



# Home Monitoring Technologies in the Community/Home Care Environment March 2006

Prepared by



British Columbia Institute of Technology

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## **Executive Summary**

### ***Objectives***

The objectives of this study were:

- to identify and characterize the major market sectors in home health monitoring
- to identify and describe the leading companies in the world in health monitoring technology who have an active interest in community/home care
- to identify and describe the leading Canadian product development companies with an active interest in community/home care
- to identify Canadian researchers and research groups engaged in community/home care technology development

Information gathering was limited by the timeframe allocated for the project and the exclusive use of secondary research methods, primarily Internet search.

### ***Market Definition***

Home health monitoring, more commonly referred to as remote patient monitoring (RPM), is a branch of telemedicine that focuses on providing monitoring a single, or set of, health related indicators of a patient located in his or her home.

The market for RPM primarily consists of agencies that pay for home health care (Home Health Agencies or HHAs) that is provided either by the agency or by a third party that the agency contracts to.

There are four sectors within the RPM market:

- remote monitoring of chronic disease
- remote monitoring of medication selection and compliance
- tracking of patient location and movement
- remote monitoring of physical indicators in order to prevent disease and promote wellness

### ***Market Growth***

Most sources reviewed felt that the RPM market will grow over the next five years. Analysis of the drivers of market growth indicates that the remote monitoring of chronic disease sector will exhibit the most activity.

Several drivers underlie expectations of a growing RPM market:

- the need to reduce healthcare costs
- advances in information and communications technology
- changes in the HHA industry that promote enhanced cost effectiveness and data collection
- changing reimbursement policies

While the RPM market holds the potential for growth, there are several obstacles to its emergence as an established industry. Three major obstacles identified are lack of funding/reimbursement for RPM, acceptance of RPM by health care practitioners and evidence of RPM cost effectiveness.

Several factors complicate estimation of present and future market size for RPM. The most current and relevant forecast reviewed was for the US RPM market. In 2003 the US remote patient monitoring devices market was estimated at \$54.5 million. By 2010, total revenues for the remote patient monitoring devices market are forecast to reach \$260 million at a compound annual growth rate of 25 per cent from 2004 to 2010. This forecast reflects a market in its infancy, one that could grow rapidly if adoption obstacles are overcome.

### ***Industry Leaders***

Companies active in RPM fall into several categories:

- ***SME Device Makers*** - small and mid sized patient monitoring device manufacturers (e.g. Health Hero Network)
- ***Industry Heavyweights*** - large multinationals providing remote patient monitoring systems (e.g. Philips)
- ***Systems Integrators*** - ICT companies integrating devices and systems with software applications to create an RPM solution that is marketed primarily to HHAs (e.g. McKesson)
- ***Prospectors*** - large multinationals interested in some or all aspects of RPM that appear to be exploring the industry before making a major commitment (e.g. Intel )

Several sources pointed to the central role partnerships play in success in the RPM business. Competitive necessity motivates industry participants to form partnerships for two main reasons. The first motivator is the trend to interoperability. Companies that offer solutions that do not connect with ICT sold by other vendors are increasingly out of step with the market. A closely related motivator is the desire for integrated solutions. Customers seek turnkey, single source, solutions rather than the challenge of purchasing solution components separately.

The desire for interoperable, integrated solutions drives industry players to work together in partnerships to provide the 'right' mix of technology, service, usability and price. A common thread running through the strategies of many of the industry leaders is the attempt to increasingly broaden the scope of the RPM solution they offer.

Partnerships are likely a prelude to consolidation as industry heavyweights and prospectors access new technology by acquiring the SME device makers that they partner with.

Globally, numerous companies are active in some or all elements of the industries that comprise RPM. In Canada, the RPM product development field consists of a small number of smaller domestically owned companies and subsidiaries of larger multinational firms. A handful of Canadian research groups are actively investigating new product development directly related to RPM.

### ***Conclusions***

The principal finding is that growth in the RPM field will likely occur most rapidly in the remote monitoring of chronic diseases sector. Many leading companies reviewed are directing their RPM related research and development toward devices, systems and solutions that monitor these diseases. Implication - technology that monitors chronic diseases should be a major emphasis point for research and development.

A secondary finding is the importance of quality partnerships in the RPM business. Implication - strategic partners that already have quality partnerships in place are likely necessary participants in any successful research and development effort, both as a market oriented influence on research direction and as an outlet for technology developed by the effort.

Along with quality partnerships, creation of technology that is interoperable and as capable as possible of being integrated into the systems and solutions of industry leaders is also a requisite for success. Implication – research and development should emphasize the creation of technology that 'plugs into' the devices, systems and solutions marketed by industry leaders. As well, because the RPM field involves the integration of medical devices and ICT, research and development efforts should feature multidisciplinary teams from both areas.

In order to achieve the scale and scope needed to create research and development activity that is meaningful to industry in the RPM area, intensive and ongoing collaboration between Canadian groups and companies involved in RPM is required. Exploration of the most effective form that this collaboration could take is recommended.

## **Limitations**

Two major limitations were present in the conduct of this study:

1. the study had a very restricted time frame
2. the study relied exclusively on secondary research methods, primarily Internet search

