PAK Publishing Group
Growing Knowledge for Future

Proceedings Book of ICEFMO, 2013, Malaysia
Handbook on the Economic, Finance and Management Outlooks
ISBN: 978-969-9347-14-6

Hospital at Home: Sustainable Healthcare in Developing Countries Through Reducing Average Length of Stay in Hospitals

Norminathan
Monash University Malaysia, Johor Bahru
Wan Noor Amalyna Binti Wan Fadzil Adlan
Medical Student, Monash University Malaysia, Johor Bahru
Arany A. Norminathan
Westmead Children's Hospital, Sydney, Australia

Abstract

Increasing health costs is becoming a burden for countries all over the world, and for the developing countries, it may reach a point where the government may not be able to provide the healthcare demanded by the public. It is not solely based on increasing the health spending; every aspect of health expenditure should be considered to improve efficiency. One of the aims of the tenth Malaysian plan is improving efficiency and reducing waste (The Economic Planning Unit, Prime Minister's Department 2010). We propose a measure to improve efficiency by decreasing the average length of stay, given the fact that hospital care is far more expensive than care in the community. Planned and managed early discharge to the homes, supported by community nurses and doctors, in addition to improved communications, can reduce average length of stay. At present the length of stay is 3.52 days in the public sector and 2.71 days in the private sector. There is a significant variation between states, not only for the average length of stay, but also for the bed turnover interval; providing less of an incentive for earlier discharge (CRC 2012). By reducing the length of stay by merely 0.5 days, we suggest that there would be savings of up to RM250 million each year, and with other additional measures, there would be significant savings, making healthcare more affordable and sustainable, making Malaysia a shining example among developing countries.

1. Introduction

Healthcare costs are increasing exponentially worldwide. One of the major healthcare challenges faced by developing countries is to provide universal and equitable care. Lessons learnt globally from systems with different heath provisions and financing show that there is no one system that fits all. Governments around the world have come to realize that as the treatments become more and more

expensive, public funding has to play a major role in financing, in order to protect the poor and vulnerable in society. Obama's reforms in the USA are a glaring example (Quek 2012) This is also a politically loaded and contentious issue because it is highly expensive, and the long term advantages of health spending will not be noticeable for many decades, manifesting in the form of productivity of the work force, wellbeing, and upward social mobility.

2. Factors Contributing to Increased Costs

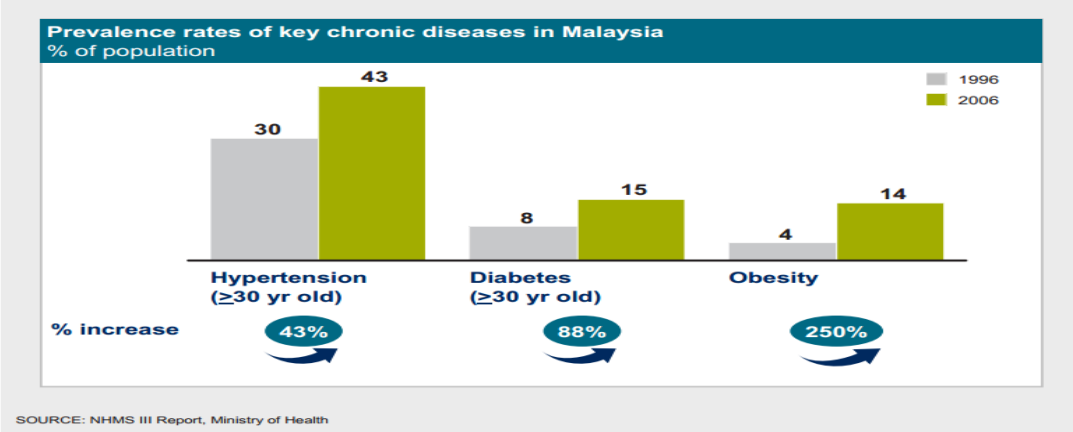
Technological and scientific advances have been found to increase healthcare costs in both the developed and developing world (Queensland Health n.d.),(Okunad et. al, 2002). This encompasses not only the cost of the technology, but also the infrastructure that is necessary to house and use these advancements. Typical examples might be endoscopes (flexible fiber optic devices) which require theatre facilities and MRI's (Magnetic Resonance Imaging) housed in their own special rooms, which are costly to build. There is a myriad of equipment to be bought for hospital use which all adds to the total cost. In addition, the doctors, nurses, and other health professionals have got to be given additional training in order to make full use of new technology. It's also ironic that billions of ringgit are spent on buying and installing these equipment, but they are under-utilized because of working practices; nowhere in any other industry has so much equipment lay idle for 16 hours a day.

