Does Regional Strategic Management Matter? Health Services in the Rural Communities – The Case of Moura, Australia

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ABSTRACT
This paper examined the performance and need of health services in the mining communities through a case study of the Moura Township in Queensland, Australia. The study involved a case study approach with a survey method to assess the current performance and the need of health services of the Moura residents. This study found only half of the respondents was reasonably satisfied with general physician (GP) and hospital services. They stated a clear demand to involve all development partners to improve these services, in particular to modernise hospital services with basic dental and pre natal services. A regional strategic management model can address this issue, and such a strategic model can be incorporated into the local area development plan or in the regional plan.

1. INTRODUCTION
Accessibility to health services are directly related to community wellbeing and economic development of a nation. The focus of this paper is to assess the accessibility of, and satisfaction with, the health services of the rural towns through a case study from the Moura Township in Queensland, Australia. The paper is organised as follows. A literature review of international and Australian policy initiatives of health services for mining communities and a background of the case study area in Sections 2 and 3, followed by the methodology in Section 4. Stakeholders’ perceptions regarding the service accessibility and future service provision are outlined in Section 5, and the case study findings and analysis are detailed in Section 6. The final sections of this paper include discussion, planning and policy implications of the study for other mining towns in Australia and elsewhere in the world.

2. INTERNATIONAL AND NATIONAL (AUSTRALIA) POLICY INITIATIVES FOR HEALTH SERVICES
Currently health of mining communities is in the priority list for many mining companies and governments (Shandro et al, 2012) but it did not get much attention until the end of the last century. The International Council on Mining and Metals (ICMM) prepared good practice guidelines for health assessment in 2010 and one of the assessment criteria was to seek continued improvement of community health. Responding to this principle of mine operation, the Canadian government stepped up their health sector budget and pro-active regional planning for the mining and rural communities (Shandro et al, 2012). Now this study has been
using this principle in assessing the accessibility of, and satisfaction with, the health service in order to understand the community’s need for future service improvement.

Australian health policy focuses sustainability of all health services for all residents living across the country, including regional, remote and mining communities (AIHW, 1998). Currently most health care services have been delivered across Australia with a mix of national, state and territory governments and private funding.

The primary health care service in Australia is based on the publicly funded care system, Medicare. More than 80 percent of the general practitioners (GP) services have been delivered through Medicare system with free of costs to the patients since 2009. The National Healthcare Agreement 2008 has stressed that primary health care comes to both national and state/territory responsibility with significant role of private providers and community organisations. Communities residing in rural and regional areas are experiencing poorer health services and outcomes compared to those living in cities and metropolitan areas (Buykx et al, 2012; Tham et al, 2009; AIHW, 2008).

Hirst (2005) and Humphreys and Wakerman (2008) highlight that the universal health services are not distributed in an equitable manner and are not accessed fairly by the regional and rural residents. Populations in many rural communities have been increasing over the last 25 years period but health services have not been increased proportionately mostly because of attraction and retention of health professional into those regions (Mann et al, 2011; Taylor, 2012). The above literature indicates that there are very few policy initiatives and studies so far have been directed towards providing effective health services in the regional and rural towns, especially in the mining towns in Australia but it is essential to understand of those communities’ views on what and how to improve these services. This paper has addressed this issue through a case study of the Moura Township in Queensland.

3. BACKGROUND OF THE CASE STUDY AREA

The Moura Township was chosen as a case study from the state of Queensland representing small to medium sized mining towns in Australia, which can represent about two-third of the mining towns in Australia. This allows the findings to be extrapolated to similar towns in this state, and potentially to similar towns elsewhere in Australia and overseas. There are about 150 coal mines, mineral and energy (gas) projects operating in the rural and regional areas of Queensland.

Moura is an almost exclusive mining community with a resident population of 2,000 (ABS, 2012), is situated in the lower Bowen Basin mining region in Queensland. Coal has been mined near Moura since 1961 and this one of the longest-established coal mining projects in Queensland. It is also expected that coal will be mining in or around Moura for another 30 to 40 years. So Moura has an expected resource life for mine is about 100 years, which is bit less than current Australian average (i.e., 120 years; Prior et al, 2012).

