement of therapeutic levels, according to a guideline by the Infectious Diseases Society of America (IDSA).<sup>10</sup> There are no data to support that this improves clinical outcomes, but this might be considered for seriously ill patients (Grade B recommendation: moderate evidence to support use).<sup>10</sup> Vancomycin is primarily excreted unchanged in the urine; therefore, initial adjustments of dose (or time) intervals must be made for renal insufficiency.<sup>12–14</sup> For patients with serious MRSA infections, vancomycin serum trough concentrations of 15–20 mg/L are recommended, and this is the target range in our facility. If the strain has a higher resistance, measured as a minimum inhibitory concentration of 2 or greater, then higher doses are needed, which increases the risk of toxicity. This may prompt the use of an alternate antibiotic such as linezolid or daptomycin.<sup>9</sup>

## Duration of use

Ideally, antibiotic selection should be tailored based on culture results. Exposing infectious organisms to multiple inappropriate antimicrobial agents may increase the potential development of resistance. In this audit, those with severe skin and soft tissue infections were commonly given vancomycin for several days, and then switched to another agent. This was sometimes done before serum vancomycin trough levels were assessed. This practice may be a function of the availability of vancomycin in northern nursing stations and medical transportation services, or of physician preference. Initial patient triaging is often done at a distance, and patient transportation can take hours or days depending on weather, perceived acuity and transportation availability. Our clinical setting also has high rates of CA-MRSA, including cases of life-threatening invasive bacteremia,<sup>1,3</sup> and

this finding will have to be balanced with use of very short courses of vancomycin identified in this audit.

In cases of sepsis or severe skin and soft tissue infection, a short course of vancomycin, pending culture results, might be the best practice in our setting. The audit did not rate clinical severity due to the retrospective nature of the study, and it would be prudent to be aware of this usage pattern. More research will be needed to understand whether vancomycin is the best initial choice and why it is often stopped after a short course. It is not clear whether the initial choice of antibiotic reflects available drugs at the nursing station and the transportation service, and the distant “over-the-phone” assessment, which is a fact of life in our region. Vancomycin requires several half-lives to reach therapeutic levels when dosed in the manner most commonly seen in this audit; such practice may lead to the development of resistance without establishing effective serum levels and duration of treatment.

### Monitoring

Monitoring of vancomycin has a dual purpose in guiding maintenance dosing to achieve therapeutic serum concentrations and assessing the risk of nephrotoxicity. According to the IDSA guideline, trough levels of greater than 10 mg/L are needed to prevent resistance, whereas a level of 15–20 mg/L is targeted for treatment of pathogens with complicated infections, including endocarditis, osteomyelitis, meningitis and hospital-acquired pneumonia.<sup>10</sup> Samples should be drawn to assess trough concentrations before the fourth dose, when steady state levels are likely achieved. Frequency of trough-level testing depends on the patient’s status and clinical course; more frequent monitoring is recommended for patients with fluctuating renal function. For prolonged courses, vancomycin levels should be checked weekly in hemodynamically stable patients.<sup>10,12</sup> Available evidence does not support the monitoring of peak serum vancomycin concentrations.<sup>10</sup> Monitoring of vancomycin to prevent ototoxicity is not supported by the literature because this toxicity is often due to concomitant use of other ototoxic medications (particularly aminoglycosides) and does not correlate with serum concentrations of vancomycin.<sup>10</sup> Our audit found trough levels missing in 40% of the charts. Trough measurement is particularly important in our population, because we do see high rates of renal failure,<sup>15</sup> even though we saw very little nephrotoxicity in this audit. The missing trough levels are partly explained by the antibiotic often being stopped early, but we will

need to be more focused on appropriate trough levels particularly if we move to increased dosing. Interestingly, an IDSA guideline from 2011<sup>16</sup> allowed that serum levels may not be needed in stable patients who are given the 1 g every 12 hours. Because we had a majority of patients with initial trough levels below the target range and our patient population already has a high rate of renal failure, attention to monitoring serum levels needs to continue in our facility.

### Cultures

We have high rates of skin and soft tissue infections with CA-MRSA in our region<sup>1</sup> as well as increasing rates of life-threatening invasive disease. Of the positive blood cultures, 31.4% (11/35) were MRSA (Table 4), as were 40.9% (27/66) of the positive tissue cultures (Table 5). Because bacteremia from CA-MRSA is often secondary to soft tissue or bone infections, serological surveillance with blood cultures is prudent and should likely be commonplace if vancomycin is initiated in our population. Our audit noted a 65.6% rate of clinicians ordering blood cultures concomitant with vancomycin institution. As the gravity of the diagnosis increased, blood culture results were more likely to be recorded in the charts (i.e., 100% of endocarditis cases and 82% of both respiratory and central nervous system infections). Gathering appropriate deep swabs, rather than superficial swabs, after debriding wounds also should become routine practice.

### Comparison with other studies

Data are lacking for comparison with other vancomycin audits conducted in rural hospitals. Urban-based audits have focused on clinical indications to use vancomycin. A nearby centre demonstrated 60% “inappropriate vancomycin use” most often associated with empiric use for treatment of sepsis.<sup>17</sup> Our setting differs from a tertiary care centre’s use of vancomycin audits, where outbreaks of both vancomycin-resistant enterococcus and health care-associated methicillin-resistant *S. aureus* are major concerns.

### Limitations

Our communities and hospital are now experiencing a shifting pattern of MRSA infections with very high rates of CA-MRSA, for which alternative antibiotics are available.<sup>2</sup> The exception is the

recently rising incidence of invasive CA-MRSA bacteremias for which a prolonged (2–6 wk) course of intravenous vancomycin is one of the recommended choices of treatments. Our data set was collected before the increased incidence of CA-MRSA bacteremias. We suspect that longer courses of vancomycin will become increasingly common in future audits.