As the population becomes increasingly affluent, as is happening in Malaysia and other developing countries, people are more likely to increase spending on health education, and this would lead to taxpayers having higher expectations of the public hospital (Quek 2012).

Another contributing factor to high cost healthcare is increasing life expectancy. In the long term, this can be seen to increase productivity, however it also takes its toll on healthcare costs, as age-related diseases are expensive to care for. The use of preventive medications, for example statins for coronary heart disease and medication for hypertension, also add financial burden (Kaur 2013). Many diseases that would have previously been considered fatal are now treatable but incur additional burden as this invariably results in further treatment, investigations, and some resulting in life long disability, for example, thrombolysis for the treatment of stroke.

The social mobility of the population from rural to urban areas in developing countries is accelerating at a rapid pace. This social mobility increases education opportunities and standards, and income also rises accordingly, as well as the expectations. One of the features of immigration in Malaysia is that the majority of migrants are from rural areas of developing countries. This poses its own health burdens, especially in regards to infectious diseases such as SARS and H5N1 (Kaur 2013). It is also now well established that urbanizing the population is more likely to contribute to the development of non-communicable chronic diseases like diabetes, hypertension and obesity with its complications (Sobngwi et al 2004) (Ebrahim et al. 2010).Figure 1 shows the prevalence of key non-communicable diseases in Malaysia in 2006 as compared to 1996, clearly illustrating the substantial rise in only ten years.

Figure-1. Prevalence Rates of Key Chronic Diseases in Malaysia (The Economic Planning Unit, Prime Minister's Department2010)



Malaysia, like other developing countries, has been able to cope with this until now because of the dichotomy of provision of health- that is, the coexistence of the public and private sectors. However, as health costs advances or increases in the private sector, the burden begins to fall on the public sector (Certified General Accountants of Canada 2010).

There has been a 3% increase in admissions to Malaysian hospitals annually in the last 5 years (The Economic Planning Unit, Prime Minister's Department 2010). There are a variety of reasons for this, for example: some of the diseases are much more amenable to treatment, technology is being developed in Malaysia, and, as previously mentioned, the expectations of the population is increasing (Quek 2012). There is also a shift of care from out of pocket/ self care to primary care on to secondary and to tertiary care, thus increasing the cost of healthcare (The Economic Planning Unit, Prime Minister's Department 2010).

Migration is an issue for a fast developing country like Malaysia from highly populated poor neighboring countries. Even though they bring economic benefits, this also has a significant impact on the health resources (Ahmad 2011). There are 1.8 million immigrants out of a population of 30 million in Malaysia (Kanapathy n.d.)(The World Bank 2012).

Thus far, Malaysia has been able to provide affordable healthcare with a GDP of 4.96% The Economic Planning Unit, Prime Minister's Department 2010); whereas in affluent nations in the developed world the proportion is up to 10-18% of GDP (The World Bank 2013). This is countered by the expanding private sector. Every year the beds in the private hospitals are increasing in numbers (CRC 2012). However, as mentioned before, once the private healthcare becomes more expensive, it can be postulated that the population will move to the public sector with higher expectations.

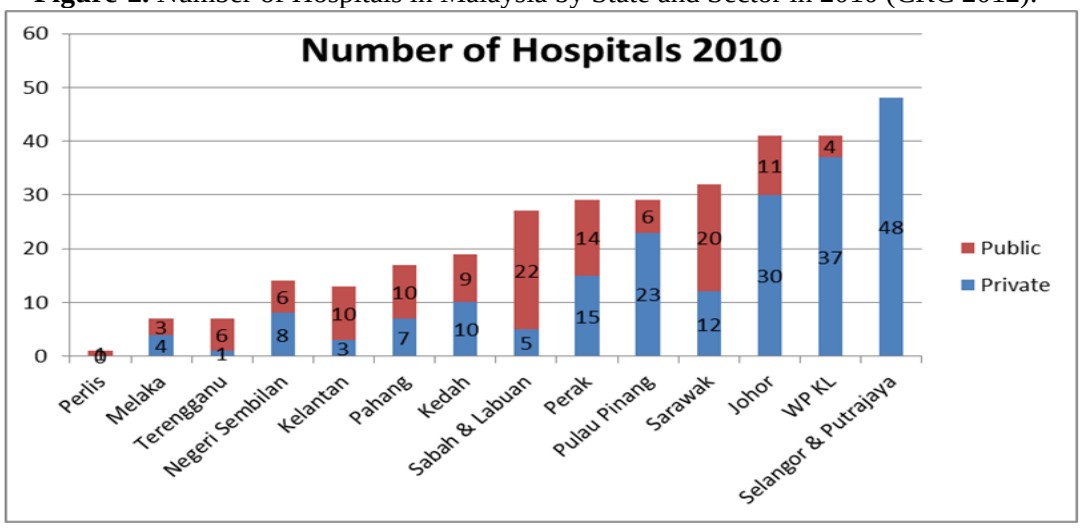
Malaysia is aspiring to become the top 20 wealthy nations by 2020. However, there is a stagnation of economy over the last 2 years (The Economic Planning Unit, Prime Minister's Department 2010). This is not unique to Malaysia, as we live in a world where the economy, and GDP, is internationally determined. An alternative approach to reducing expenditure in the face of rising costs is to consider reducing waste, rather than merely expanding provision.