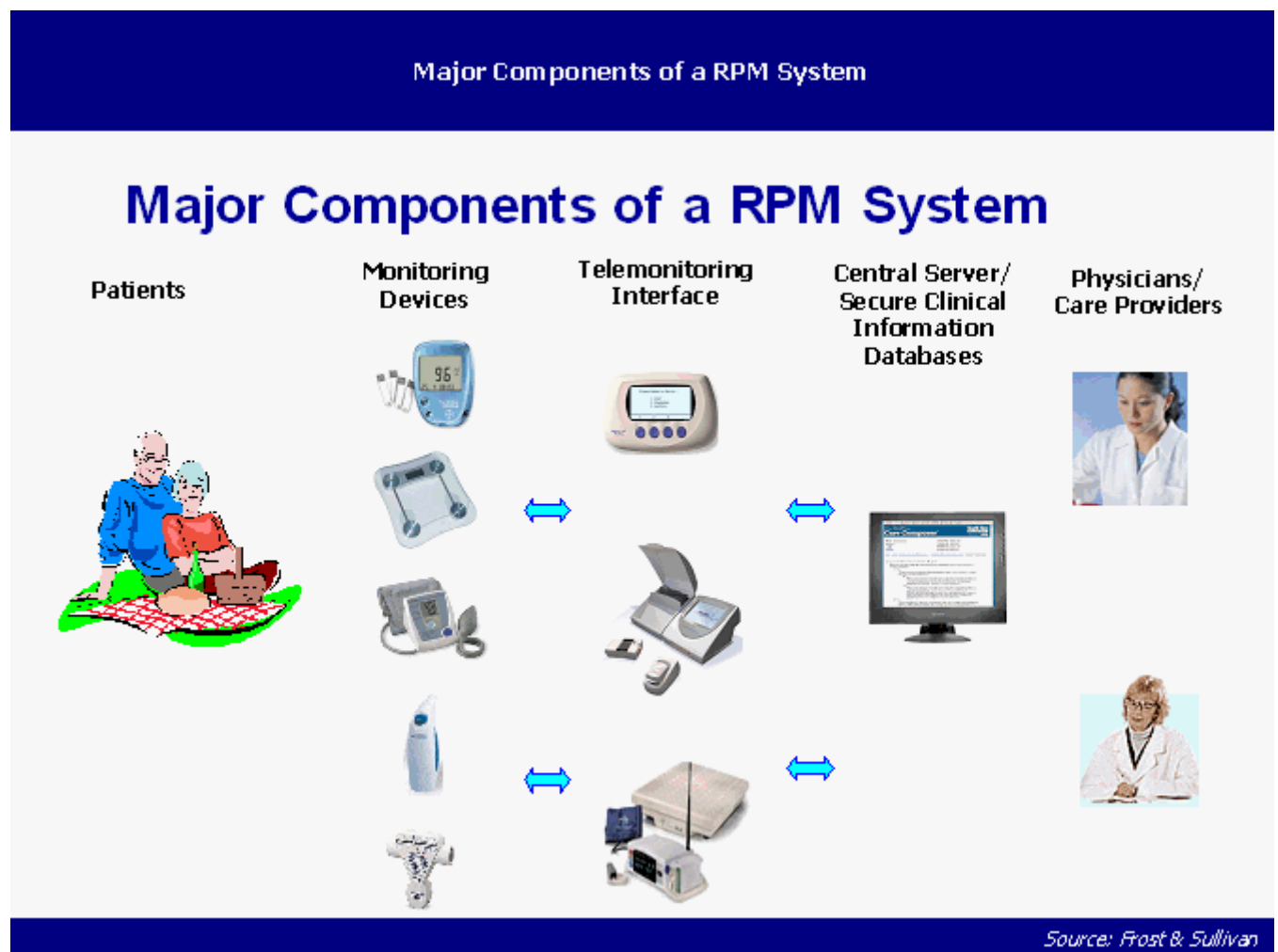
Both limitations primarily impacted the depth and currency of information found within the profiles, particularly those of the Canadian companies and research groups.

# 1.0 Market Sectors in Home Health Monitoring

Remote patient monitoring (RPM) is a branch of telemedicine that focuses on providing monitoring a single, or set of, health related indicators of a patient located in his or her home. RPM technology provides a remote device or system that collects and transmits regular patient monitoring data between a home-based patient and a home health care agency, physician or other group responsible for monitoring and interpreting the data.

Figure 1 provides a schematic representation of a basic RPM situation.

Figure 1



The market for RPM primarily consists of agencies that pay for home health care that is provided either by the agency or by a third party that the agency contracts to. These agencies are referred to as Home Health Agencies ('HHAs') in this study. Thus, as in many medical markets, the market is not the consumer of the medical service or product, but a third party,

the HHA. The HHA often must obtain approval from a medical insurer before payment can be received by the third party i.e. the RPM in question must fall within a reimbursable medical insurance category or the HHA will not receive payment. As in the medical devices market generally, the presence of reimbursement is a major market driver.

The HHA often provides RPM as part of a health care package purchased by a customer (which could be a government agency, a private company, a hospital, a nursing home chain, or other care giving group) from the HHA. In the American market, private sector HHAs are found more frequently than in other markets with larger direct state roles in the provision of medical services.

There are four sectors within the RPM market:

### ***1.1 Major Market Sector 1- Remote monitoring of chronic diseases***

This sector centres on RPM for five chronic diseases - diabetes, congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), asthma, and hypertension. RPM is used to monitor individuals with chronic disease to support improved compliance with treatment programs and provide early detection of changes in health status.

RPM components used in this sector include:

- blood pressure monitors
- pulse oximeters
- cardiac monitors (ECG monitors, Holter monitors, heart rate monitors, cardiac output monitors)
- respiratory monitors
- pulmonary function analyzers
- neurological monitors (EEG, EMG monitors)
- blood glucose monitors
- cholesterol monitors

Most RPM activity reviewed for this study occurs in this sector. It is likely that the remote monitoring of vital signs for chronically ill patients market area will experience the most growth of the four sectors in the next five years. Discussion of market growth drivers below strongly reinforces this observation.

## ***1.2 Major Market Sector 2 - Medication selection and compliance***

This sector involves RPM to ensure that users are taking the appropriate type and levels of medication. Applications in this area include 'talking' pill bottles that remind users of their dosage and timing of medication. This sector appears to have less potential than the chronic illness sector for RPM applications over the next five years

## ***1.3 Major Market Sector 3 - Tracking of patient location***

This sector involves use of RPM to track users with dementia who may 'wander' or enter dangerous situations due to disorientation. The range of applications and market potential for this sector appear to be narrower and thus have less potential than those found in the chronic illness sector.