The audit occurred during the introduction of electronic medical laboratory reporting. Although paper charts were considered to be complete, the transition may have left some data off the paper charts. To the best of our ability, we checked electronic charts as well. Additionally, serum vancomycin laboratory samples at the time of the audit needed to be shipped to another centre, which potentially affected the timing and integrity of the results.

Because the regional air ambulance service stocks only vancomycin and ceftriaxone, these antibiotics might be favoured as initial antibiotic choices for patients with sepsis being transported from remote communities. This may also be a factor in the audit findings of early cessation of this antibiotic, once patients were triaged and reassessed on admission to hospital. Pharmaceutical limitations in northern nursing stations and air ambulance presently also preclude the choice of newer (and less cost-effective) agents such as linezolid or daptomycin (also effective against MRSA) as agents of first choice where they may be needed.<sup>18</sup>

## CONCLUSION

Most courses of vancomycin were brief, and more work is required to assess the appropriateness of vancomycin use and duration of therapy in rural and remote settings. In a region with increasing rates of invasive CA-MRSA bacteremia, we will need to be familiar with vancomycin's indication, dosing, monitoring and toxicity. Our antibiotic use and infectious disease surveillance can also inform the appropriateness of antibiotic supplies in remote communities and regional air ambulance services for northwestern Ontario. Our results show areas in which further education can be done in our hospital to improve dosing strategies and monitoring, and to encourage reflection on antibiotic choices. Empiric dosing may deliver subtherapeutic serum levels in our population, and weight-based dosing may be more appropriate.

Competing interests: None declared.

## REFERENCES

1. Muileboom J, Hamilton M, Parent K, et al. Community-associated methicillin resistant *Staphylococcus aureus* in northwest Ontario: a five year report of incidence and antibiotic resistance. *Can J Infect Dis Med Microbiol* 2013;24:e42-4.
2. Muileboom J, Hamilton M, Kelly L. Changing face of cellulitis and MRSA in rural Canada: a clinical update. *Can J Rural Med* 2013; 18:137-9.
3. Kirlaw M, Rea S, Schroeter A, et al. Invasive CA-MRSA in northwestern Ontario: a 2-year prospective study. *Can J Rural Med* 2014; 19:99-102.
4. Cosgrove SE, Sakoulas G, Perencevich EN, et al. Comparison of mortality associated with methicillin-resistant and methicillin-susceptible *Staphylococcus aureus* bacteremia: a meta-analysis. *Clin Infect Dis* 2003;36:53-9.
5. Golding G, Simor A, Pelude L, et al. Characterization of methicillin-resistant *Staphylococcus aureus* (MRSA) in patients with bloodstream infection (BSI) identified by the Canadian Nosocomial Infection Surveillance Program (CNISP), 2008–2010. Available: <https://idsa.confex.com/idsa/2013/webprogram/Paper40471.html> (accessed 2014 Mar. 6).
6. Kaye KS, Anderson D, Choi Y, et al. The deadly toll of invasive methicillin-resistant *Staphylococcus aureus* infection in community hospitals. *Clin Infect Dis* 2008;46:1568-77.
7. Adam HJ, Louie L, Watt C, et al. Detection and characterization of heterogeneous vancomycin-intermediate *Staphylococcus aureus* isolates in Canada: results from the Canadian Nosocomial Infection Surveillance Program, 1995–2006. *Antimicrob Agents Chemother* 2010;54:945-9.
8. Walker R, Cromarty H, Kelly L, et al. Achieving cultural safety in aboriginal health services: implementation of a cross-cultural safety model in a hospital setting. *Diversity in Health and Care* 2009;6:11-22.
9. Chua K, Howden BP. Treating gram-positive infections: vancomycin update and the whys, wherefores and evidence base for continuous infusion of anti-gram-positive antibiotics. *Curr Opin Infect Dis* 2009;22:525-34.
10. Rybak MJ, Lomaestro B, Rotschaher J, et al. Vancomycin therapeutic guidelines: a summary of consensus recommendations from the Infectious Diseases Society of America, the American Society of Health-System Pharmacists, and the Society of Infectious Diseases Pharmacists. *Clin Infect Dis* 2009;49:325-7.
11. Cataldo MA, Tacconelli E, Grilli E, et al. Continuous versus intermittent infusion of vancomycin for the treatment of gram-positive infections: systematic review and meta-analysis. *J Antimicrob Chemother* 2012;67:17-24.
12. Schilling A, Neuner E, Rehm SJ. Vancomycin: a 50-something-year-old antibiotic we still don't understand. *Cleve Clin J Med* 2011;78:465-71.
13. Elyasi S, Khalili H, Dashti-Khavidaki S, et al. Vancomycin-induced nephrotoxicity: mechanism, incidence, risk factors and special populations. A literature review. *Eur J Clin Pharmacol* 2012;68:1243-55.
14. Gupta A, Biyani M, Khaira A. Vancomycin nephrotoxicity: myths and facts. *Neth J Med* 2011;69:379-83.
15. North West LHIN. Health services blueprint: building out future. Final report. Available: [www.northwestlhin.on.ca/uploadedFiles/NW%20LHIN\\_Health%20Services%20Blueprint\\_Building%20Our%20Future%20-%20Final%20Report.pdf](http://www.northwestlhin.on.ca/uploadedFiles/NW%20LHIN_Health%20Services%20Blueprint_Building%20Our%20Future%20-%20Final%20Report.pdf) (accessed 2015 Jan. 27).
16. Liu C, Bayer A, Cosgrove SE, et al. Clinical practice guidelines by the Infectious Diseases Society of America for the treatment of methicillin-resistant *Staphylococcus aureus* infections in adults and children. *Clin Infect Dis* 2011;52:e18-55.
17. Markowsky M, Smith K, Ariano R, et al. An assessment of vancomycin use in 2 tertiary care hospitals. *Can J Hosp Pharm* 2004; 57:150-7.
18. Mandell LA, Wunderink R, Anzueto A, et al. Infectious Diseases Society of America/American Thoracic Society consensus guidelines on the management of community-acquired pneumonia in adults. *Clin Infect Dis* 2007;44:S27-72.