3. Lean Management

3.1. Bed Occupancy

One of the components of the 10th 5 year plan is to improve efficiency (The Economic Planning Unit, Prime Minister's Department 2010). It is evident that there are significant savings to be made in healthcare. For example, the bed occupancy rate in Malaysia is approximately 65%, and in Indonesia it is about 57.5% (Awofeso et al. 2012); yet in spite of this, there is still an overall expansion of hospitals as well as beds in both the private and public sector, as seen in Figure 2 (CRC 2012). Expansion costs money, in terms of both capital and revenue. Therefore, developing countries should shift their focus from expansion to cutting out waste to a bare minimum- the practice of 'lean management'.

Figure-2. Number of Hospitals in Malaysia by State and Sector in 2010 (CRC 2012).



Bed occupancy rates in various countries are illustrated in Figure 3. In Malaysia, the rates are lower than the ideal of 80-85% (Bain et al. 2010) and varies from state to state (Figure 4).It has been claimed that a higher number of empty beds lead to a lack of incentive to discharge, due to a lack of pressure. This would not only lead to higher incurred costs, but would also increase the average length of stay, therefore warranting rationalization of the current system in order to utilize the beds in the most efficient manner. The waiting list would then be shortened by reducing throughput- making the system more efficient on the whole. However, discharging patients early would be a difficult task as the supportive care and monitoring that was supposed to have been done in the hospital would still have to be carried out elsewhere; but this is where the concept of 'hospital at home', as discussed later, is relevant.

Figure-3. Bed occupancy rates between countries (OECD 2011) (Awofeso et al. 2012).