## ***1.4 Major Market Sector 4 - Prevention and wellness***

This sector involves using RPM to monitor individuals in ways that enable the users to reduce their susceptibility to chronic diseases such as diabetes and to improve or maintain their overall health. Users could be monitored for weight gain, cholesterol levels, blood pressure and the like prior to onset of chronic illness. The prevention market represents a possible future for RPM that could conceivably embrace a mass market. However, there is little solid evidence of a significant near term market for this application although a wide range of exploratory activity is apparent.

## ***1.5 Drivers of Growth***

Most sources reviewed reflected the observation that the RPM market is "poised for robust growth in the years ahead."

[Frost and Sullivan, Remote Patient Monitoring Technologies Get Patients Wired for Health and Wellness, July 1 2004]

A consensus appears to exist that the drivers of growth are most prevalent in the *chronic illness* market sector:

*Remote patient monitoring technologies have demonstrated the strong cost savings potential of telehealth technologies in managing chronic diseases such as diabetes. A key driver of the growth of RPM technologies is the consistent increase in the over-65 age group causing a rise in the incidence of chronic diseases and associated co-morbidities.*

*With chronic diseases such as diabetes being among the costliest and most burdensome for the healthcare system, the U.S. healthcare community, which was traditionally focused on providing acute care, has been forced to consider alternatives that empower and enable patients to take a more active role in managing their conditions. RPM programs are expected to deliver a higher quality*

*of care in a more cost-effective manner. With an undeniable value proposition, the growth of the remote patient monitoring devices market is forecast to be robust in the years ahead.*

[Frost and Sullivan, Overview of the U.S. Diabetes Remote Patient Monitoring Devices Market August 29, 2004]

Movements by large industry players reinforce the view that market potential exists. For example, the recent acquisition of Lifeline Systems (Lifeline provides emergency-monitoring and response services for senior citizens and disabled people) by RPM leader Philips Medical Systems is notable for the valuation (\$750 million \$US or roughly five times sales) and the sales projections that accompanied the announcement:

*Philips Electronics targets sales for the [Medical Systems] division of €750 million to €1 billion in two to three years. That is up sharply from less than €100 million now. Niels de Zwart, an analyst at Rabo Securities, said home monitoring is a clear growth market. "Penetration of such systems is still low and is offering significant growth opportunities," he said.*

(Philips Electronics Plans to Buy Lifeline Systems for \$750 Million *Wall Street Journal* January 20, 2006; Page A11).

The Philips press announcement noted that:

*Marking an important milestone in building its consumer healthcare and wellness business, Philips has acquired Lifeline. Lifeline is the leader in 'personal emergency response' services targeted at seniors living independently at home. With over 30 years' experience, the company has a broad market presence in North America. In 2005, its turnover is expected to be approximately USD150 million with a growth of 15%. The acquisition fits perfectly with Philips' focus on home healthcare.*

Another example of financial commitment to RPM is the 2005 purchase of Tunstall Group. Tunstall, the largest UK telehealth company, was acquired by a private equity firm for almost \$400 million US.

Several drivers underlie expectations of a growing RPM market:

#### ***The need to reduce healthcare costs***

Chronic diseases are particularly expensive to manage. Across geographic markets, the demographic reality of aging populations and the accompanying upswing in chronic disease sufferers has created a pronounced need to reduce health costs. Home health care has emerged as an option for reducing hospitalization costs and possibly preventing deterioration of existing chronic illness patients. Demand for RPM will rise as HHAs seek to provide solutions that can be shown to be cost effective compared to other means of caring for patients.

As an industry analyst observed,

*"the drive for increased cost control and efficiency emanates from the rapidly increasing healthcare costs. There is pressure from reimbursement agencies such*

*as Medicare to reduce patient hospital re-admissions. These trends are promoting the development of sophisticated systems that allow patients to self-manage conditions from homes while providing a technology-based system to facilitate timely intervention.*

[Frost and Sullivan, Overview of the U.S. Diabetes Remote Patient Monitoring Devices Market August 29, 2004]

### ***Information and communications technology advances.***

Information and communications technology (ICT), particularly in relation to Internet applications, has advanced to the point where RPM systems can now inspire more confidence in HHAs and key influencers such as MDs and other health care professionals. Falling technology costs and availability of vendor financing options for RPM systems will allow smaller HHAs to afford to purchase.

### ***The changing HHA industry***

HHAs are under pressure from insurers and government funders to show cost effective approaches to home care and to provide data supporting their approaches. RPM offers a solution aligned with both necessities

### ***Changes in reimbursement policies***

RPM has begun to gain limited acceptance from insurers in some markets. For example, in the US market:

*Some private payers are also offering reimbursement for telehealth in at least 25 states. These factors have positively impacted the return on investment (ROI) for manufacturers and customers like home care agencies and enhanced the adoption of remote patient monitoring programs.*

[Frost and Sullivan, Remote Patient Monitoring Technologies Get Patients Wired for Health and Wellness, July 1 2004]

This driver is of paramount importance in the development of a market for RPM. Jay Mazelsky, the point man for RPM at industry leader Philips, remarked that:

*The application of home patient monitoring still remains largely untapped, but market growth is in the foreseeable future, Philips' Mazelsky says. "We are at a key inflection point of the interest level. What has changed—something that tends to drive the creation of marketplaces—is Medicare- or CMS-level interest in chronic care improvement programs.*

[Managed Healthcare Executive, Mar 1, 2005]

Frost and Sullivan note that "a more comprehensive program of reimbursement is likely to emerge in the next three to five years given the strong value proposition and results of current programs."

[Frost and Sullivan, Remote Patient Monitoring Technologies Get Patients Wired for Health and Wellness, July 1 2004]

## **1.6 Obstacles to Growth**

While the RPM market holds the potential for growth, there are several obstacles to its emergence as an established industry. Three major obstacles are funding, acceptance and evidence of cost effectiveness.

