The Impact of Rural Rotations on Urban Based Postgraduate Learners:

A cautionary tale

ICRE 2019

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This meeting is taking place on the traditional territories of the people of the Algonquin Nation. We pay respect to all Indigenous people in this region and we honour their courageous leaders: past, present and future.
I do not have an affiliation (financial or otherwise) with a pharmaceutical, medical device or communications organization.
“The country doctor has only himself to rely on: he cannot in every pinch hail specialist, expert, and nurse. On his own skill, knowledge, resourcefulness, the welfare of his patient altogether depends. The rural district is therefore entitled to the best trained physician that can be induced to go there”.

(Abraham Flexner, 1910, p.44)
The Problem – Physician Maldistribution

Canadian Population
Family Physicians
Specialty Physicians

Rural  Urban
Urban program cost

- Annual budget
  ≈$600,000/year

- Average cost
  $6400/resident/year (2018)

Percent in Rural Practice 3 Years after Graduation

[VALUE]

Rural Graduates 6.3% Urban Graduates
This review assesses the published evidence of the impact of rural rotations on urban based postgraduate learners
Methodology

- OVID Medline search 1980-2017
- Peer reviewed, original qualitative, quantitative, and mixed method research studies
- Inclusion: English, post-graduate medical, rural
- Exclusion: retention, undergraduate medical, pharmacy, dentistry, nursing, no abstracts available
Methodology

- **Titles/abstracts screened**
  - Full texts of shortlisted studies reviewed
  - 2 authors, independently

- **Data extraction**
  - 2 authors independently with a 3rd to resolve disputes

- **Quality assessment with the Medical Education Research Study Quality Instrument (MERSQI; Reed et al. 2007)**
  - 2 authors, independently
Identification Screening Eligibility Included

Database search (n=301) → Duplicates removed (n=7)

Title and abstract screen (n=294) → Excluded, not relevant (n=265)

Full text review for eligibility (n=29) → Excluded with reason (n=10)

Articles for analysis (n=19)
- Rotation and participant characteristics considered
- Data pooled if study methods and populations were comparable
- Statistical analysis
  - kappa scores for MERSQI interrater agreement
  - $I^2$ as a measure of heterogeneity
  - Odds ratios calculated when control group present
- Random effects analysis was used due to anticipated heterogeneity
Weaknesses

- One database searched
- English language only
- Heterogeneity
Results: Characteristics

- Study Characteristics
- Participant Characteristics
- Rotation Characteristics
- Outcome Characteristics
All studies observational
- 70% single group post-test or cross-sectional
- 63% objective evidence of behaviour change
Mean adjusted MERSQI 11.95
Results: Characteristics

- Study Characteristics
- Participant Characteristics
  - Widely variable with only partial age or gender records
  - Only rural background data suitable for statistical analysis
- Rotation Characteristics
- Outcome Characteristics
Results: Participant Characteristics

- Rural Origin: 10 studies
- Gender: 13 studies
- Year of Study: 9 studies
- Discipline: 18 studies
- Age: 9 studies
Results: Characteristics

- Study Characteristics
- Participant Characteristics
- Rotation Characteristics
  - Only duration data suitable for analysis
- Outcome Characteristics
Results: Rotation Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th># Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>12</td>
</tr>
<tr>
<td>Timing (within curriculum)</td>
<td>3</td>
</tr>
<tr>
<td>Mandatory vs Optional</td>
<td>11</td>
</tr>
<tr>
<td>Distance from urban area</td>
<td>4</td>
</tr>
<tr>
<td>Scope of practice</td>
<td>4</td>
</tr>
</tbody>
</table>

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Results: Outcome Characteristics

- Study Characteristics
- Participant Characteristics
- Rotation Characteristics
- Outcome Characteristics
Results: Outcome Characteristics

- Rural rotations associated with rural practice location
- Rural rotations associated with rural practice intent
Effect of Rural Rotation on Subsequent Rural Practice