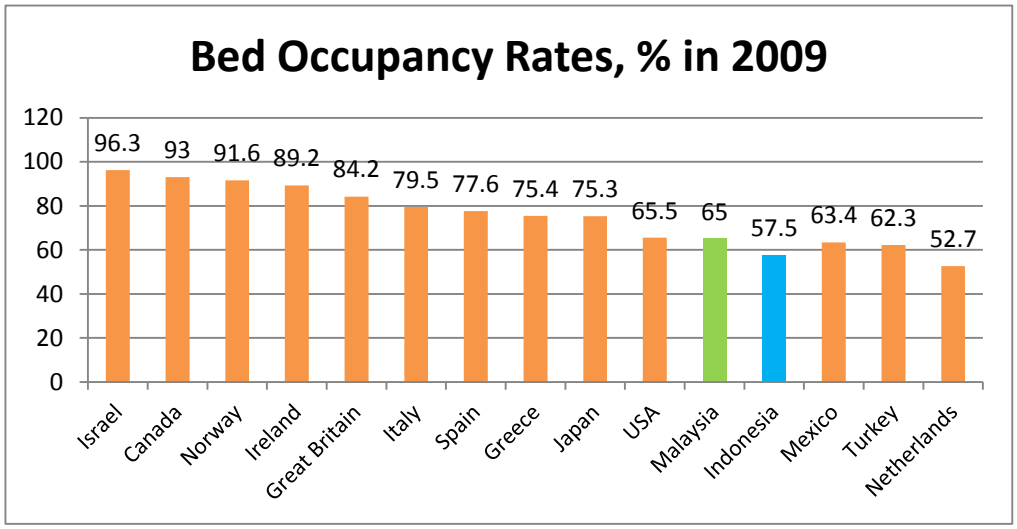
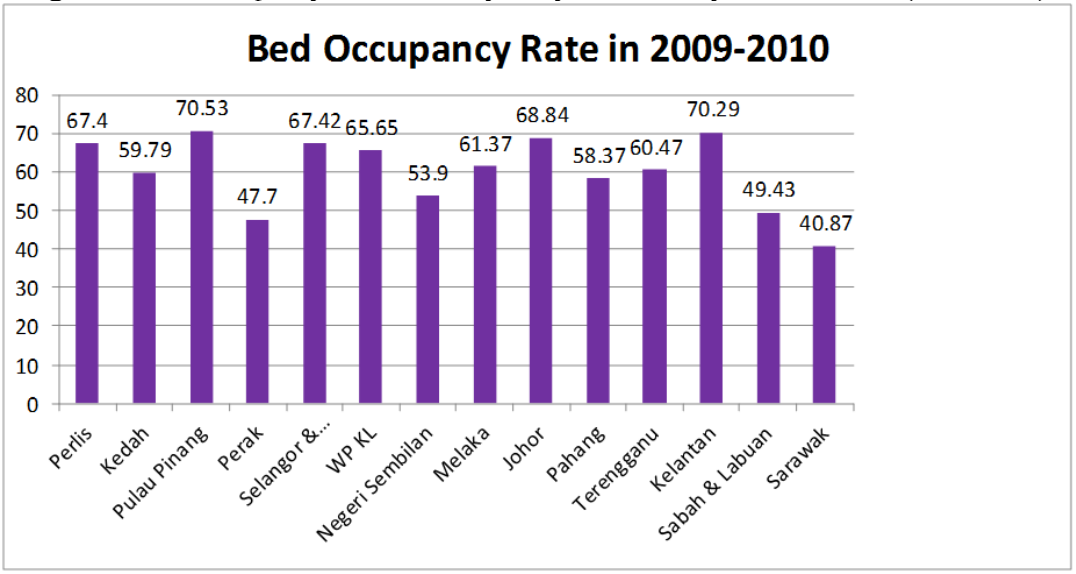


Figure-4. Bed occupancy rates in Malaysia by state in the year 2009-2010 (CRC 2012).