### ***Funding for RPM***

Payment for RPM is linked to HHAs receiving funding for RPM from government or private medical insurance plans. This implies institutional acceptance of RPM as a reimbursable service. Such acceptance has not occurred in a comprehensive way in any market examined.

Frost and Sullivan echo the views of many sources reviewed:

*Foremost among these [obstacles to RPM growth] is the challenge of gaining reimbursement in a market perceived to be lacking the critical mass and evidence of cost-effectiveness. The absence of reimbursement impacts manufacturers investing in the innovation, adoption, and deployment of telehealth programs. While technology is a strong differentiator, **industry participants realize that the prime driver of the market is reimbursement.***

[Frost and Sullivan, Overview of the U.S. Diabetes Remote Patient Monitoring Devices Market August 29, 2004]

While technology creates the capabilities of RPM, reimbursement creates the market.

### ***Limited Acceptance of RPM by Influencers***

The health industry is one in which several different groups must accept an innovation or change in order for it to be adopted successfully. Acceptance by influencers is thus critically important for market penetration. For example, RPM will not be implemented in a comprehensive manner unless health care practitioners and hospitals accept the approach and actively collaborate with it.

There is evidence of several obstacles to influencer acceptance:

- RPM technology may be perceived to be too difficult to integrate into existing medical systems and routines
- RPM is often not reimbursable; existing reimbursement favours the conventional face to face examination and treatment approach
- RPM technology does not work 'as advertised' e.g. RPM yields too many false positives and ends up consuming more time and resources for the health care professional than normal forms of monitoring
- While there appear to be many RPM benefits for patients (less waiting, less travel time, convenience) patients are neither the buyers nor the key influencers involved in the purchase of RPM

- Definitive technology standards have not been set for RPM. Interoperability between the systems offered by different vendors has been limited and HHAs are hesitant to invest in an approach that is incompatible with the eventual standard will be used by hospitals and clinics

### ***Lack of Evidence of Cost Savings or Cost Containment***

Adoption of RPM by insurers, government, HHAs and medical professionals has been limited by lack of solid evidence of cost savings. Several studies and test projects have been done and more are underway. No comprehensive, definitive evidence of cost savings yet exists, largely because the field is still in its infancy. However, this lack of evidence slows adoption by HHAs looking for data showing outcome improvement and/or cost containment or reduction.

In a 2004 White Paper, the Ontario Hospital eHealth Council observed that:

*The technology [to provide telehealth] exists in the Canadian marketplace, but no technology vendor has had a significant breakthrough in the adoption of their products in Ontario, largely due to funding models and other healthcare priorities. Vendors may be looking for an Ontario-based flagship program.*

Analysis & Opportunities For expanding Home Telehealth in Ontario, A White Paper developed by the Ontario Hospital eHealth Council April 2004

None of these obstacles are insurmountable. A recent announcement by Health Hero is indicative of movement in a favourable direction, an RPM test funded by Medicare:

*Health Hero Network, announced today the start of a new program sponsored by Medicare. Named the Health Buddy Program, the project will test whether technology-based preventive care can help patients struggling with chronic illness lead happier, healthier, longer lives while reducing health care costs. Up to 1,600 patients with severe chronic illnesses will use Health Hero Network's Health Buddy® system to manage their conditions from their homes with daily oversight from their care management teams. Health Hero Network's technology has reduced hospitalizations by up to 63 percent in similar programs.*

## **1.7 RPM Market Size**

Several factors complicate estimation of present and future market size for RPM. As one source noted in relation to the broader field of telemedicine:

*"The telemedicine market is 'a mile wide,' and that makes it difficult to pin down comprehensive spending figures," explains Jon Linkous, executive director of the American Telemedicine Association, a nonprofit organization that has been providing information, policy development and training, and advocacy related to telemedicine for more than a decade. "The overall telemedicine market may be close to \$2 billion per year, but that's a wild guess. Tracking that spending is*

*going to be difficult because it becomes integrated into medicine, which is what we want."*

[Glenn Wachter" How High Will Telemedicine Soar? *For the Record*, Vol. 16 No. 5 p. 28 2004]

Another observer pointed to the diverse nature of telemedicine as a complicating factor in estimating market size:

*Another striking (and confounding) problem is that telemedicine is more than simply one product. Telemedicine is better described as a method of distant healthcare delivery that can be accomplished by—it would seem—an infinite number of technology solutions in a variety of settings. Certainly, there are successful vendors that sell telemedicine packages and turn-key systems. However, scores of institutions pride themselves on assembling their own system solutions. Further, there are many privately owned (as opposed to publicly traded) vendors whose annual sales figures are usually proprietary and therefore hard to obtain.*

[Glenn Wachter" How High Will Telemedicine Soar? *For the Record*, Vol. 16 No. 5 p. 28 2004]

RPM can be regarded as a subset of either 'telemedicine' or 'patient monitoring'.

Forecasts for telemedicine vary widely. The most relevant forecast reviewed was for the US RPM market, prepared by Frost and Sullivan:

*Remote patient monitoring is a branch of telemedicine that focuses on providing home health services using telehealth technologies. It delivers improved quality of care to patients, reduces costs associated with avoidable emergency room (ER) visits and helps manage a host of chronic diseases by providing timely intervention and care. In 2003, the US remote patient monitoring devices market was estimated at \$54.5 million. By 2010, total revenues for the remote patient monitoring devices market are forecast to reach \$260 million at a compound annual growth rate of 25.0 per cent from 2004 to 2010*

[Frost and Sullivan, Remote Patient Monitoring Technologies Get Patients Wired for Health and Wellness, July 1 2004]

This forecast corresponds to a market in its infancy, one that could grow rapidly if adoption obstacles are overcome.

## 2.0 Leading (Top 10) companies in the world in health monitoring technology who have an active interest in community/home care

A review of the industry is required to place the listing of companies in context.

