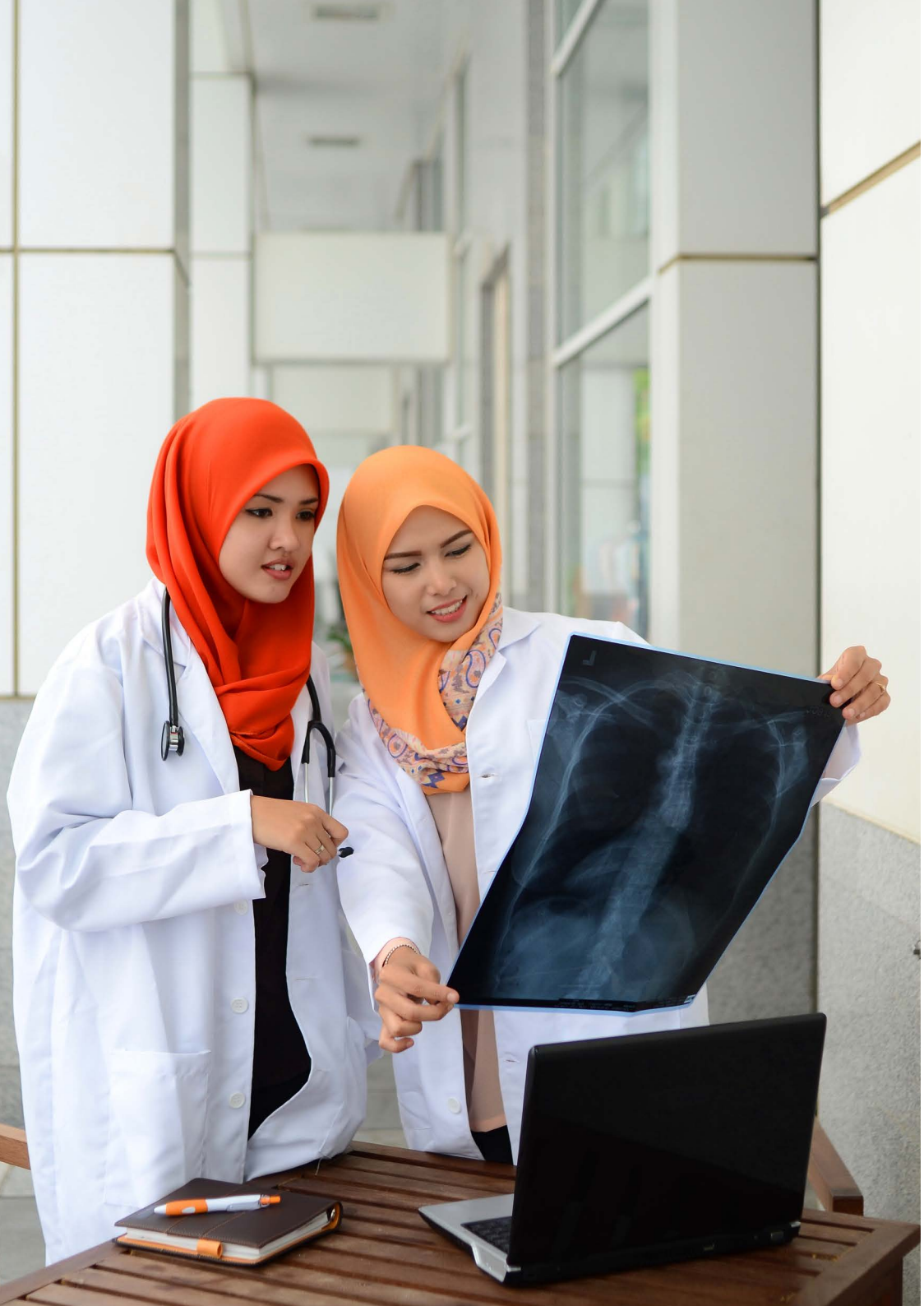
Healthcare Technology

NZ patient data management systems in Malaysia

Southeast Asia
Centre of Asia-Pacific Excellence



Executive Summary

A key focus of the Malaysian government is to provide a high-quality healthcare system in what is an emerging upper-middle-income country. There is a particular interest and market gap in healthtech and robust ICT infrastructure. The Malaysian government has increasing budget allocations to healthcare technology systems and encourages private investment, as currently no nationally integrated patient data management system (PDMS) exists.