## Country cardiograms case 53

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This article has been peer  
reviewed.

**A** 73-year-old man presents to a rural emergency department with chest pain. Figure 1 shows the initial electrocardiogram (ECG). After this ECG is obtained, a change is noted on the monitor screen, and a second tracing, shown in Figure 2,

is taken 1 minute later. What are the diagnoses?

**For the answer, see page 71.**

**Competing interests:** None declared.

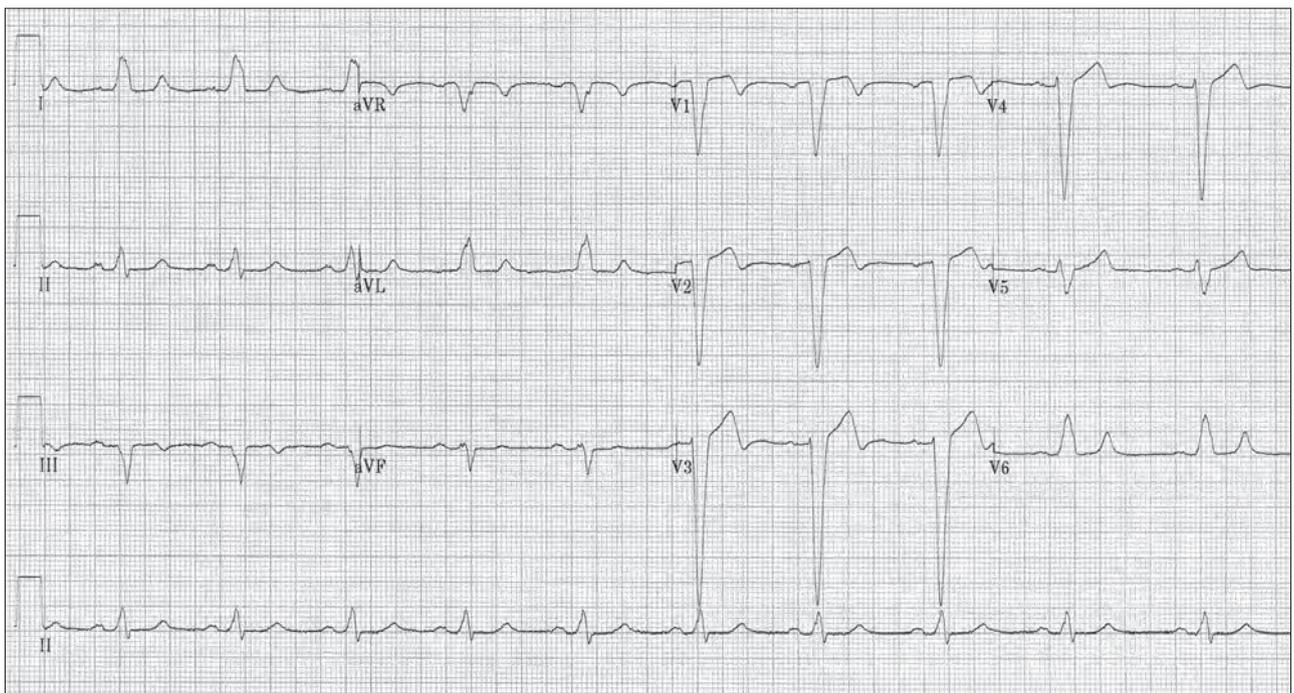


Fig. 1. Initial electrocardiogram in a 73-year-old man with chest pain.

“Country cardiograms” is a regular feature of *CJRM*. We present an electrocardiogram and discuss the case in a rural context. Please submit cases to Suzanne Kingsmill, *CJRM*, 45 Overlea Blvd., P.O. Box 22015, Toronto ON M4H 1N9; cjrm@cjrm.net.