The median age of Moura residents is 33 with little change over time and average household size is 2.5, which is very similar to many other mining towns in Australia (ABS, 2012). Median personal income has increased by $391 since 2006, which is higher than many other towns in the region (ABS, 2012; ABS, 2008). Moura has a proportion of working age residents (72.5%) compared to other regional and rural towns in Queensland. The township has a high proportion (about 50%) of non-resident population living in the mining workcamps (OESR, 2012). Both residents and non-residents population of this town are taking health services from a private GP practice and a small public hospital.
These socio-demographic characteristics of Moura are very similar to other small-sized mining towns in Australia. Also current and future life time of the Moura community is similar to many other regional communities in Australia, which should deserve accessibility to the basic health services because this is directly related to the wellbeing and productivity of the community. This paper further explores Moura’s socio-demographic characteristics and an assessment of its current health services through an in-depth case study research as explained below.

Figure 1: Location of the Case Study Area (Moura Township) and its Adjoining Mining Towns within the Central Queensland Region

4. APPROACH AND METHODOLOGY
This study entails a case study approach with a mix methodology of quantitative and qualitative methods for data analysis.

4.1 Case Study Approach
A case study approach mostly makes a contribution in developing a systematic framework to examine a problem, and is well suited to the needs of policy analysis (Finn et al, 2000). In view of this, health services in Moura have been selected as the case study for this research to assess performance of the current health services and to understand community’s need for upgrading existing services or for new services.

4.2 Scope and Limitation of the Study
This paper only focuses on health services because these services are considered basic social services that are necessary to maintain individual and household wellbeing. The study specifically focuses on understanding the overall performance for current services and potential future service levels and locations. The study did not focus on requirements of specific age or gender groups. Nor did it look in depth at the quality of any particular health service or identify or detail factors affecting the supply of those services. The study did not
examine impacts of the services inaccessibility or unavailability and also did not estimate any cost that the suggested health service would require. Here, ‘service optimisation’ refers to a reasonable level of service as perceived by the community and stakeholders.

4.3 Data Collection and Analysis Methods

Two sources of primary data were collected. Firstly, interviews with the stakeholders were conducted and secondly a household survey was undertaken of Moura residents. This study interviewed eight stakeholder participants, were selected from health, education, local government and mining sector. The sample size for the surveys was based on the current household size (2.5 people) and total number of households, from 95% confidence level, was estimated at between 46 and 85 households. A total of 91 households’ responses were received, of which 83 were valid (the remaining responses were not returned complete). Data analysis was performed by categorising, tabulating and visualising evidence to address the objectives of this study.

4.4 Optimum Health Service Delivery Models and Indicators

To date, a number of studies examined the health service locations and allocation levels, especially in locating hospitals, pre and post natal medical services because a reasonable level of these services is required to maintain a good population health (Harper et al, 2005; Glavo et al, 2002; Rahman and Smith, 2000; Narula, 1984; Chao, 1998). After reviewing these publications, we investigated how a reasonable level of service had been modelled over time and what the variables were that scholars and service provides considered, in determining a reasonable level of service.

The health facility models that adopt efficiency measures are based on the minimisation of travel distance or time or the maximisation of demand coverage (Cho, 1998). These types of models are constructed under an assumption that the consumers always go to the nearest facility from their residence. On the other hand, Murray and Gerrard (1998) found that quantitative location-allocation models cannot ensure service efficiency. For example, the residents of a community can avail medical services from certain hospitals, even if the hospitals are suffering from staff and medicine deficiencies. So the location allocation model can predict the location of the service point but it is difficult to judge the service quality.