Malaysia's healthcare is a two-tiered system comprised of 65% public and 35% private providers. No patient data integration occurs between private and public providers or between primary and secondary healthcare providers. This compromises the efficiency and quality of healthcare services.

New Zealand is well-positioned to engage in Malaysia's healthcare service industry. New Zealand healthcare technology providers have experience developing and implementing PDMS internationally, and New Zealand's existing free trade agreements with Malaysia reduce barriers to trade.

We explore the opportunities for New Zealand businesses to provide PDMS technology in Malaysia and recommend options for market entry. We suggest two options for a targeted entry strategy through either: 1) a state government contract in Selangor, which has a similar size and wealth to the New Zealand domestic market; or 2) KPJ healthcare, a relatively wealthy private healthcare provider in Kuala Lumpur that is ready to partner with international technology providers. Both of these strategies would facilitate market learning for subsequent national expansion in both the private and public healthcare sectors in Malaysia.

Background

Malaysia at a Glance

Malaysia has well-established links to New Zealand and has had diplomatic relations for over 60 years. These links provide a platform for developing authentic business-to-business and business-to-government relationships.

Malaysia is the sixth largest country in ASEAN by population, and one of the fastest growing and youngest nations, with 61% of the population aged 20 - 64 years old. Malaysia is a multicultural country, with three main ethnicities: Bumipetra (Malay), Chinese, and Indian. The country's high religious and ethnic diversity should be considered when doing business in the country, because of the resulting diverse consumer perceptions.

Malaysia's Business Environment

Malaysia is noted for its political stability and relatively democratic governance. It has a business-friendly regulatory climate, and is ranked 15 out of 190 in the World Bank's 'ease of doing business' index, and 51 out of 180 in Transparency International's Corruption Perceptions Index. Already an upper-middle-income country, it aims to reach high-income status in the near future, and consumers have the third highest purchasing power in ASEAN. It also has the third highest GDP in ASEAN with its real GDP forecasted to increase by 4.6% p.a. from 2019 to 2023.[1]

Malaysia is New Zealand's tenth largest export market with total exports of NZ$1.3 billion in March 2018.[2] Malaysia and New Zealand have two free-trade agreements: the ASEAN Australia New Zealand Free-Trade Agreement (AANZFTA) and the Malaysia-New Zealand Free-Trade Agreement (MNZFTA). AANZFTA is especially relevant to this project since it facilitates the export of healthcare technologies to Malaysia, a currently underdeveloped export sector.

Services are critical to Malaysia, contributing to 55% of GDP in 2018.[3] Furthermore, the government is backing further investment in services, and most employees work in the sector.

Relationship building in the Malaysian business environment involves building mutual understanding among individuals and presenting mutual benefits from business activities to yield maximum results. Business activities are chosen based on relationship quality and a desire to continue a partnership, rather than on necessity. The key business relationship attributes valued in Malaysia are trustworthiness, respect, and likeability. Business relationships in Malaysia are built over a longer period than in New Zealand. Therefore, it is vital to begin relationship development well before conducting business.

Healthcare in Malaysia

Malaysia's healthcare services operate a dual-tiered system comprised of a government-led and funded public sector and an independent private sector. In 2018, Malaysia had 144 public and 240 private hospitals (secondary healthcare providers), as well as 2,900 public and 7,000 private primary healthcare providers.[4]

The public sector services approximately 65% of the population, but is served by only 45% of all registered doctors and 25-30% of all registered specialists.[5] The public sector is heavily subsidised by the government, enabling patients to access both outpatient services and hospitalisations for minimal cost. Conversely, the private sector is directly funded by patients and various private health insurers.

The Malaysian government is proactive in improving the current healthcare system. For example, the Malaysian National eHealth Plan (2014) aims to strengthen the current health system with robust ICT infrastructure and systems. This includes the

“one person, one record” initiative to develop lifetime health records through data integration for accessibility and interoperability. The plan includes the development of a cloud-based, online healthcare platform to remotely connect patients to doctors and health and medical information.