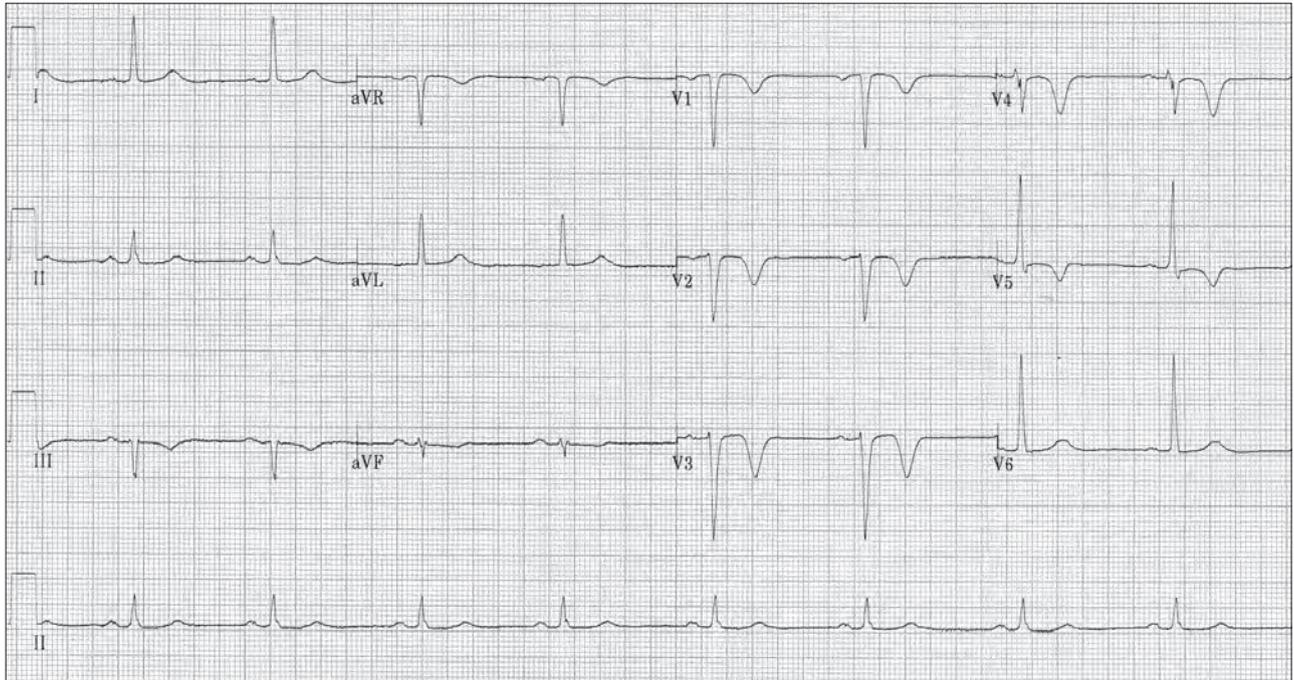


Fig. 2. A second electrocardiogram, taken 1 minute after a change is noted on the monitor screen.

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## The occasional posterior hip dislocation reduction

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reviewed.*

### INTRODUCTION

Traumatic dislocation of the hip, although a rare diagnosis for most of us, constitutes a true orthopedic emergency.<sup>1–3</sup> Closed reduction of a posterior hip dislocation requires the ability to perform procedural sedation, teamwork, and a knowledge of the proper method of the application of judicious force to the dislocated joint. Treatment of this dislocation is further complicated by the following factors:<sup>1,2</sup>

- the patient may have other, more serious, injuries to the thorax, abdomen or pelvis that require immediate attention;
- the dislocation should ideally be reduced within 6–8 hours to prevent the complication of avascular necrosis of the femoral head;
- a fair degree of force may be necessary to effect successful reduction, especially in a large patient.

Ideally, the patient would be transferred to an institution with full anesthesiology and orthopedic services, but when this is not possible or desirable within the 6–8 hour time frame, responsibility for successful reduction falls on the rural physician.

### ANATOMY AND PATHOPHYSIOLOGY

The hip is a ball-and-socket joint located deep within the body, where a strong network of ligaments and muscles render it quite stable. A dislocated hip therefore serves as a marker of a large amount of force having been applied to the body. Hence, there is a risk of concurrent — and possibly more

life-threatening — injury to the thorax, abdomen or pelvis.<sup>2,3</sup>

On the other hand, concurrent injury elsewhere (found in 71% of hip dislocations in one study<sup>3</sup>) may mask this injury from medical staff. It has been recommended to screen for this injury in severe trauma;<sup>1,3</sup> a full range-of-motion of the hip will rule it out.

Hip dislocation is most commonly posterior (80%–95% of cases), with the “ball” displaced posterior to the acetabulum, where it may injure the sciatic nerve.<sup>2</sup> About two-thirds of cases are said to be caused by motor vehicle crashes, the mechanism being the flexed and adducted femur striking against the dashboard, driving the femoral head backward. Most of the other cases are caused by a fall from a height (e.g., a ladder), but elderly patients and patients in the weeks following hip arthroplasty may dislocate the joint after more minimal trauma, such as a fall out of bed. The injury has also been reported in extreme sports, such as snowboarding.<sup>1,4,5</sup>

Most of the remaining 5%–20% of dislocations are anterior. This article will concern itself with the more common posterior dislocation.

### SIGNS AND SYMPTOMS

Unless the patient is obtunded, or distracted by other severe injuries, this injury is very painful. The leg will be foreshortened, in a position of hip flexion, adduction and internal rotation (Fig. 1). Note that this is the opposite of the leg position of a patient with a hip fracture.

The sciatic nerve passes posterior to the hip, and may be injured in up

to 10% of cases of posterior hip dislocation, with an even higher rate when there is a fracture of the acetabulum. The possibility of sciatic nerve injury should be checked for — and documented — in all cases by checking for impairment of dorsiflexion of the ankle and toes. Vascular impairment is uncommon, but injury of the femoral artery can occur in the less common anterior dislocation.<sup>6</sup>

## DIAGNOSIS

As mentioned, the diagnosis may be missed if there are concomitant life-threatening injuries or fractures of the ipsilateral leg.

The injury is almost always apparent on the anteroposterior view of a pelvis radiograph. The dislocated femoral head will appear outside and just superior to the acetabulum. The dislocated femoral head will also appear to be smaller than the contralateral femoral head, because it is posterior and thus farther away from the origin of the radiographic beam<sup>2</sup> (Fig. 2).



Fig. 1. The typical appearance of a patient with a posterior dislocation of the right hip.



Fig. 2. Radiograph of a dislocated left hip.

There is a high rate of associated acetabular fracture in posterior hip dislocation (up to 81%).<sup>2</sup> However, as long as there is no sciatic nerve deficit, neither a fracture of the acetabulum nor an isolated, nondisplaced femoral head fracture fundamentally changes the initial, closed reduction technique (see below).

## INDICATIONS AND CONTRAINDICATIONS FOR CLOSED REDUCTION

Closed reduction may be attempted for a posterior hip dislocation, with or without a neurologic deficit, as long as no associated fracture is present. Again, if there is an acetabular fracture, or an isolated femoral head fracture, closed reduction may still be attempted, but only if there is no accompanying neurologic deficit.<sup>1,2</sup>

Open reduction is indicated if any of the following are present:

- a posterior hip dislocation with a fracture of the acetabulum or of the femoral head and a neurologic deficit: a bony fragment may be pressing on the sciatic nerve;
- a fracture of the femur or femoral neck, where traction will not be possible;
- an open dislocation.