Tien et al. (1983) introduced a service hierarchy model for local level service delivery. Narula (1984) also used a hierarchy model to maintain cost-effectiveness of the services, especially in the case of health service delivery. Narula (1984) also suggested two types of service delivery hierarchy: successively inclusive and successively exclusive. In successively inclusive a provider provides a hierarchy of its services in all its branches according to the population base and need. In a successively exclusive hierarchy, a facility of a given type offers services unique to it. Further categorisation of service hierarchy by Glavo (2002) suggested a three level hierarchical model to support perinatal health services from a metropolitan city to rural towns: basic units, maternity centres and neonatal clinics. Here service optimisation has been determined through to a delivery of service hierarchy with an assumption that travel is always to a nearest facility of appropriate level. Since the model is successively inclusive, the location of basic units, maternity homes and neonatal clinics at the same site is prohibited.

Satoh (2007) suggested a hierarchical decision tree model for service delivery. However, hierarchical systems are complex where an effective coordination of services provided at different levels requires integration in the spatial organization of facilities. Syam (2008) developed a comprehensive nonlinear location–allocation model for service system design that incorporates several relevant costs and considerations. These include transportation,
facilities, and waiting costs, queuing considerations, multiple servers, multiple order priority levels, multiple service sites, and service distance limits. This model only supports financial aspects of service delivery but it failed predict future direction in terms of providing essential services.

In Turkey, there has been three levels of health care systems identified (Sahin and Sural, 2007). These are: demand points and local clinics, regional hospitals, and metropolitan hospitals. Patients are first served by a local clinic whose services are usually restricted with diagnosis and treatment of common diseases. For surgeries up to advanced diagnosis and treatment services patients are referred to regional hospitals. Metropolitan hospitals offer advanced specialized surgeries and long-term intensive treatment services, and can accept patients from both local clinics and hospitals or patients can request the initial service directly from a regional hospital. We can classify this setting as a multi-flow system.

Therefore the above studies identified location of service delivery and service hierarchy based on population base, distance and travel time. Based on this information, a flexible practical stochastic geographical simulation model can predict the level and type of service, however, a drawback to this simulation approach is that an optimal solution is not necessarily found. Limitations to location planning are subject to various constraints and other drivers, such as political considerations, road infrastructure and physical amenities. However a few studies have examined people’s satisfaction with the services provided nor did they explore the people’s opinions when developing new services or upgrading the existing services. Instead they were all based on quantitative location-allocation models.

Mining communities can be short lived, for the life of the resource, 30 to 50 years, compared to an established multi-functional community, such as a regional hub that can function indefinably. In such cases, there is a need to explore the community’s characteristics and perception towards service delivery, as well as the stakeholder’s perceptions toward the need of such services. Thus, this study focused on identifying the level and location of services based on the same modelling variables as other authors (i.e. demographic characteristics, travel time and distance, and frequency of use) but has also used community perceptions regarding service need and examining stakeholder opinions.

5. STAKEHOLDERS’ PERCEPTIONS AND SUGGESTIONS

Stakeholder interviews were conducted at the beginning of the research to understand the overall health services situation in the case study town of Moura and surrounding region. Stakeholders included two health care officials, three education officers, two local government employees and one local mine manager.

Hospital Services in Moura: Moura has one public hospital, which only has emergency based patient care. They offer outpatient services, an emergency department and primary antenatal and postnatal care. Moura hospital has 10 staffed beds, although there are facilities for 16 beds. There is no surgery, aged care or maternity facilities. The current facilities include a number of visiting specialists: psychiatrist (once a month), women’s health adviser (twice a month), mental health (at varying intervals), social worker (at varying intervals), occupational therapist (at varying intervals), physiotherapist (at varying intervals) and speech pathologist (at varying intervals). According to Glavo (2002), this can be compared with a lowest level of health service delivery, where the patients received only primary and general health services. The performance of the hospital was rated between 2.5 and 5 (out of a scale of 1-5, while 1 refers to poor and 5 refers to excellent quality of services) by the stakeholders, while hospital staff reported client feedback at 95% positive. Moura does not have a dentist, although the
hospital has the facilities for a dental clinic. A dentist visits twice a year but exclusively for school students’ checkups.

