

**A Proposal Submission for the 2009 Russell Ackoff Doctoral Student Award for
Research on Decision Processes and Risk Management**

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Project Title: “Health Delivery Complements and Health Worker Emigration from Africa”
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Proposal

This research abstract has been awarded an oral presentation slot at the African Health Economics and Policy Conference (AfHEA) in Accra, Ghana in March 2009. A major motivation for conference attendance is networking with potential research collaborators and discussing potential panel data sources and alternative analyses which examine determinants and decision processes surrounding physician emigration from developing countries. I hope to move the research to a more publishable form as a result.

Research Abstract:

Aim/Rationale: Economic frameworks identify multiple determinants which influence the decision of physicians and nurses to emigrate from Africa. In order to make rational and cost-effective decisions, policy makers ideally wish to identify the crucial factors affecting emigration. Recent findings suggest that non-wage determinants may play an important role in the supply decision (Vujicic et al., 2003). Given the stark wage differentials between developed and developing countries, alternative mechanisms to retain health workers are being explored by multilateral and national policy making bodies. The preliminary research presented here explores the role of health production resources on the extent of emigration at the country level. The primary hypothesis posits that countries with lower per capita levels of resources relative to to physician (or nurse) care have a greater emigration shares, *ceteris paribus*.

Theory: The theoretical framework relies on an individual physician (or nurse) utility model in which utility is a function of income (I), leisure (L) and work environment (W).

$$U_{it}=f(I(R),L,W (R))$$

Work environment includes physical and human capital resources (R) in the health production process which improve the ability of the practitioner to provide high-quality, effective and efficient care. Examples of human capital resources are nurses (or physicians) per capita. Physical complements include hospital beds, pharmacy networks / pharmaceutical access or spending per capita at the country-level. In this static model, physicians (or nurses) locate based on the relative utilities associated with practicing in each of the environments (home vs. host country). More resources impact utility directly

but also may indirectly affect utility by changing the ability of the physician (or nurse) to increase their income (depending on the reimbursement incentives characteristic of these markets). This indirect effect of resources (say pharmaceuticals) may also detract from physician earnings if these resources substitute for physician services rather than complement them. Hence increasing health resources may have potentially ambiguous effect on the utility of physicians (or nurses) to emigrate. Recent donor efforts to improve resources, especially for AIDS/TB/Malaria could have unintended consequences. Nevertheless, the primary hypothesis posits that most of the resources serve as complements within the context of the health systems and a higher level of complementary resources will improve health worker retention.

Objective: Estimate the effect of health production resources, such as complementary healthcare workers (nurses), public health infrastructure or pharmaceutical access, on the aggregate share of emigration by health workers.

Data: Measures of the outcome variable, the percentage of physicians (nurses) emigrating at the country level relative to the total number of physicians (nurses), are derived from the Center for Global Development (CGD) database on health profession emigration from Africa (Clemens and Patterson, 2006). Country level independent variables are sourced from the World Bank World Development Indicator database (country financial data), WHO dataset on pharmaceutical tariffs and imports (pharmaceutical data), CIA World Factbook (country characteristic data) and the CGD data. The reference year is 2000.

Methods: At the country level (n=48), I run a weighted linear regression of emigration share of MDs on complements (nurses/1000 population, pharmaceutical import value \$US PPP), per capital health expenditure, indicator variables for historical colonial presence (UK, France), GDP per capita (\$US PPP, 2000) and DTP immunization coverage (a proxy for public health complements). Weights equal the number of MDs in each country. I also run a similar specification for nurses.

Key Findings: Physician emigration shares ranged from 5 percent to 75 percent (mean: 36 percent). In the base case, an increase of 1 additional nurse per 1000 population (mean: 0.99 per 1000) reduced the physician emigration by 16 percent ($p < .01$). A similar analysis seeking to explain nurse emigration found no spillovers. Caution is warranted given the cross-sectional nature of the data, but this result suggests that improved nurse retention will have spillover effects in reducing physician emigration. Future research with panel data and country-specific policy experiments will improve causal interpretation.