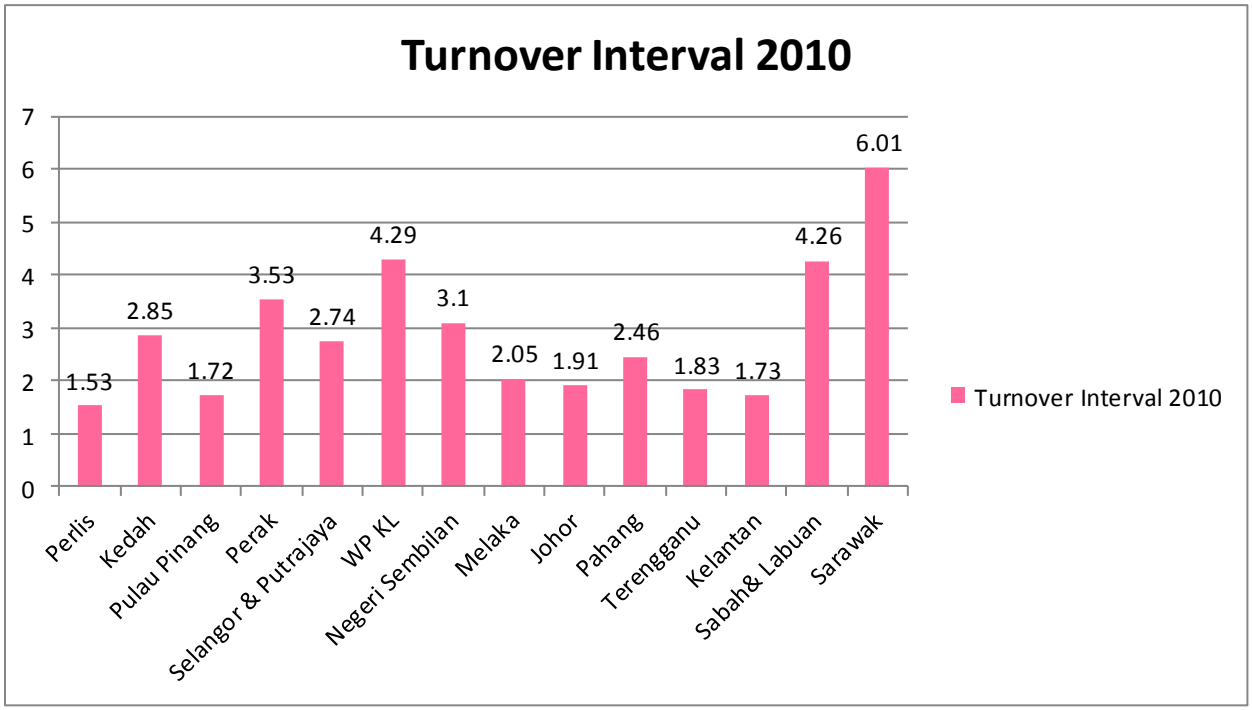


3.2. Turnover Interval

The turnover interval is the average number of days a bed is unoccupied after a discharge. Figure 4 shows the average turnover interval by state in the years 2009 and 2010 (CRC 2012).
By restructuring and redistributing the beds, the turnover rate can be easily reduced.
Based on Figure 4, the bed turnover interval is high, suggesting that there is an excess of beds and that the urgency to improve is minimal. Both are costly and are a waste of meager resources. This also

interferes with the through put, hence with efficiency. It is interesting to note that the number of beds is increasing year by year (CRC 2012).

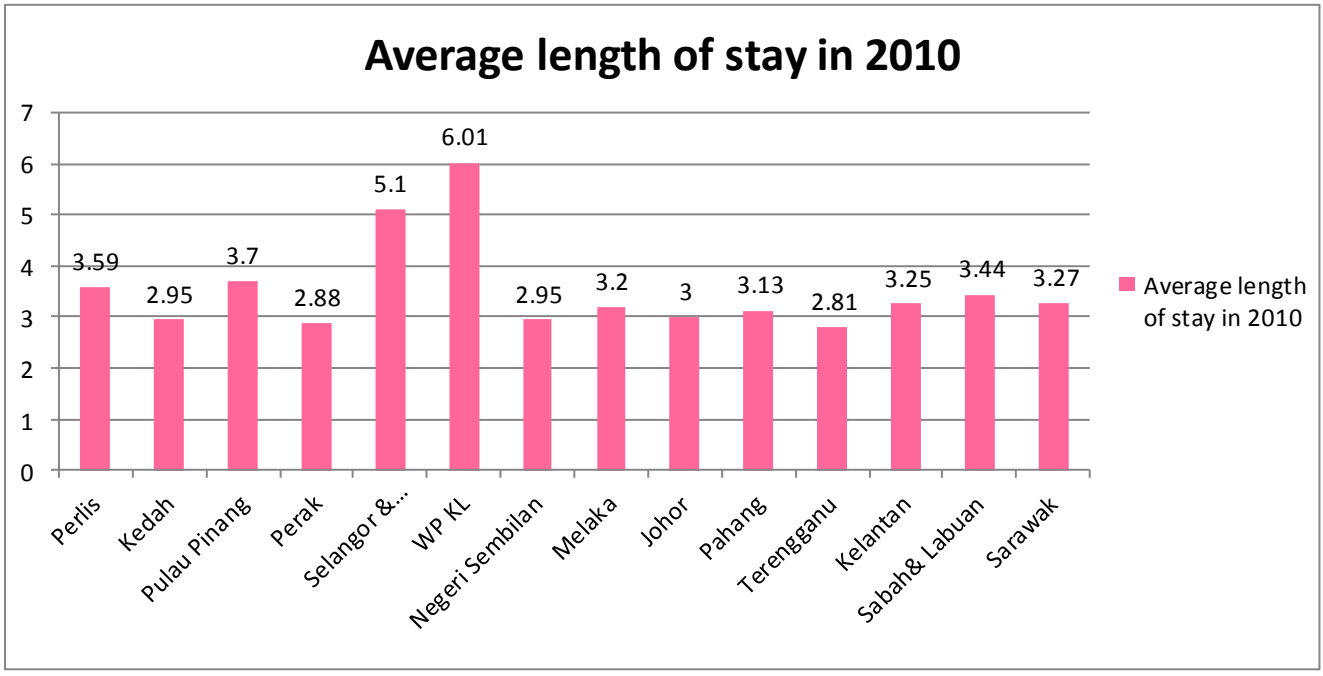
Figure-4. Turnover Interval by State in the year 2010 (CRC 2012)



3.3. Average Length of Stay

The average length of stay is defined as the mean time a patient is admitted to hospital, not inclusive of newborns (CRC 2012). Figure 5 illustrates the average length of stay in Malaysian public hospitals by state in the year 2010.