<table>
<thead>
<tr>
<th>Study</th>
<th>Effect Size</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asher (1984)</td>
<td>5.09</td>
<td>(1.39, 18.70)</td>
<td>6.20</td>
</tr>
<tr>
<td>Chong (2015)</td>
<td>2.99</td>
<td>(1.08, 8.27)</td>
<td>9.49</td>
</tr>
<tr>
<td>Deveney (2013)</td>
<td>7.86</td>
<td>(1.60, 38.67)</td>
<td>4.28</td>
</tr>
<tr>
<td>Playford (2017)</td>
<td>1.93</td>
<td>(1.00, 3.50)</td>
<td>19.87</td>
</tr>
<tr>
<td>Runge (intern) (2016)</td>
<td>4.07</td>
<td>(2.12, 7.82)</td>
<td>18.79</td>
</tr>
<tr>
<td>Runge (registrar) (2016)</td>
<td>1.86</td>
<td>(1.00, 3.46)</td>
<td>20.11</td>
</tr>
<tr>
<td>Runge (resident) (2016)</td>
<td>4.00</td>
<td>(2.21, 7.26)</td>
<td>21.26</td>
</tr>
<tr>
<td>Overall (I-squared = 24.6%, p = 0.241)</td>
<td>3.03</td>
<td>(2.15, 4.26)</td>
<td>100.00</td>
</tr>
</tbody>
</table>

NOTE: Weights are from random effects analysis
Duration effect

- One month rotations seem to have no impact
- Chan’s research (2006):
  - Rural doctors *satisfied* with preparation had 6/12 rural
  - Rural Doctors *dissatisfied* with preparation had 2/12 rural
Effect of Rural Origin on Subsequent Rural Practice

<table>
<thead>
<tr>
<th>Study</th>
<th>Odds Ratio</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asher (1984)</td>
<td>5.66 (1.17, 28.58)</td>
<td>5.20</td>
</tr>
<tr>
<td>Blondell (1993)</td>
<td>3.81 (1.31, 11.17)</td>
<td>10.85</td>
</tr>
<tr>
<td>Playford (2017)</td>
<td>3.91 (2.10, 7.20)</td>
<td>26.72</td>
</tr>
<tr>
<td>Runge (2016)</td>
<td>1.89 (1.10, 3.27)</td>
<td>31.71</td>
</tr>
<tr>
<td>Shannon Jackson (2015)</td>
<td>4.02 (2.17, 7.74)</td>
<td>25.52</td>
</tr>
<tr>
<td>Overall (I-squared = 20.7%, p = 0.283)</td>
<td>3.18 (2.19, 4.62)</td>
<td>100.00</td>
</tr>
</tbody>
</table>

NOTE: Weights are from random effects analysis
Reinforces that rural rotations are influential
- Rural Rotation approx. equal in impact to rural origin
- Assumption of a single rural experience of significant duration that excludes all other participation

Duration is primary factor
- Brief rotations do not have a negative impact
- Longer rotations seem to be more effective

No standard unit of measurement
- duration, timing, interaction with UME, mandate
‘undergraduate rural training raises the possibility of future rural practice, while [rural] postgraduate training confirms the intention’ (Playford, 2017)
No systematic, standardized evaluations
  — Duration of rural rotation appears to be the most consistent factor of influence
  — Short rotations do not have a negative impact
Impact of other participant and rotation factors or interactions unclear
Interplay of factors neither evaluated nor clear
Future

- Prospective study interaction of undergraduate and postgraduate experiences required
- Assessment of impact on the rural preceptor
- Assessment of impact of relationship
- Assessment of impact on the urban based resident
Take Home: It’s complicated

- Policy: existing mandated urban based rural rotations may be an outdated response to rural communities’ needs.

- Accreditation: Urban programs must be flexible to increase time (min 4/12) to meet needs of rural interest.
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