The government seeks to develop a system where hospitals access medical reports on a single platform, enabling critical information transfer when patients move between private and public healthcare facilities. The vision is an integrated healthcare system, which will require information from different systems and various sources.

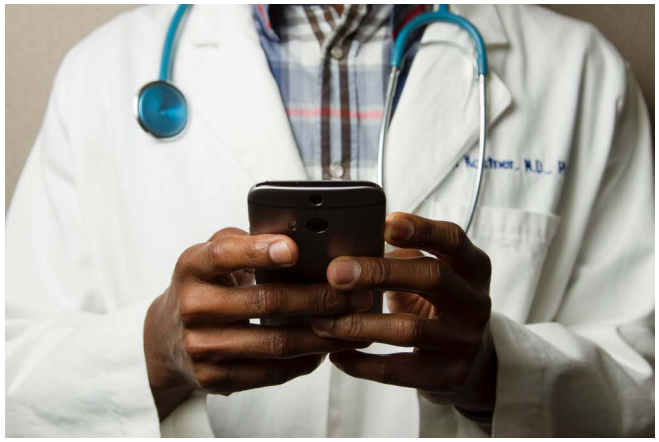
As a result, the Malaysian government will implement a national Electronic Medical Record (EMR) system. An EMR system is a fundamental part of the digital infrastructure of Malaysia’s health ecosystem, integrating all clinics and hospitals. Ultimately, the EMR system will help the Ministry of Health improve patient care and management. The Minister of Health estimates that the EMR system will be completed within three to five years in all hospitals and clinics nationwide.

The Malaysian government has steadily increased its funding for the public healthcare sector, and forecasts estimate that long-term healthcare spending in Malaysia will increase by 50-75%. Healthcare spending accounted for 10% of Malaysia’s 2019 budget, and the government allocated over US$7 billion for public healthcare in 2019.[6] This government commitment indicates a sizable and rapidly growing market opportunity for high-value New Zealand healthcare service exports.

Patient Data Management Systems in Malaysia

A Patient Data Management System (PDSM) is a software system that combines medical data and analysis with other software and administrative applications, which facilitate the collection and storage of large volumes of health data. A PDMS makes healthcare operations more efficient and improves healthcare outcomes through research on patient data. It typically includes clinical information, financial information systems, laboratory information, nursing information, pharmacy information, picture archiving, communications, and radiology information.

Private healthcare providers in Malaysia operate their own stand-alone PDMS. In contrast, public hospitals operate on a public Health Information System (HIS), which is comprised of the Basic Hospital Information System (BHIS), Intermediate Hospital Information System (IHIS), and Total Hospital Information System (THIS). Complexities arise in the interoperability between these three systems within the same healthcare providers and amongst different healthcare providers, so the Malaysian government is currently developing and managing an interoperable PDMS with international benchmarking.



Defining the Business Problem

Why have an integrated PDMS?

Unlike most developed nations, Malaysia does not have an effective integrated PDMS across healthcare providers. Consequently, patient data such as medical history, physician notes and prescriptions are not able to be transferred amongst:

— Primary and secondary healthcare providers in the public sector;

— Primary and secondary healthcare providers in the private sector;

— Public and private healthcare providers as a whole.

For instance, 70% of public hospitals do not have a dedicated Electronic Medical Record system.[7] Consequently, doctors and nurses still use written records that are hard to transfer among staff and other healthcare providers.

To complicate matters, over 40% of the population use private healthcare facilities outside the realm of the government system, further fragmenting data collection.[8] Consumer trends indicate that Malaysian patients also tend to 'shop around' for primary and secondary healthcare providers. It is common for patients to see a public GP (primary provider) who diagnoses them with a condition that the patient then chooses to have treated in a private hospital (secondary provider). In addition, many Malaysian patients do not have a regular family GP and instead choose different GPs based on price and convenience. The combination of these factors means that most Malaysian patients will regularly use multiple primary and secondary healthcare providers from both the public and private sectors throughout their lifetime. As a result, their health records are dispersed across the entire health system.

The lack of a comprehensive national PDMS has significant negative impacts on the efficiency and quality of healthcare. It takes considerably longer to retrieve and understand a patient's health history, resulting in re-testing and re-diagnosis, which in turn increases the cost of patient care. It also prolongs the delivery of treatment which can exacerbate pre-existing health conditions.