These patients will need urgent referral for an open reduction. If such is not possible due to weather, distance or other logistical factors, an orthopedic surgeon might be consulted by telephone to assess whether an attempt at closed reduction to decompress the sciatic nerve is indicated.

## TECHNIQUE OF CLOSED REDUCTION

Many techniques have been described to reduce this dislocation, some dating back to at least the 19th century. Each method has its own advantages, disadvantages and advocates.

All have in common the basic principle of reduction of a dislocation: manual in-line longitudinal traction, often supplemented with movement in a direction opposite to the displacement — in this case, external rotation because the limb is internally rotated. The methods differ mostly in the position of the physician with respect to how he or she applies longitudinal traction to the femur.

This article will describe 4 methods: the Stimson or gravity method, the Bigelow method, the Captain Morgan method<sup>4</sup> and the Whistler method.<sup>7</sup>

Procedural sedation is generally necessary. Thus, at least 3 people will be required: a physician

to perform the reduction, an assistant to stabilize the patient, and a physician or nurse to supervise the procedural sedation.

In common to all methods:

1. Ensure that the patient does not have a concomitant, more serious injury due to the sustained trauma.
2. Check for, and document, any prereduction sciatic nerve deficit (see “Indications and contraindications for closed reduction”).
3. Assemble your team and ensure that all understand the plan of action.
4. Assemble the equipment you will need:
  - oxygen supply and bag-valve mask device
  - airway cart with rescue airway equipment
  - suction apparatus with suction tubing and suction catheter
  - oxygen saturation monitor, plus full electrocardiography and blood pressure monitoring if indicated
  - intravenous catheter
  - your preferred drugs for procedural sedation
  - 0.9% saline solution for “flushes” and treatment of hypotension
5. As always, the best anxiolytic is careful explanation by the physician (Fig. 3).
6. Perform procedural sedation as per your usual technique.

### The Stimson or gravity method

This method has the advantage of simplicity and the use of gravity, in addition to physician-applied traction, to achieve reduction. Although the Stimson method has been described as being of “historical interest only,”<sup>2</sup> it may be reasonable in a rural area, especially if the patient is very large or the physician is small. The main disadvantage is that the patient is in the prone position and very difficult to monitor under procedural sedation (Fig. 4).

Procedure (after steps 1–6 as above):

7. Position the patient prone on the table with the hips flexed and the legs hanging over the edge of the table.
8. The assistant presses down over the sacrum and buttock to stabilize the pelvis and prevent the patient falling off the table.
9. The physician keeps the knee flexed to 90°. In conjunction with gravity, the physician then applies steady downward traction to the leg.
10. Gentle rotary motion of the lower limb with the other hand may assist in the reduction<sup>8</sup> (Fig. 4).

### The Bigelow method

Procedure<sup>8</sup> (after steps 1–6 as above):

7. Place the patient in a supine position, with the stretcher or table lowered to about the waist level of the physician.
8. The assistant applies downward bilateral pressure on the anterior superior iliac spine (Figs. 5 and 6) to provide countertraction. Alternatively, the patient may be stabilized by tying the pelvis to the table or gurney with a sheet.

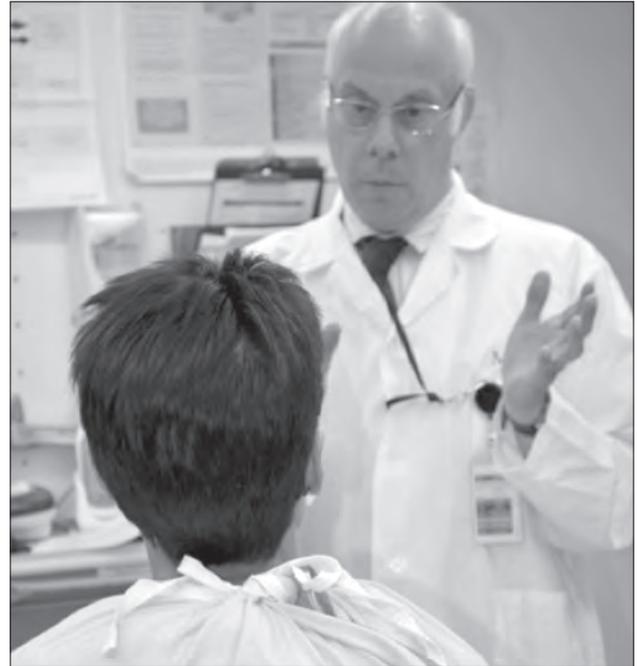


Fig. 3. The best anxiolytic is careful explanation by the physician.

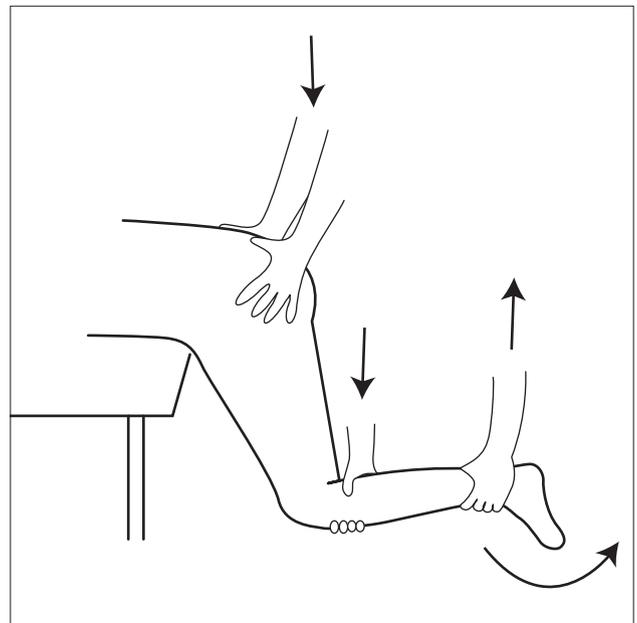


Fig. 4. The Stimson or gravity method.<sup>2</sup>

9. The physician then applies steady longitudinal traction in the line of the deformity, using leverage from his or her arms and back (Fig. 6). While traction is maintained, the femoral head is levered into the acetabulum by abduction, external rotation and extension of the hip.<sup>6</sup>

10. Reduction may be eased by gentle abduction, external rotation and extension of the hip, while traction is maintained.