### 2.1 Structure of Remote Health Monitoring Industry

Companies in the industry provide one or more of three different offerings, depending largely on their size, commitment level to RPM and expertise:

- *Devices* - defined as stand alone products such as glucose monitors or oxidimeters. For example, the Health Buddy monitor sold by Health Hero Network
- *Systems* - defined as a combination of stand alone product(s) and a gateway or integration product that the devices 'plug into'. For example the McKesson Telehealth Guardian system
- *Solutions* - defined as a combination of devices and system(s) sold as an overall solution. For example - McKesson markets a solution that combines the Telehealth Guardian system, the Health Buddy monitor and other monitoring elements into a single turnkey solution called the Telehealth Advisor

Larger companies tend to provide solutions, while smaller companies focus on devices.

Companies fall into several categories

- *SME Device Makers* - small and mid sized patient monitoring device manufacturers e.g. Health Hero Network
- *Industry Heavyweights* - large multinationals providing remote patient monitoring systems e.g. Philips
- *Systems Integrators* - ICT companies integrating devices and systems with software applications to create a solution that is either marketed directly to HHAs (e.g. McKesson) or marketed to other RPM companies, who then perform a VAR role by modifying and then reselling the solution to HHAs (e.g. Emergin)
- *Prospectors* - large multinationals interested in some or all aspects of RPM that appear to be exploring the industry before making a major commitment e.g. Intel (sensors), Cisco (networks)

### RPM Industry Participant Categories

CATEGORY	CHARACTERISTICS	EXAMPLE
<b>SME Device Makers</b>	<ul style="list-style-type: none"> <li>- often entered by developing a single device, often as an offshoot of R&amp;D done in an ICT field</li> <li>- usually a small range of products</li> <li>- niche oriented</li> <li>- usually license or sell products to larger companies in other categories</li> <li>- some may have attempted to create systems based on their products</li> <li>- many companies in this category; leaders have partnerships with industry heavyweights and/or systems integrators</li> </ul>	Care Guard Health Hero
<b>Industry Heavyweights</b>	<ul style="list-style-type: none"> <li>- entered market through existing medical equipment business</li> <li>- sell systems and solutions</li> <li>- some leaders have partnerships with systems integrators and SME device makers (e.g. Draeger); some leaders develop or acquire their own technology (e.g. GE Healthcare)</li> </ul>	Philips Draeger
<b>Systems Integrators</b>	<ul style="list-style-type: none"> <li>- entered market through existing ICT/management information systems business</li> <li>- larger companies are attempting to expand their presence in the health industry by moving into RPM (e.g. McKesson)</li> <li>- leaders have partnerships with SMEs and industry heavyweights</li> </ul>	Emergin McKesson
<b>Prospectors</b>	<ul style="list-style-type: none"> <li>- are exploring the potential of the industry, which they see as having some synergy with their core business</li> <li>- not fully committed</li> </ul>	Intel

Two industry features are relevant in identifying the leading RPM companies - partnerships and consolidation.

### ***Paramount Role of Partnerships***

Several sources pointed to the central role partnerships play in success. Competitive necessity motivates industry participants to form partnerships for two main reasons - the movement to interoperability and the market's desire for integrated solutions.

The first motivator is the trend to *interoperability*. As the health industry moves to adopt ICT, devices and systems from vendors must connect with each other. Companies that offer solutions that do not connect with ICT sold by other vendors are increasingly out of step with the market.

As analyst Nathan Cohen noted in a 2006 report:

*"The IT movement has spurred an unprecedented level of communication between hospitals, vendors and consultants; companies that 'don't play well with others' quickly receive unfavourable publicity. Considering the complex web of technologies and competing interests that characterizes the healthcare industry, most vendors are realizing the central importance of partnerships for rapid market development and penetration....the dominant patient monitoring companies, such as GE, Philips and Draeger Medical, are the first clear winners in the move towards interconnected monitoring devices".*

[Frost and Sullivan, Complex Patient Monitoring Systems Drive Standardization January 25 2006]

A closely related motivator is the *desire for integrated solutions*. Customers seek turnkey, single source, solutions rather than the challenge of purchasing solution components separately and then performing the integration themselves.

The desire for integrated solutions drives industry players to work together to provide the 'right' mix of technology, service, usability and price. A common thread running through the strategies of many of the industry leaders is the attempt to increasingly broaden the scope of the RPM solution they offer. This broadening movement implies ongoing and increasing partnerships.

As Frost and Sullivan noted in a 2006 report:

*The key for developing more expansive patient monitoring systems in this space **will be the partnerships** formed with an eye to delivering high-quality, integrated monitoring devices.*

[Frost and Sullivan, Complex Patient Monitoring Systems Drive Standardization January 25 2006]

An example of the many cross category partnerships that have evolved in the last year is the Clinical Connection system provided by a partnership made up of Cisco (prospector), Philips (industry heavyweight) and Emergin (systems integrator).

*The patient monitoring system sends electrocardiogram data via waveform snippets and text messages to the Cisco Wireless IP Phone 7920 from the Philips IntelliVue patient monitoring system via the Emergin Patient Monitoring Gateway. Acting as a secondary alarm notification, the solution allows nurses and clinicians to maintain their mobility while still receiving critical patient data.*

[Cisco press release]

Another example that shows the breadth of the 'prospector' category is the Humana/Careguard joint venture called Sensei. Humana is a major health insurance and benefits administrator exploring the potential benefits and synergies to its core business from RPM.

*Sensei will be operated mainly as a wireless information platform, on which subscribers will be able to receive personalized nutrition, weight loss information, fitness notifications and medication reminders through their mobile phones and/or PDA's. The company's first services are scheduled to be available to subscribers in the first half of 2006. **The Sensei platform will be marketed through wireless carriers, weight loss companies, fitness centers, consumer electronic companies and web portals. By 2007, the platform is also expected to include monitoring for hypertension, diabetes, heart failure, stress reduction, and asthma, among other conditions.***

[Card Guard press release]

This joint venture is also interesting in its focus beyond the chronic care/HHAs market to the preventative/consumer market.