How does an integrated PDMS help?

An integrated PDMS can provide the following benefits:

— Efficiency increases because patient information can be retrieved more quickly, thus reducing the patient care delivery time. Faster data input and retrieval improves the capacity to record medical treatment, procedures, progress, and recovery in greater detail.

— Traceability is enhanced as each staff member involved in the patient care cycle may input data into the PDMS. This increases accountability amongst healthcare workers in primary and secondary providers.

— Compliance with documentation requirements improves because comprehensive data in the clinical workflow is integrated. This aids the development of healthcare policies based on the outcomes and experiences of patients, thereby also improving their safety and quality of care.

— A PDMS is essential to implement advanced medical technologies. The increase in health data is not only derived from increasing populations or greater recording of the patient cycle, but also from the new technologies implemented by healthcare providers. New x-ray technologies and testing systems require the data management structure to be large, comprehensive, and systematic to support their integration.[9]

Why Should New Zealand Export PDMS?

New Zealand's Competitive Advantages

New Zealand is well-positioned to export PDMS to Malaysia to improve patient data integration. The country's competitive advantages in the sector include:

— *Strong healthcare integration technologies:* Our sparsely distributed population and regional DHB system mean we have expertise in developing and implementing electronic management records for patient data.

— *The rapid growth in healthcare technologies:* This industry is projected to have strong growth over the coming decade in New Zealand. For example, health IT companies reported an average growth of 15% in 2013 – 2014 and 35% in 2014 – 2015.[10]

— *Export-oriented:* Since New Zealand only makes up 0.3% of the total world healthcare market, over 90% of New Zealand medical technologies are exported.[11] Medical technology exports were valued at more than $700 million in 2015. There are over 140 New Zealand medical device and health IT companies exporting to over 116 countries, including Malaysia, Singapore and Indonesia.[12]

— *Consistent with government aims:* The New Zealand government has identified healthcare technologies as a key future export sector. This opens the door to potential partnerships, incentives or support from the government for healthtech firms seeking to export into Asia.

— *Our small size:* Our health technology companies benefit from our small population size, which allows for agile testing, ensuring the reliability of our health technology exports.

Existing New Zealand PDMS Exports

New Zealand company Orion Health has two PDMS products that could be customised and exported to Malaysian healthcare providers. Orion Health is a world leader in creating PDMS, and it provides software for integration through to population health management and precision medicine. The company has more than 450 customers in 25 countries and about 1,200 staff globally.

Orion Health's key product is their Amadeus software, which manages electronic patient information for over 25% of the United Kingdom's population. Amadeus is a highly scalable platform built on modern technology that can aggregate all types of health data from both traditional and non-traditional sources. The open platform scales to accommodate the vast amount of data generated by new models of care, to support the journey from population health management to precision medicine.

A second software product, Orion Medicines, also aggregates medication data from multiple systems and care settings to display an up-to-date and accurate list of a patient's medications. This enables clinicians to curate, review, modify, and prescribe medications.

Business Strategy

Target Consumers

Whilst there are considerably more private healthcare facilities than public ones in Malaysia, the private market is relatively more fragmented, because many healthcare conglomerates own private facilities. In contrast, all public facilities are under the authority of the Malaysian Ministry of Health. The federal government is responsible for national healthcare financing and strategy while 13 state governments implement the federal mandate.

Table 1 summarises the key factors a New Zealand business should consider when choosing the business model for exporting PDMS services to Malaysia. Engagement with the Malaysian government typically requires a longer tender process, and the size of the public healthcare market is smaller than the private sector. However, there is a relatively greater chance to obtain large-scale and nationwide contracts through the public health sector, as the Ministry of Health would be the sole operator. On the other hand, the private healthcare market is larger with a relatively shorter tender process, but the fragmented nature of the sector creates difficulties in securing large, national-level contracts.

Table 1: Comparison of Private and Public Healthcare Sectors in Malaysia.