Hospital improvements were suggested by up to 40% of stakeholders, and in most cases improvement was related to the performance of the hospital. The hospital buildings are in good condition and have good facilities. There is also a need for more good quality doctors, and better storage facilities for equipment and paperwork. Some stakeholders stated that the hospital needs a maternity facility, but this was countered by the hospital staff, who claim there is limited demand for a maternity unit.

**General Physician (GP) Services:** Moura has one private GP centre, which has facilities for two doctors; however, there is currently only one permanent doctor and visiting locums. Stakeholders rate the performance of this medical centre as 3 out of 5, but their only criticism was a need for more doctors. The level of improvement needed ranged from 10% (since the building and facilities are relatively new) to 50% due to the lack of doctors.

**Ambulance Service:** Moura has one ambulance, with the possibly of two as there are two ambulance officers. The service is rated from 3.5-4 (out of a scale of 5), and only 20% of stakeholders think it requires improvement.

**Other Services:** Moura has a Blue Care service which provides home care and meals on wheels. Performance of these services was rated at 3.5 (out of a scale of 5), with a low proportion of stakeholders (10%) suggesting that it requires any improvement, with some stated that the funding was too restricted.

**Constraints:** There was only one constraint identified, which was regarding population and demographics. The regular mining population were not an issue, but during times of high development, an increase in the volume of outside contractors tends to result in busy times at the hospital. The transient population also limits the hospital’s minimum funding. It was also stated that Moura needs a nursing home or similar aged care facility.

Geographically, Moura is a considerable distance from a major centre which is a factor for visiting doctors and specialists. A lack of funds and the remoteness of the area also limits the attractiveness for doctors and other health staff. The limited funding also restricts salary packages of the health staff. Contributing to this issue is the lack of facilities for families, further reducing the attractiveness of living longer in a small town.

**Stakeholder’s Recommendations for Additional Facilities:** Most stakeholders agreed that the hospital in Biloela should be upgraded as a first preference, with only one person stated that Moura hospital should be upgraded as a first preference, and all of them agreed to improve the GP services at Moura. Those who identified Biloela as a first preference usually indicated Moura as a second preference. Stakeholders also identified the need for health services in other centres, such as Taroom or Theodore, due to their similar geographic isolation.

### 6. CASE STUDY FINDINGS AND ANALYSIS

A questionnaire survey was conducted to explore the existing health services in the Moura Township and to understand the perception of the Moura residents about how and where to improve the quality of those services.

#### 6.1 Socio-demographic Characteristics

Households surveyed were randomly selected to include all socio-economic groups and family types, so the study’s findings can be generalised over the case study population. Respondents were categorised into six age groups, of which respondents in the 45-54 group
were higher (28%) compared to other groups (around 17%). Respondents over 64 years of age accounted for just 1% (Figure 2). More than three quarter of respondents (76%) were female.

Figure 2: Age of Respondents

![Age of Respondents](source)

Source: Moura Community Survey 2010: Health Services.

Twenty-three percent of households had an annual gross income between $70,001 and $100,000. This is slightly more than the households who earned between $101,000 and $150,000. Approximately one-third of households belonged to the low income group, compared to the census data where approximately 50% of the households in Moura were in the same category (Akbar et al., 2011). Households in the low income category are mostly working outside the mining sector or working as a part-time employee. One third of Moura residents surveyed had lived in Moura for more than five years and a further third of the Moura population have been in the town for more than twenty years, and this indicates majority of Moura’s residents are stable in terms of their livelihood and they require a standard level of health services at their own locality.

6.2 Performance and Importance of Health Services in Moura

Moura and the communities that surround it are supported by a range of health services, such as a general hospital and private general physician (GP) clinic. This section describes the residents’ perceptions about the accessibility of these health services, the condition of services and future service development.

Location for health services sourced by respondents: The majority of residents sourced ambulance, GP and hospital services from Moura. Dental, pre and post natal and specialist services were generally sourced from Rockhampton (a regional level health service centre) (4). Some respondents (about 20%) sourced specialist services from Brisbane (a state or metropolitan level health service centre) while one third preferred Biloela (local level health service centre) for dental services (Figure 3).