*"Sensei is well positioned to capitalize on the vision and resources of Humana and Card Guard to positively impact consumer behavior," said Terry Minton, CEO of Sensei. "Engaging consumers with personalized messages and customized content enables Sensei to be their wireless information mentor."*

[Card Guard press release]

Partnerships are likely a prelude to consolidation as industry heavyweights and prospectors acquire technology by acquiring SMEs they partner with.

## **Consolidation of Ownership**

The medical devices industry in general is experiencing significant merger and acquisition activity. As the Wall Street Journal noted recently:

*M&A news in the medical-device industry has been dominated recently by the bidding war for device giant Guidant Corp. But smaller, venture-backed device companies also are in play. Last year, for example, St. Jude Medical Inc. acquired Velocimed LLC, a Minneapolis-based maker of cardiovascular devices that was backed by Warburg Pincus and other VCs.*

[Medical-Device Firms Receive A Healthy Increase in Funding, *Wall Street Journal* March 8 2006]

The larger players in the RPM market can be expected to access technology by acquiring smaller device makers or ICT companies that both fit into their existing solutions and expand their breadth.

## ***2.2 Industry Leaders***

RPM industry leaders are presented in a tabular form commencing on the next page.

Precise measurement of the 'top ten' in this industry is impossible, in large part due to the fact that the industry per se does not exist, but is an amalgamation of other industries (medical devices, ICT, home care). Conventional measures such as sales or profit are not usable ranking methods because i) several leaders are divisions or subsidiaries of larger companies and do not provide any financial information and ii) in the larger, leading, companies particularly, the revenue or profit from RPM is not capable of being segregated from that of related operations.

Market share information is also not forthcoming because of the relative infancy of the industry and the multiple business models and markets involved.

Numerous companies are active in some or all elements of the industries that comprise RPM. To focus the selections on those companies that appear to be the leaders over the next five years, the study adopted the following parameters:

- Companies that are active in the growth market sector of chronic disease monitoring are emphasized
- Some companies with lower levels of direct RPM activity (e.g. Draeger) have been included because of their future significance should they more fully commit to RPM.
- Companies whose technology is highly speculative have been excluded
- Companies that are working with device, systems or solutions directly involved monitoring are included; companies that are working exclusively with documentation (i.e. EHR) or transmission (i.e. videoconferencing) of RPM are excluded

Company descriptions were divided into several sections:

**Profile** - this section includes a broad description of the company, often taken verbatim from the company's website

**Strategic Direction** - outlines broadly the overall approach of the company. The descriptions are based on inference from research and the company's own public statements

**Research** - describes broadly the research thrust of the company. The descriptions are based on inference from research and the company's own public statements


**Partnerships** - includes major partnerships that are publicly known relating to the RPM field.

**Executive information** - is based on secondary research, primarily from company websites. In some cases, an equivalent to a position such as Business Development is used.

Results reflect the limitations of the project time frame and the exclusive use of secondary research.


In some cases, information was not available and is denoted as "NA".

## Philips Medical Systems

<p><b>PROFILE</b></p> 	<p>Philips Medical Systems, N.A.                  22100 Bothell Everett Highway                  P.O. Box 3003                  Bothell, WA 98041-3003                  Telephone: (425) 487-7000                  Toll Free (US): (800) 722-7900 Ext. 0                  Fax: (425) 485-6080 Canada</p> <p>Philips Medical Systems, Canada                  281 Hillmount Road                  Markham, ON                  L6C 2S3                  Tel: (905) 201-4100                  Toll Free: (877) 744-5633                  Fax: (905) 201-4323</p> <p>Royal Philips Electronics of the Netherlands is one of the world's biggest electronics companies and Europe's largest, with sales of \$37.7 billion in 2005. With activities in the three interlocking domains of healthcare, lifestyle and technology and 159,200 employees in more than 60 countries, it has market leadership positions in medical diagnostic imaging and patient monitoring, color television sets, electric shavers, lighting and silicon system solutions.</p> <p>For over five years, Philips' award-winning telemonitoring devices have enabled disease management firms and healthcare providers to remotely monitor chronic disease patients in their homes.</p> <p>Today, Philips is committed more than ever to improving the quality of life for chronically ill patients. With the development of a new TV-based interactive healthcare platform - Motiva - Phillips takes remote patient management to a new level.</p>
<p><b>STRATEGIC DIRECTION</b></p>	<ul style="list-style-type: none"> <li>- overall corporate strategy is to move from less stable core businesses such as semi-conductors to more stable, high margin, healthcare lines</li> <li>- acquisition of Lifeline Systems signals continued investment in home health care</li> <li>- home health care strategy is to build increasingly comprehensive solutions, using existing technologies primarily those already developed for Phillips for other applications</li> </ul>
<p><b>RESEARCH</b></p>	<ul style="list-style-type: none"> <li>- adapt technologies that already exist in medical world and make them consumer-friendly e.g. a home defibulator</li> </ul>


	<p>- most recent RPM development is Motiva, an interactive healthcare platform uses broadband television, along with home vital sign measurement devices, to connect patients to their healthcare providers and medical support system. Motiva's goal is to turn the home TV into the patient's own personal healthcare channel or "virtual health coach.</p> <p>The patient will access their personalized content via an easy-to-use interactive television interface, delivered via a cable TV connection, standard set top box, and special remote control designed for older users. A nurse care manager, using the Motiva clinical information system will monitor the patient's condition and is alerted if follow-up is necessary.</p> <p>The Motiva platform can be tailored to address a wide range of chronic diseases and acuity levels and will offer a scalable solution for remote patient care - ranging from cost-effective patient education and self-management tools to clinical monitoring with home measurement devices</p>
<b>PARTNERS</b>	<p><a href="#">Cisco Systems</a></p> <p><a href="#">Emergin</a></p> <p><a href="#">Epic</a></p>
<b>CEO</b>	<p>Jay Mazelsky, General Manager, New Ventures Business Unit</p> <p>Jouko Karvinen Chief Executive Officer Philips Medical Systems</p>
<b>VP BUSINESS DEVELOPMENT</b>	<p>Carla Joliat Director of Product Marketing</p> <p>Paul Smit, Senior Vice President, Strategy and Business Development, Philips Medical Systems</p>
<b>CSO</b>	<p>NA</p>