Figure-5. Average Length of Stay in Malaysia by State in 2010 (CRC 2012)



In Malaysia, the average length of stay is approximately 3.52 days (CRC 2012), which is already lower than many other nations (OECD 2011). This is due to the fact that the Malaysian population is a younger one, and under 7% of the population is over 65 (Kaur 2013). It is the cultural norm for family members to take care of one another. This social framework lends well to implementing the concept of hospital at home in Malaysia.

There are many ways the length of stay can be reduced, for example by instituting many reforms, like day care surgery and reducing admissions to hospitals as practiced in more affluent countries. This paper will be confined to reducing length of stay in hospitals. It is well established that care in the community including patients' homes is much cheaper. In Malaysia caring for patients in the community rather than a hospital bed is estimated to be a third of the cost (WHO 2013).

3.4. Achieving A Reduction in the Length of Stay

1) Reduce admissions by providing primary care physicians with clear guidelines
2) Increased supervision by senior clinicians before admission
3) Early discharge and providing appropriate care at home by trained health personnel with proper discharge planning, which would include communication with hospital and community staff.
4) Increase day surgeries and investigations for elective procedures rather than necessitating longer admissions.
5) Eliminate long waiting times for prescriptions, discharge letters and allied health professionals' appointments.
6) Regular audits by hospital management to ensure the above.

3.5. Hospital at Home

Hospital at home is a concept where patients spend a shorter duration as inpatients, and are discharged as early as possible when deemed clinically fit with a comprehensive written management plans for the community staff. Patients are allowed to go home with the knowledge that they will have 24 hour access to the community staff as well as the hospital for at least the next 48 hours via mobile phones or e-mail. It is encouraging to see that Malaysia, with its population of 29 million, has mobile phone ownership of 129% (Evans 2012).

Patients who have recovered from the acute stage and need intravenous treatment, particularly antibiotics, can be discharged early and treatment continued at home by the community nurses who have extended training and are licensed to carry out the procedure by their professional bodies. This in itself was found to save significant resources, in addition to achieving patient satisfaction (Dalovisio et al. 2000). In a few instances patients may need to be visited by a doctor. Similarly this can be extended to other conditions and procedures as well. One of the major advantages is that the health professionals are able to assess and make appropriate action as needed.

There will be a large cohort of patients who would not need the 'hospital at home' intervention. One of the factors that favor this approach is the continued support and care given by the extended family in Malaysia, which is by no means universal. Hospital at home would not only result in financial savings for the nation but would also provide significant social and psychological advantages. The longer a patient stays in the hospital, the higher the risk of untoward incidents, including hospital acquired antibiotic resistant infections, accidents and medical misadventures (Classen et al. 1997)

3.6. Achieving Cost Reductions

The projected average cost of a day in hospital is approximately RM155 (WHO 2013); this approximation represents the hotel cost and is not inclusive of drugs. However, this is based on figures from the year 2005 but published in 2012. The actual costs at this point in time are projected to be much higher.

There were approximately 2.23 million (Sivasampu et al. 2011) admissions to public hospitals in the year 2009. Using 2005 cost RM 155 as the cost per day, and average length of 3.52 days, the total hotel costs is approximated to be RM 1.22 billion.

If the average length of stay could be reduced by 0.5 days, to 3.02 days, the total cost would be approximately RM 1.02 billion. This reflects a saving of RM 200 million an year. If the cost per day

is extrapolated to 2009 -taking into account the inflation, cost of technology and significant increase in staff – the saving would be at least 25% higher i.e. 250 million.

As illustrated above, significant savings can be made by reducing length of stay. This is achievable, as not all patients actually need the extended hospital stay. This is where the concept of hospital at home really begins. Personal experience has shown that some of these patients can be discharged, provided that there is care in the community.

This is a concept that is being developed in certain specialties in the developed world (Iglehart 2008). However, in countries where this is being practiced in a small scale, personal experience suggests that there is no support in the community, and the doctors who care for these patients are not comfortable discharging them into the community. However, this system has its benefits. If the community support could be provided by appropriately trained doctors and nurses, patients could be treated in the comfort of their own home. It has been demonstrated that the longer the patient stays in hospital, the more likely it is for the patient to acquire complications other than the problem they presented with (Classen et al. 1997). Between the visits of health professionals, these patients could be cared for by their family, as is the cultural norm mentioned above.