Frequency of using health services: Only about 10% of respondents used pre and post natal services and ambulance services, while up to 90% of the respondents used GP, hospital, dental and specialist services in the last 12 months. All ambulance users utilised this service three or fewer times, while pre and post natal services were accessed up to 12 times in the last 12 months by some respondents (Figure 4).
**Figure 3: Location of health services sourced by respondents**

![Figure 3: Location of health services sourced by respondents](image)

Source: Moura Community Survey 2010: Health Services.

**Figure 4: Frequency of Use for Health Services for those Respondents Using Each Service in the Last Twelve Months**

![Figure 4: Frequency of Use for Health Services](image)

Source: Moura Community Survey 2010: Health Services.

**Level of satisfaction with the current health services**: Well over 50% of respondents felt the current level of most health services were ‘very good’ or ‘excellent’. Pre and post natal services were less satisfying with fewer rating it as ‘excellent’, and more (24%) rating it as ‘poor’ (Figure 6). Less than 10% of respondents rated the remaining health services (excluding pre and post natal services) as ‘poor’ (Figure 5).

The most highly rated service was the ambulance, with 86% or respondents who had used the service rating it as ‘good’ or ‘better’. If the first three categories are grouped to give an indication of a low to moderate level of satisfaction, then approximately 50% of the respondents felt limited satisfaction with health services in Moura.

**Distance and travelling time to access health services**: Among the respondents who used health service in the last 12 months, around 60% travelled up to 20km for up to 15 minutes (driving or walking) to source GP and hospital services. Up to 30% of respondents travelled more than 100 km taking more than an hour to access to these services (Figures 6 and 7).
Although GP and hospital services are available in Moura, about 40% of respondents travelled to access these services from Rockhampton, Biloela and Theodore. Additionally, most respondents sourced dental, pre and post natal and specialist services from outside of Moura. This area needs further investigated clearly below to determine what health services need to be established in Moura or what associated services are needed to facilitate access to health services.

**Importance of health services:** When respondents were asked about how importance the health services were to the support their personal and their families wellbeing, most respondents felt that all health services were very important, with the exception of pre and post natal services, where approximately half of the respondents considered this service was not at all important. Very few, about 5% of the respondents, felt that they didn’t require any of these services (Figure 8).
6.3 Proffered Health Service Level and Location by the Moura Community

Respondent preferences for accessing health services: When respondents were asked about maximum travel time and distance to access health services, two thirds of respondents advised that it should not to be more than 15 minute walk or drive to access a GP or hospital services. Some of the respondents (10% to 45%) were willing to travelling about an hour to access to any of these health services. This is the case for dental, specialists, pre and post natal services with most willing to travel for more than 20 km and up to one third willing to travel up to 200 km (Figures 9 and 10). Almost all of the respondents (92%) preferred an ambulance waiting period of less than 15 minutes.

Based on these respondent preferences, it is preferred that GP and hospital services be available in Moura township, while other specialist services, etc. be situated within 60 km of the town (with a travelling time up to 45 minutes).
Respondents preferred location to build or upgrade hospital services: From the sections above, we highlighted a clear need to either develop or upgrade some of Moura’s health services, particularly GP, hospital, dental, pre and post natal services. The stakeholders interviewed suggested an integration of services, such as dental, pre and post natal and other hospital services be developed in Moura, this could be achieved by upgrading the existing hospital which currently has a reasonable level of services. However the respondents preferred Moura as the location for a new hospital or an upgrade of the existing hospital (Figure 11), mainly because the second preferred town, a regional hub, Biloela is about an hour drive from Moura. Other suggestions for facility upgrades included Banana, Baralaba, Gladstone and Miles townships.

These findings indicate a clear need to develop new hospitals or upgrade the existing hospital in Moura, with a multifunctional facility offering general health, dental, and pre and post natal services.
services. Moura residents are satisfied with the current ambulance services. Specialised services need to be within 200km or within two hours driving/travel time. This equates to specialised services offered by the Rockhampton Base Hospital (a regional hospital within 200km of Moura) needs to be made more accessible and available for such communities. Specialised services not currently available at the Rockhampton Base Hospital need to be added to the facility within a reasonable time period.