This method may be difficult if the patient is large or the physician small (or both). The Allis method of reduction is similar, but in this method the physician stands on the gurney or stretcher, straddles the patient and applies longitudinal traction. This method exposes the physician to a risk of a fall or even overturning the gurney, which might not be able to support the weight of 2 people.

Two other methods are available, in which the physician can use the principle of leverage and multiplication of force, with his or her knee (the Captain Morgan method) or arm (the Whistler method) as the fulcrum.



Fig. 5. Stabilizing the pelvis.

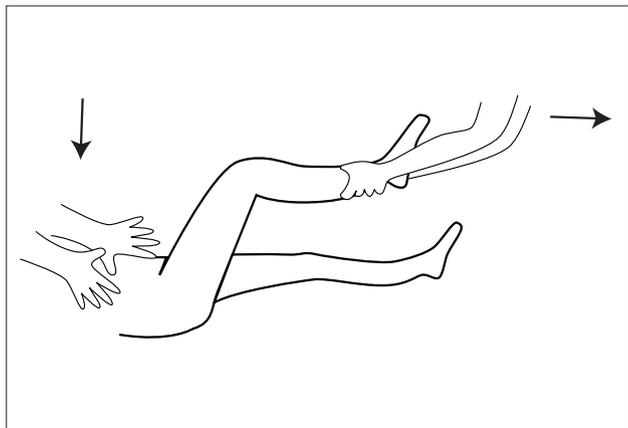


Fig. 6. The Bigelow method of reduction.

### The Captain Morgan method

This method was described in 2011 by Hendey and Avila,<sup>4</sup> who reported a 92% success rate, albeit in a small group of 13 patients. It is so-named because the physician places his or her knee in a position similar to that of the pirate pictured with his left knee up on a rum barrel on the label of a well-known rum brand (Fig. 7).

This method has the advantage of safety for the practitioner — the physician is in a stable position



Fig. 7. The Captain Morgan position.



Fig. 8. Physician's flexed knee placed under the patient's knee on the affected side.

on the floor — and also requires less arm strength to accomplish.<sup>4</sup>

Procedure (after steps 1–6 as above):

7. The patient is placed supine on the floor on a stretcher or backboard, and then secured with a sheet or strap, ensuring safe footing for the physician.



Fig. 9. The physician can apply additional anterior traction by plantar-flexing his or her foot.

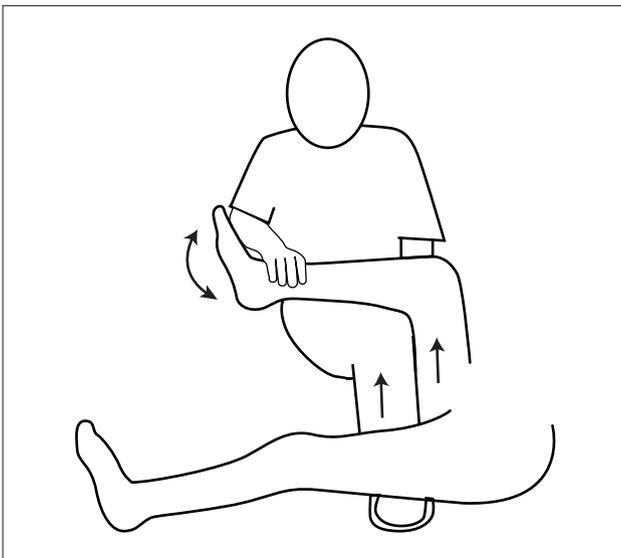


Fig. 10. The Captain Morgan method.

8. The physician places his or her flexed knee under the patient's upper leg on the affected side (Fig. 8).

9. In this method, it is important to keep the patient's knee flexed to 90° by using one hand to hold the ankle down and placing the other hand behind the knee.

10. Anterior-directed traction is applied by the combination of the physician raising his or her hand that is behind the patient's knee, and, at the same time, plantar-flexing his or her foot (i.e., standing on tiptoes) (Figs. 9 and 10).

11. As with the other methods, reduction may be facilitated by gentle internal–external rotation (“rocking”) of the ankle.

### The Whistler technique

Developed in Whistler, BC, this technique uses the same basic principle as the Captain Morgan method, but instead uses the physician's forearm under the patient's knee as the fulcrum, instead of the physician's knee.<sup>2,7</sup>

Procedure (after steps 1–6 as above):

7. The patient lies supine.

8. The unaffected leg is flexed at the knee, bringing the foot on the unaffected side as close to the patient's buttock as possible, thus raising the knee on that side as high as possible. An assistant can stabilize the pelvis (Fig. 5) or the patient can be secured to the bed with a sheet or a strap.

9. The physician stands at the same side of the bed as the dislocated hip, his or her back toward the patient's head, and body perpendicular to the bed. The physician's forearm is placed under the



Fig. 11. The Whistler technique.