Public	Private
Smaller market size	Larger market size
One potential consumer (government)	Many potential consumers
National e-health strategy plan	No integrated e-health strategy plan
Longer tender process (typically 2 years+)	Shorter tender process (typically 1-2 years)

Financing

Public-sector sources of financing in Malaysia include the federal government and social security funds. Alternately, private-sector finance could be provided by insurance companies and patients. The Ministry of Health finances over 44% of all Malaysian healthcare expenditure, whilst private household expenditure accounts for 38% and private insurance 8%.[13]

New Zealand firms should consider that public sector financing is less flexible in accommodating unbudgeted costs, so the pricing of healthcare technologies is relatively inflexible. Public healthcare providers in Malaysia are highly subsidised to offer low-cost services for low- and middle-income patients. In contrast, private healthcare providers serve a wealthier segment and patients pay directly from their household income or through insurance.

Market Entry Strategy

We recommend that New Zealand PDMS service providers enter the Malaysian healthcare technology market with a targeted entry, focusing on either a particular state government or a single private healthcare conglomerate. The optimal outcome of this entry strategy would enable a New Zealand healthcare technology provider to:

— leverage the impact of the minimal resources required for marketing and relationship building;

— have a trial to adapt systems and processes for the Malaysian market; and

— build credibility in the Malaysian market by successfully implementing patient data management software in either a public or private context.

This approach accounts for the limited experience a New Zealand healthcare technology firm may have with adapting software to the Malaysian market. A targeted entry strategy facilitates greater customisation of software because of the small to

medium-scale of the initial client. The learnings and capacity developed from the initial market entry could then be leveraged to provide a competitive advantage in pursuing large-scale, nationwide projects as part of the government's e-health programme.

Option One: Selling to the Government

We have identified Selangor as a potential first regional government partner for the following reasons:

— Selangor has 11 state hospitals and 5 new hospitals to be built by 2023. The state hospitals served over 5.5 million patients in 2018 and lack an integrated PDMS.[14]

— Selangor is Malaysia's most populous state of 6.4 million people, which is comparable to the population of New Zealand.

— Selangor state accounts for 23% of Malaysia's GDP ($US78 billion) and it is the fifth wealthiest state by GDP per capita ($US12,500).[15] It also has the third highest HDI (Human Development Index) score and best digital infrastructure nationally. Consequently, the state has greater purchasing power and demand for integrated PDMS compared to smaller, less populous states.

— The state is highly urbanised (90%+) with a high population density, facilitating ease of implementation and integration of a state-wide PDMS.

Option Two: Selling to Private Healthcare Providers

Kuala Lumpur is the country's largest private healthcare market, with a disproportionate amount of the nations' private hospitals and primary health care providers. There are over 40 private hospitals, which is 25% of all private hospitals nationally. It is Malaysia's wealthiest region, with a GDP per capita of US$29,000 in 2018.

Kuala Lumpur is the best location for a New Zealand healthtech firm to enter the private healthcare market in Malaysia because:

— There is no data integration between private hospitals and private healthcare conglomerates in Kuala Lumpur.

— The majority of private hospitals do not have integrated PDMS, although private technology advances are greater than public sector counterparts.

— Kuala Lumpur has a competitive private healthcare market, and private providers are willing to incur significant expenditure on system digitalisation to increase service quality and efficiency.

We have identified KPJ Healthcare in Kuala Lumpur as a potential partner to enter the private market. KPJ Healthcare has a network of 25 hospitals in Malaysia, two hospitals in Indonesia, one hospital in Thailand, one hospital in Bangladesh and four retirement facilities in Malaysia and Brisbane, Australia. The company has over 3,000 licensed beds, treating more than 2.7 million patients in 2017 and employing over 13,000 staff.[16] KPJ would likely be open to engaging with a New Zealand partner for PDMS because:

— It is upgrading its Clinical Information System, which holds patient records, treatment orders, and other clinical information.

— It is a leader in digital adoption and was the first private healthcare provider in Malaysia to use the IBM Watson for Oncology.

— It currently sources data management programmes from Europe and the United States.

Existing Competition

Public and private sector healthcare providers in Malaysia tend to select Western companies to build and implement PDMS, because Malaysia does not have its own large healthtech companies with PDMS capabilities. A potential competitor is the government-launched incubator, Malaysian Data Warehouse, but the Ministry of Health has indicated that the incubator's system only collects data on a patient's visit to any health care facility, inpatient visits, and outpatient visits and thus is not a full EMS system.