**Figure 11: Preferred Location for Hospital Services Upgrades or New Developments**

Source: Moura Community Survey 2010: Health Services.

7. **DISCUSSIONS, POLICY AND MANAGEMENT IMPLICATIONS**

Moura is a typical mining town with a mix of rural and mining activities. Most Moura residents found the overall liveability of their town as moderate. Respondents suggested that liveability can be enhanced through the maintenance and improvement of good health services. The town currently has some health services that despite some shortcoming prove reasonable prospects for the future. Most stakeholders and survey respondents rated the performance of health services, especially the hospital, as moderate to reasonably good. However the satisfaction level varied between the services; for instances most respondents (about 85%) were reasonably satisfied with ambulance services, while only half of them were satisfied with GP and hospital services. So there is a clear need to improve the GP and hospital services to include dental, and pre and post natal services.

Moura Hospital buildings are in good condition and also have good health instruments, but it is lacking enough doctors and better storage facilities for equipment and paperwork. Some residents demanded maternity facility at the hospital, but this was countered by hospital staff, who felt there was not enough demand for such a health unit. The Moura Medical Centre has facilities for two GPs, but currently there is only one. The stakeholders rated this medical centre as average quality. Both the stakeholders and the residents suggested an increase in the number of good quality GPs in this medical centre.

In synthesising community perceptions about the health services in Moura, Figure 9 exhibited that GP services, hospital and ambulance services were very important to the Moura residents. There is a need to improve GP and Hospital services. Community survey results also indicated that most residents were looking for these services either within 15 minutes travel time or within the 20 kilometres of travel distance (Figures 9 and 10); and Moura is the only locality within this travel time and/or distance. Therefore Moura’s GP and Hospital services
need to be improved. Further Figure 11 confirmed the need to improve GP and Hospital services in the Moura Township.

Stakeholders suggested that the nearby Biloela Hospital should be upgraded as a first preference, but this was contradicted by survey respondents, who preferred upgrading the Moura hospital, including the addition of some dental, and pre natal facilities. Stakeholders who identified Biloela as a first preference usually indicated Moura as a second preference and vice versa for the survey respondents. A need for health services in Taroom or Theodore, due to geographic isolation, was also noted by some survey respondents. Most stakeholders mentioned that the mining companies should come forward to improve these services, at least with a major share in establishment or refurbishment costs. They also pointed out that there is a need for an integrated framework for providing such service, where the state and local governments, mining companies and the community representatives should decide collectively how the services would be funded and managed. Some of the Moura residents recommended the same framework to improve the current level of GP and Hospital services.

Therefore this study recommend to upgrade Moura Hospital with some additional services of dental, and pre natal facilities and staff. If this is not feasible, as this study did not include a cost effectiveness analysis, then an upgrade to the Biloela Hospital should be considered. This would need to be in conjunction with some additional services and beds and the provision of adequate public transport facilities between Moura and Biloela. Current GP services also need to be updated despite costs. This is the most frequently used service by both residents and the non-resident population. Local government, mining industries and the medical service providers should work together to ensure an adequate quality and quantity of GP services in Moura.

The following strategic policy and planning guidelines can be adopted in order to improve the health services of mining communities and the liveability of the mining towns in Queensland, elsewhere in Australia and overseas:

1. State and local governments, and mining industries should work together to identify the health service needs based on such an established case study, variables of performance and need assessment, with consideration of socio-demographic characteristics.

2. In case of very basic services such as GPs and basic hospital services, government and industry together should provide incentives to retain service delivery personnel in mining communities and to provide joint capital funding to improve the current level of services.

3. A joint (i.e., mining companies, state and local governments) strategic plan supported by a local community group can address this issue, and such a strategic plan can be incorporated into the local area development plan or in regional plan. For instances, Queensland Government (a state government) should make a general planning framework how to provide a basic level of health services to the mining towns but Banana Shire Council (a local government) should implements such plan through consultation with the local communities and the service providers.

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