If one assumes that the cost of providing hospital at home services to be about 50 million to employ staff and other capital and revenue costs, there would be a saving of around 200 million per annum, but this is only a conservative estimate. Malaysia has enough staff, both medical and nursing, as it has had a significant increase in the number of medical schools. According to the Malaysian medical association report in 2004, it is predicted that there will be a surplus of 4000 doctors by 2020. There is also an impending surplus of nurses (The Star Online 2012). This means that there would not likely be a shortage of staff for employment in the implementation of this system, as all that is needed is additional training.

Despite these advantages, the patients' safety is paramount, and the adverse effects of early discharge have to be considered. Proper evaluation of the patient prior to discharge is imperative, and a 24 hour open admission system has to be put in place in public hospitals, so the patient could be easily admitted in the event that something goes wrong. This concept of hospital at home also places a social burden on the patient's family, and may increase out-of-pocket costs, as items that would have otherwise been provided by the hospital such as gauze for dressing would now have to be bought by the carers themselves.

3.7. Risks of Hospital at Home

Early discharge for the purpose of savings will increase the risk of complications. However, this can be minimized by appropriate discharge planning and clinically appropriate discharge.

Feeling of inadequacy to care for a sick relative by the extended family can be overcome by providing support via mobile devices, community staff and open admission policy.

3.8. Managing Change

Managing change is one of the most difficult areas, especially in the healthcare sector, where there are age-old practices handed down from generation to generation. However, as Nigel Hawkes (2013) aptly described, *'nothing galvanises a community so much as a threat to its hospital. For better or worse, hospitals embody the reality of the NHS for most people in a way that general practice, let alone community care, cannot match. They are as important to a local sense of wellbeing as churches used to be, and defended with all the fervour that once filled those empty pews'*. Health personnel are quite passionate about caring for patients, and will resist any changes unless they are convinced; and to convince them is to put up the appropriate resources- in this case, in the community. One of the ways of developing the confidence to discharge early is to have the staff split their hours between working in the community and the hospital. Also, the professional bodies of nursing, doctors and other allied professionals should be consulted fully and should agree with the changes before the change is made, so they may be stakeholders in these changes.

4. Conclusion

A reduction in the average length of stay by just 0.5 days would approximately save up to RM 250 million. This is achievable and sustainable, and can be improved with appropriate planning and implementation. There are many advantages to the concept of hospital at home and community care, such as the reduction in costs, the comfort of patients in their own homes, reduction in the waiting lists with higher throughput and the further employment of clinical staff. However, managing change is a considerable obstacle and needs to be managed by involving all the stakeholders and with representation of professional bodies of all disciplines. The savings from this concept can be utilized to provide equity of care in the urban and rural areas. This concept is in-line with what was suggested by Nigel Hawkes (2013), as '*It is one in which physical and mental barriers dissolve: the walls that trap clinicians inside buildings and within professional silos are eliminated. Care is delivered where patients' needs can best be met, by medical teams working with professionals from primary and social care. Expertise is available seven days a week, both in hospitals and in the community … The hospital ceases to be "somewhere"; it becomes everywhere*.' . As suggested, future hospitals and care should be 'without walls' (Hawkes 2013), so that it would be fit for purpose in the future, and Malaysia would be a shining example for all other developing countries.

References

Ahmad L, 2011, Trends and outlook of labour migration in Asia 2009-10: Malaysia as a migrant receiving country. Presented at: ADBI-OECD Roundtable on Labor Migration in Asia: Recent Trends and Prospects in the Postcrisis Context, Tokyo, Japan.

Awofeso N, Rammohan A, Asmaripa A, 2012, Exploring Indonesia's "low hospital bed utilization-low bed occupancy- high disease burden" paradox, Journal of Hospital Administration, vol.2, no. 1, pp. 49-58, viewed 13 Sep 2013. Available from : http://www.sciedu.ca/journal/index.php/jha/article/view/1829/1082. doi: 10.5430/jha.v2n1p49

Bain CA, Taylor PG, Mcdonell G, Georgiou A, 2010 Myths of ideal hospital occupancy, Medical Journal of Australia, vol.192, no.1 pp. 42-43, viewed 13 Sep 2013. Available from: https://www.mja.com.au/journal/2010/192/1/myths-ideal-hospital-occupancy.

Certified General Accountants of Canada, 2010, Shifting the burden of healthcare costs-where to?, Canada.