## Honeywell Hommed

<p><b>PROFILE</b></p> 	<p>3400 Intertech Drive, Suite 200                  Brookfield, Wisconsin 53045                  1-888-353-5440 Fax: 1-262-252-5795</p> <p>Hommed was acquired by Honeywell in 2004. Honeywell is a \$28 billion diversified technology and manufacturing leader, serving customers worldwide with aerospace products and services; control technologies for buildings, homes and industry; automotive products; turbochargers; and specialty materials.</p> <p>The Honeywell HomMed Health Monitoring System (monitor and proprietary software) is a hospital grade FDA Class II medical device. In addition to base biometrics measurements, multiple peripheral devices allow managing a wide cross section of disease states. The goal of daily home monitoring is to identify deteriorating changes in a client's condition and to provide appropriate early intervention. There currently are in excess of 15,000 patient units installed in the United States, Canada and Germany.</p> <p>Honeywell HomMed has been involved in the care of over 300,000 patients since its inception.</p>
<p><b>STRATEGIC DIRECTION</b></p>	<ul style="list-style-type: none"> <li>- achieve synergies with other divisions and capabilities of Honeywell</li> <li>e.g. Honeywell has major presence in home security and other home controls areas - 'health security' via Hommed could be added to the bundle</li> <li>e.g. use of Honeywell R&amp;D capabilities to drive product innovation</li> <li>- focus on direct marketing to HHAs e.g. JV with MedicAlert <a href="http://www.medicalert.org/hes">www.medicalert.org/hes</a>.</li> <li>- building national network of HHAs. At the heart of Honeywell HomMed's solution is a nationwide network of local home healthcare agencies and clinicians. Each agency is carefully screened for its reputation, financial viability and most importantly, its proven ability to deliver and manage quality care. To assure optimal results, Honeywell HomMed partners undergo extensive training through our clinical, managed care program.</li> <li>- expanding into UK via Tunstall JV and NHS pilot projects</li> </ul>
<p><b>RESEARCH</b></p>	<ul style="list-style-type: none"> <li>- drive down cost of providing RPM through constant technological innovation, using Honeywell's labs and R&amp;D capability</li> <li>- driving down cost vital to obtaining reimbursement</li> </ul>


	<i>The challenge Honeywell HomMed faces is to continue to develop its new lower-cost products and cutting-edge telemonitoring technologies to make home telehealth the standard.</i>
<b>PARTNERS</b>	<a href="#">McKesson</a> <a href="#">Tunstall</a> <a href="#">MedicAlert.</a>
<b>CEO</b>	Herschel Q. "Buzz" Peddicord, III, CEO and President
<b>VP BUSINESS DEVELOPMENT</b>	NA
<b>CSO</b>	Greg Wischstadt, Vice President of Engineering

## McKesson Telehealth

<p><b>PROFILE</b></p> 	<p>1550 E. Republic Rd. Springfield, MO 65804 ☎417.874.4000</p> <p>McKesson Corporation is the leading provider of supply, information and care management products and services designed to reduce costs and improve quality across healthcare. McKesson solutions empower healthcare professionals with the tools they need to deliver care more effectively and efficiently. Founded in 1833, with annual revenues of more than \$50 billion, McKesson ranks as the 20th largest industrial company in the United States.</p> <p>McKesson is the leading provider of information technology solutions to the home health and hospice industries.</p> <p>McKesson offers a unique combination of technology solutions that support patient independence while reducing the cost of managing chronic illnesses. No other automation company can match McKesson’s breadth of solutions that allow providers to extend their patient interaction across the continuum of care.</p> <p>McKesson leads the industry in supporting the information needs of homecare organizations, with more than 19,000 nurses and other clinicians relying on Horizon Homecare to support more than 42 million patient visits per year. Thousands of caregivers use point-of-care laptop computer devices for home visits.</p> <p>McKesson’s telehealth solutions represent the next step in improving caregiver efficiency while empowering patients to become more engaged in their own care. Recent additions to the company’s family of solutions include McKesson Telehealth Guardian™, a personal emergency response system (PERS) that uses wireless technology to create an advanced communication link between patient and an expert call center, and Horizon Patient Connect™, which offers patients secure online access to their physician’s office for routine non-urgent communications.</p>
<p><b>STRATEGIC DIRECTION</b></p>	<p>- overall strategy is to create and market an increasingly comprehensive solution to HHAs by adding and integrating third party devices to its Telehealth Advisor solution: <i>no other automation company can match McKesson's <b>breadth of solutions</b> that allows providers to extend their patient interaction across the continuum of care.</i></p>
<p><b>RESEARCH</b></p>	<ul style="list-style-type: none"> <li>- enhancement of connectivity between OEM devices</li> <li>- creation of increasingly integrated solutions</li> </ul>
<p><b>PARTNERS</b></p>	<p><a href="#">Health Hero Network</a></p>


	<a href="#">American Medical Alert Corporation</a> Numerous HHA chains
<b>CEO</b>	Paul Julian, Executive VP and Group President  Craig Frazier, Vice President and General Manager, Extended Care Solutions Group
<b>VP BUSINESS DEVELOPMENT</b>	Mike Mosquito, Senior Vice President, Emerging Technologies
<b>CSO</b>	NA