Price is not always a determining factor for PDMS contracts as healthcare providers are willing to pay a premium for non-financial benefits, such as the customisability of software, enhanced data privacy and trusted working relationships. New Zealand healthcare technology providers may therefore have an advantage over larger multinationals because of their agile testing capacity and personalised service, as well as a strong trust in New Zealand privacy laws.

Finance

Operational Costs

There are three major operational costs to consider prior to entering the PDMS market in Malaysia. Together, these costs will total approximately NZ$235,550 per year.

The first cost is employing regional staff in Malaysia, a necessity to maintain relationships whilst operating in Malaysia. We suggest that the initial team should consist of a Manager, Head of Marketing and one staff member who is a New Zealand national with operational experience in New Zealand to ensure the system is managed efficiently. Standard New Zealand salary rates in comparable sectors were used to create an estimated total salary cost of NZ$200,000 per year.

The second operational cost is the rent of a headquarters in Malaysia. A physical presence is required while working with Malaysian clients to enhance the company's credibility and to develop trust, particularly when securing high-value public and private-sector contracts. Kuala Lumpur is the optimal location for the private-sector entry strategy, and the estimated cost for a high-quality premise here is approximately RM1,150 per desk per month, equating to about NZ$15,550 per annum in total.

Executive personnel based in New Zealand would be required to travel regularly to Malaysia for relationship development and maintenance and critical business activities such as contract negotiations. We assume that the three executive personnel would travel to Malaysia three times a year, for an annual cost of NZ$36,000.

Revenue Generation

Revenue may be generated with the initial sale of the PDMS, followed by recurring revenue from system maintenance and upgrades. Table 2 compares the revenue potential of the public and private-market entry strategies we have recommended, calculated by modelling previous PDMS contracts of a comparable scale and scope.

Table 2: Estimated revenue that could be generated from public and private healthcare contracts for PDMS services in Malaysia. All figures are in New Zealand dollars.

	Option 1: Government (Selangor)	Option 2: Private (KPJ)
Initial revenue from selling PDMS	40,000 beds x $350 = $14,000,000	3000 beds x $750 = $2,250,000
Recurring revenue from maintenance and upgrades	40,000 beds x $31.50 = $1,250,000	3000 beds x $83.33 = $250,000

Future Growth

Table 3 illustrates the potential growth opportunities in Malaysia's other 12 states. Again low, medium and high forecasts are projected by modelling previous PDMS contracts of a comparable scale and scope. These models suggest potential revenue could reach NZ$2.7 – $6.9million per year through national expansion.

Table 3: Forecasted potential revenue per annum from expanding the PDMS services to the 12 remaining Malaysian states. All figures are in New Zealand dollars.

	Low Revenue Estimate	Middle Revenue Estimate	High Revenue Estimate
Public contracts – initial revenue	5000 beds x $350 = $1,750,000	10,000 beds x $350 = $3,500,000	15,000 beds x $350 = $5,250,000
Public contracts – recurring revenue	5000 beds x $31.50 = $157,000	10,000 beds x $31.50 = $315,000	15,000 beds x $31.50 = $427,500
Private contracts – initial revenue	1000 beds x $750 = $750,000	1250 beds x $750 = $937,500	1500 beds x $750 = $1,125,000
Private contracts – recurring revenue	1000 beds x $83.33 = $83,330	1250 beds x $83.33 = $104,000	1500 beds x $83.33 = $124,995
TOTAL POTENTIAL REVENUE	$2,740,330	$4,856,500	$6,927,495

Conclusions

This report highlights the opportunity for New Zealand healthcare technology businesses to export PDMS to the Malaysian healthcare market. New Zealand's growing healthcare technology sector, agile-testing environment, and existing expertise provide firms with a competitive advantage to help the Malaysian Government achieve their "one-patient, one record" e-health strategy.

We recommend that New Zealand companies exporting PDMS to Malaysia use a targeted market entry strategy, either through the public sector in Selangor state, or through KPJ Healthcare, a private healthcare provider in Kuala Lumpur. Both of these entry strategies will create an opportunity for initial market adaptation prior to national expansion. The potential for the PDMS export market to public and private healthcare providers in Malaysia is significant, and companies with existing expertise in the sector should explore the export opportunities before other international competitors capture the market.

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