Classen DC, Pestotnik SL, Evans RS, Lloyd JF, Burke JP, 1997, Adverse drug events in hospitalized patients: excess length of stay, extra costs, and attributable mortality, Journal of the American Medical Association, vol.277, no.4,pp.301-306, viewed 13 Sep 2013. Available from:http://jama.jamanetwork.com/article.aspx?articleid=413536. doi:10.1001/jama.1997.03540280039031.

CRC, 2012, NHSI charts Malaysia, Health Interface, viewed 13 Sep 2013. Available from: http://www.crc.gov.my/nhsi/charts/dashboard.html

Dalovisio JR, Juneu J, Baumgarten K, Kateiva J, 2000, Financial impact of a home antibiotic program on a medicare managed care program, Clinical Infectious Diseases, vol. 36, pp.639-42.

Ebrahim S, Kinra S, Bowen L, Andersen E, Ben-Shlomo Y, Lyngdoh T, Ramakrishnan L, Ahuja RC, Joshi P, Dass MS, Mohan M, Smith GD, Prabhkaran D, 2010, The effect of rural-to-urban migration on obesity and diabetes in India: a cross-sectional study, PLoS Med [Internet]. vol.7, no.4, viewed 13 Sep 2013. Available from: http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1000268 DOI: doi:10.1371/journal.pmed.1000268.

Evans P, 2012, Malaysia- telecoms, mobile, broadband and forecasts, viewed 13 Sep 2013. Available from: http://www.budde.com.au/Research/Malaysia-Telecoms-Mobile-Broadband-and-Forecasts.html

Hawkes N, 2013, Hospitals without walls, British Medical Journal, vol. 347, viewed 13 Sep 2013. Available from: http://www.bmj.com/content/347/bmj.f5479.short?rss=1. doi: http://dx.doi.org/10.1136/bmj.f5479.

Iglehart JK, 2008, No place like home- testing a new model of care delivery, New England Journal of Medicine, vol.359, pp.1200-1202, viewed 13 Sep 2013. Available from: http://www.nejm.org/doi/full/10.1056/NEJMp0805225. DOI: 10.1056/NEJMp0805225.

Kanapathy V, n.d., International migration statistics and data sources, viewed 13 Sep 2013. Available from: http://www.docstoc.com/docs/22427609/International-Migration-Statistics-and-Data-Sources-Malaysia

Kaur S, 2013, 'Great strides in Malaysia's healthcare system', *The Star Online*. Available from: http://www.thestar.com.my/News/Nation/2013/07/18/Health-Malaysia-University-Melaya.aspx

OECD, 2011, Health at a Glance 2011: OECD Indicators, OECD Publishing, viewed 13 Sep 2013. DOI: 10.1787/health_glance-2011-en

Okunad AA, Murthy VN, 2002, 'Technology as a 'major driver' of healthcare costs: a coanalysis of the newhouse conjecture', *Journal of Health Economics*, vol. 21, no. 1, p.147-59.

Queensland Health n.d., *Health technology assessment in Queensland*.

Quek DKL 2012, 'Health care costs & challenges for Malaysia', *Berita*, Malaysia.

Sivasampu S, Lim TO, Hisham AN, 2011, National healthcare establishments & workforce statistics 2008-2009, NHSI, Kuala Lumpur.

Sobngwi E, Mbanya JC, Unwin NC, Procher R, Kengne AP, Fezeu L, Minkoulou EM, Tournoux C, Gautier JF, Aspray TJ, Alberti KI, 2004, Exposure over the life course to an urban environment and its relation with obesity, diabetes and hypertension in rural and urban Cameroon, International Journal of Epidemiology, vol. 33, no.4 pp.769-76.

The Economic Planning Unit, Prime Minister's Department, 2010, *Tenth Malaysia plan 2011-2015*, Putrajaya.

The Star Online, 2012, Mismatch between training and market needs for specialized nurses, viewed 13 Sep 2013. Available from: http://www.thestar.com.my/News/Nation/2012/02/07/Mismatch-between-training-and-market-needs-for-specialised-nurses.aspx

The World Bank, 2012, Malaysia economic monitor: modern jobs. Thailand. Report number: 67944.

The World Bank, 2013, Health expenditure, total (% of GDP), viewed 13 Sep 2013. Available from: http://data.worldbank.org/indicator/sh.xpd.totl.zs

WHO, 2013. Choosing interventions that are choice effective (WHO-CHOICE): Malaysia, viewed 13 Sep 2013. Available from: http://www.who.int/choice/country/mys/cost/en/