- patient's knee on the dislocated side, and the physician's hand on the opposite knee (Fig. 11).
10. The physician then grasps the ankle or lower leg of the affected side with the other hand.
  11. Using the forearm as a fulcrum under the knee and the patient's leg as the lever, the physician raises the patient's knee on the affected side until the hip is flexed to 90°, thus putting traction along the femur (Fig. 11).
  12. The process may be aided by internal and external rotation of the affected leg

Upward movement of the physician's forearm is key here. This may be done either by using the physician's shoulder muscles, or by positioning the gurney or stretcher so that the physician's knees are bent. In the latter case, upward movement of the forearm can be effected by the physician extending his or her knees, using the more powerful leg musculature.

## GUIDELINES FOR REFERRAL

The patient should be referred for possible open reduction if 2 or 3 attempts at closed reduction are unsuccessful. Too many attempts at reduction risk damage to the sciatic nerve or avascular necrosis of the femoral head.<sup>2,3</sup>

Online videos of these methods are available, and it may be reasonable to review one before the attempt.<sup>9-11</sup>

## POSTREDUCTION CARE

A successful reduction may be felt and heard. It should be confirmed by full passive range of motion, while the patient is still sedated, keeping in mind any other fractures or injuries that the patient may have sustained.<sup>2</sup>

After tentative reduction, a recheck should be done for sciatic nerve injury and the leg stabilized in the extended position by pillows and sandbags, as well as postreduction radiographs obtained.<sup>2</sup>

The patient should rest in bed until the pain is relieved, at which time weight-bearing can begin, usually in 2–10 weeks.<sup>3</sup>

One long-term study reported a 9.6% risk of avascular necrosis of the femoral head and 16.1% incidence of late osteoarthritis of the hip joint.<sup>3</sup>

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**Competing interests:** None declared.

## REFERENCES

1. McMillan SR. Hip dislocation in emergency medicine. Available: <http://emedicine.medscape.com/article/823471-overview> (accessed 2014 June 16).
2. Kain MSH, Tornetta P. Hip dislocations and fractures of the femoral head. In: Rockwood CA, Bucholz RW, Heckman JD, et al., editors. *Rockwood and Green's fractures in adults*. 6th ed. Lippincott Williams & Wilkins; 2006. p. 1717-52.
3. Sahin V, Karakaş ES, Aksu S, et al. Traumatic dislocations of the hip: a long-term follow-up study. *J Trauma* 2003;54:520-9.
4. Hendey GW, Avila A. The Captain Morgan technique for the reduction of the dislocated hip. *Ann Emerg Med* 2011;58:536-40.
5. Davenport M. Joint reduction, hip dislocation, posterior. Available: <http://emedicine.medscape.com/article/109225-overview> (accessed 2014 June 16).
6. Dwyer AJ, John B, Singh SA, et al. Complications after posterior dislocation of the hip. *Int Orthop* 2006;30:224-7.
7. Walden PD, Hamer JD. Whistler technique used to reduce traumatic hip dislocation in the emergency department. *J Emerg Med* 1999;17:441-4.
8. Wheelless' Textbook of Orthopaedics. Dislocations and fracture dislocations of the hip. Available: [www.wheellessonline.com/ortho/fracture\\_dislocations\\_of\\_the\\_hip](http://www.wheellessonline.com/ortho/fracture_dislocations_of_the_hip) (accessed 2014 June 17).
9. Youtube. Hip reduction trauma, Kelly Barringer, MD. Available: [www.youtube.com/watch?v=VYl6M87Uh68](http://www.youtube.com/watch?v=VYl6M87Uh68) (accessed 2014 June 17).
10. Youtube. Captain Morgan reduction dislocated hip. Available: [www.youtube.com/watch?v=IQMWaFX-MeQ](http://www.youtube.com/watch?v=IQMWaFX-MeQ) (accessed 2014 June 17).
11. Youtube. Whistler. Available: [www.youtube.com/watch?v=UxUhW4Zac74](http://www.youtube.com/watch?v=UxUhW4Zac74) (accessed 2014 June 17).

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## Country cardiograms case 53: Answer

Charles Helm, MD,  
CCFP  
Tumbler Ridge, BC

**T**hese electrocardiograms (ECGs) address 2 related issues: intermittent left bundle branch block (LBBB) and evidence for ischemia.

Figure 1 (on page 63) shows normal sinus rhythm, at a rate of 63 beats/min. Figure 2 (on page 64) displays sinus bradycardia, at a rate of 52 beats/min.

In Figure 1, the QRS complexes are wide (0.16 s), with a tiny r wave in V1 and V2, and a deep, wide S wave. These are diagnostic features of LBBB. In Figure 2, the QRS complexes are substantially narrower (0.10 s).

Whereas BBB is often complete and permanent, in many cases it is intermittent and related to the refractory period of the affected bundle branch or to variations in blood supply. It may therefore be rate-dependent, emerging at higher rates and disappearing at lower rates. This is the likely explanation for the intermittent LBBB seen in these ECGs.

Fortuitously, this allows for an interesting analysis of the ST and T wave changes in these sequential ECGs, first with, and then without, LBBB.

In Figure 2, there is suggestion of an acute ischemic process: although there is no ST segment elevation or depression, T waves are deeply and symmetrically inverted in leads V1 through V5.

To correctly interpret the ST and T wave changes in Figure 1, it is first essential to consider the usual ST-T changes in leads V1 and V2 when LBBB is present. There should be ST segment elevation in these leads, sinusously sloping upward, along with a tall T wave. What is seen on an ECG tracing is the sum of electrical forces recorded. Hypothetically, if BBB causes an electrical force in one direction and ischemia causes an exactly equal force in the opposite direction, and there are

no other forces at play, a flat, isoelectric line will result.

With this in mind, it is evident that the ST-T wave configuration seen in Figure 1 in leads V1 and V2, with biphasic T waves (seen also in V3 and V4), is highly abnormal. It represents the ischemic changes seen in Figure 2, superimposed on the typical LBBB pattern.

New LBBB in a clinical setting, consistent with acute myocardial infarction (MI), is one of the indications for thrombolytic therapy. This reflects the fact that interpretation of the changes in ST elevation of an ST elevation MI can be difficult in the presence of LBBB. However, the benefits of thrombolysis do not extend to non-ST elevation MI. Inevitably, some cases of non-ST elevation MI, or even other causes of chest pain, will receive thrombolysis, based on this “new LBBB” indication.

In this case, if a recent ECG from a previous presentation were available, if the LBBB could be shown to be new, and if only the ECG in Figure 1 were available from the current presentation, a decision to administer thrombolysis would be reasonable. However, Figure 2 demonstrates that the ischemic pattern in this patient does not involve ST segment elevation. Thrombolysis is therefore not indicated.

In the setting of MI, remembering that LBBB is sometimes intermittent and that it may disappear at slower heart rates has the potential to avoid unnecessary thrombolysis. If the rate slows and the QRS complex narrows, obtain a second ECG before proceeding with thrombolysis.

**For the question, see page 63.**

**Competing interests:** None declared.

## RESIDENTS' CORNER

### COIN DES RÉSIDENTS

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# From the T-dot\* to the Rock: my journey in rural family medicine

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NL

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It's 3 am. I'm in the first month of my family medicine residency, and I find myself sitting in the back of an ambulance on an old airstrip in rural Newfoundland awaiting an air transfer for a trauma patient to St. John's. The back doors open. It's pitch black outside. Off in the distance 2 faint lights approach the airstrip. They're getting closer now, brighter. I can hear the engine of the small plane roaring. Here it comes ... ready to land. Wait. What? It flew right by us! I turn to Dr. C., puzzled. He looks at me and explains, "They have to fly over once to scare off any moose on the runway." I let out a wry smile. Only in Newfoundland ...

The first few months of my residency have been full of surprises. Having spent the past 4 years in Ottawa for medical school and having grown up in Toronto, I am well accustomed to the big city lifestyle. When I read the email informing me that I would be spending the 2 years of my residency in Grand Falls-Windsor, Newfoundland, a town of 14 000, my heart nearly stopped. "STUDENTS Fear the 3 Cs": the mnemonic I memorized over and over during my psychiatry rotation for the signs and symptoms of panic disorder. I had every one of them. Little did I know that I would be embarking on the most amazing journey of my life to date.

I started my residency on a 4-month rotation in rural family medicine. Each week I would spend a few days doing office-based family practice; shifts in the emergency department; on-call shifts for obstetrics, geriatrics or surgical assist; or hospitalist work. In fact, in just one morning I saw a patient with a heart failure exacerbation in

clinic, then walked with him over to the emergency department to assess him, admitted him to hospital and followed up with him in hospital the next day. Now THAT is continuity of care! Every day that I have worked I've received one-on-one teaching, and it is always an incredible learning experience. I have delivered numerous babies, performed countless cardioversions, run trauma codes and become quite proficient in ultrasonography all in my first 4 months of residency! I've even been able to join one of the physicians providing care for the local professional hockey team, the Grand Falls-Windsor Cataracts, and learned some sports medicine along the way. Needless to say, my clinical acumen and confidence have skyrocketed. I truly cannot imagine receiving any better training than in a rural family medicine program.

Living outside the big city has many perks. Traffic? Can you please remind me what this word means? My drive to the hospital every morning takes an entire 8 minutes. Although, when you're driving along the Exploits River as the sun rises and glistens off the calm water it seems even shorter. Annoyingly, there is one stop sign along the way. I've spent a lot more time outdoors learning to fly fish, and the hiking offered out in the country is absolutely stunning. This winter I started cross-country skiing, as the trails in Grand Falls-Windsor are some of the best in the province. Although the residency years don't provide too many hours for leisure, there are plenty of activities in rural areas to keep you occupied.

One of the biggest changes I've found living in a rural area is the sense of community that just doesn't exist in the big city. Everyone you work with is your neighbour, and you often see your patients around town when grocery shopping or eating at a restaurant. You quickly find out who is related to whom between the jigs and the reels† (that's a Newfie saying I've picked up; I'm learning about more than just medicine!). The patients you meet are so incredibly welcoming to all the young doctors and medical students who stay in their communities. You'll be invited more than once to enjoy Jiggs' dinner‡ with a family or attend a kitchen party.† In Newfoundland, when I ask the man with an ST elevation myocardial infarction if he's having chest pain, he replies, "Yes, me son. Now, you're not from Newfoundland, are ya?" He's more interested in learning where I'm from and what my father's name is than he is in hearing about anything related to thrombolytics. Being welcomed so openly and treated with such respect by the community makes it a great privilege to care for the patients and their families.

Although my path toward a residency in rural family medicine was never set in stone, I'm so incredibly happy that I ended up on the Rock. I can't wait to tackle the next challenge this residency has in store for me, and there is so much more of this province that I have yet to discover. For the next 2 years of my life, I'll have my head constantly in books, but, as always in Newfoundland, I'll make sure to keep an eye out for the moose.

\*T-dot = Toronto.

†Newfoundland glossary (for readers who are mainlanders): Between the jigs and the reels = somehow (e.g., "Despite being busy with residency, I found time to write this essay between the jigs and the reels").

Jiggs' dinner = a traditional meal commonly eaten on Sundays throughout Newfoundland consisting of corned beef boiled together with cabbage, turnip, potatoes or carrots. It is believed to be the sole cause of hypertension in the province.

Kitchen party = a household musical jam with guitars, accordions, fiddles, and an ugly stick or two. Look it up on YouTube.

**Competing interests:** None declared.

This essay won the SRPC Medical Resident Essay Contest 2015.

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