# Tunstall

<p><b>PROFILE</b></p> <div style="border: 1px solid blue; border-radius: 10px; padding: 5px; width: fit-content; margin: 10px auto;">  </div>	<p>Tunstall Group Ltd Whitley Lodge, Whitley Bridge Yorkshire DN14 0HR</p> <p>Tel. 01977 661234 Fax. 01977 660562 Email. enquiries@tunstall.co.uk</p> <p>Established in the UK in 1957, Tunstall is the world's leading manufacturer and provider of personal and home reassurance telecare solutions, which help an increasing range of people at risk in their own homes or at work.</p> <p>Tunstall solutions are developed and delivered in partnership with a wide range of client organizations. These include local authority housing and social services departments, housing associations, care providers in the public and private sector, NHS and private health care providers, police, schools, retirement property developers and charities and voluntary groups.</p> <p>Tunstall design, manufacture, supply and install solutions and provide after-sales service to its partners throughout the UK, via a network of 160 field service engineers.</p> <p>Tunstall is an integrated solutions provider offering:</p> <ul style="list-style-type: none"> <li>- Personal and home reassurance - System design consultancy</li> <li>- Community telemedicine - Total project management</li> <li>- Supported housing/warden call - Installation and commissioning</li> <li>- Response centre - Maintenance and field support</li> <li>- Nurse Call - Monitoring service</li> <li>- Homecare management systems - Service repair centre</li> </ul> <p>Tunstall was purchased by a UK private equity firm in mid 2005 for approximately \$400 mil \$US. Sales of the Tunstall group are estimated to be over \$170 mil \$US.</p>
<p><b>STRATEGIC DIRECTION</b></p>	<ul style="list-style-type: none"> <li>- targeting chronic disease management to align with the National Service Framework for UK health care (new UK health policy)</li> <li>- geographic expansion by acquisition in Europe (in 2005 acquired leading Scandinavian telecare company)</li> </ul>

<b>RESEARCH</b>	- creation of integrated personal safety/security/health solution  - see <a href="http://www.tunstalltown.com/site/#">http://www.tunstalltown.com/site/#</a> for longer term vision of integrated solution
<b>PARTNERS</b>	<a href="#">Honeywell Hommed Health Watch</a>
<b>CEO</b>	James Buckley CEO
<b>VP BUSINESS DEVELOPMENT</b>	NA
<b>CSO</b>	Steve Sadler, Group Technical Director

## GE Healthcare

<p><b>PROFILE</b></p> 	<p>Headquartered in the United Kingdom, GE Healthcare is a \$15 billion unit of General Electric Company (NYSE:GE).</p> <p>GE Healthcare provides transformational medical technologies and services that are shaping a new age of patient care. Our expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, performance improvement, drug discovery, and biopharmaceutical manufacturing technologies is helping clinicians around the world re-imagine new ways to predict, diagnose, inform and treat disease, so their patients can live their lives to the fullest.</p> <p>Our vision for the future is to enable a new "early health" model of care focused on earlier diagnosis, pre-symptomatic disease detection and disease prevention.</p>
<p><b>STRATEGIC DIRECTION</b></p>	<ul style="list-style-type: none"> <li>- create fully integrated, all GE, solutions (monitoring, care, financial, EHR)</li> <li>- aggressive integration of ICT into healthcare solutions</li> <li>- focus on ICT as the way to reduce costs, improve efficiency and accuracy</li> <li>- move into home health care through existing relationships with MDs and hospitals</li> <li>- example is Centricity product line, a fusion of GE and IDX (a healthcare ITC company acquired by GE) technology</li> <li>- <i>the new Centricity(R) product line, emphasizing the combined strengths that the GE and IDX products bring to the practice and enterprise, such as the new Centricity Enterprise solution (formerly IDX Carecast) and the GE Centricity Picture Archiving Communications System (PACS) interfaced with the former IDX Imagecast (TM) Radiology Information System (RIS).</i></li> <li>- <i>"By offering a comprehensive solution of information technologies, we are truly integrating healthcare delivery by seamlessly capturing a comprehensive view of the patient." "This view will help all care providers better predict, diagnose and treat their patients - resulting in more effective and cost efficient care."</i></li> <li>- some suggestion that attempting to enter into exclusive connectivity agreements with SME device makers e.g. AirStrip OB® partnership with MP4 LLP. AirStrip interfaces exclusively with GE's Centricity Perinatal (QS) system to provide obstetricians with the ability to stay in real-time contact with their patients whenever they want, regardless of physician location.</li> </ul>
<p><b>RESEARCH</b></p>	<p>- research focused on creating technologies that will help enable</p>


	<p>healthcare providers to predict, diagnose, inform and treat disease more efficiently than ever before.</p> <p><i>- GE is re-imagining the role of healthcare IT and science, creating the backbone for revolutionizing healthcare from treating "late disease" to enabling "early health" through innovative technologies including evidence-based medicine; modular decision support; home monitoring device integration; and portable lifetime patient health records.</i></p>
<b>PARTNERS</b>	<p><a href="#">Intermountain Health Care</a></p> <p><a href="#">MP4 Solutions</a></p> <p><a href="#">Microsoft</a></p> <p><a href="#">Palm</a></p>
<b>CEO</b>	<p>Joseph M. Hogan Senior Vice President &amp; CEO, GE Healthcare</p> <p>Vishal Wanchoo President and CEO of GE Healthcare Integrated IT Solutions</p>
<b>VP BUSINESS DEVELOPMENT</b>	<p>Michael A. Jones Executive Vice-President, Business Development</p>
<b>CSO</b>	<p>Dr. William R. Clarke Executive Vice President and Chief Technology &amp; Medical Officer GE Healthcare</p>

## Viterion

<p><b>PROFILE</b></p> 	<p>Viterion TeleHealthcare LLC                      555 White Plains Road                      Tarrytown, NY 10591                      USA</p> <p>914-333-6600                      800-866-0133                      914-333-6470 (fax)                      info@viterion.com</p> <p>Viterion TeleHealthcare LLC, a Bayer - Panasonic Company, was established in January 2003 as a joint venture between Bayer HealthCare LLC's Diagnostics Division and Matsushita Electric Industrial Co., Ltd. Based in Tarrytown, New York, Viterion TeleHealthcare LLC offers comprehensive, easy-to-implement solutions for the rapidly growing telehealth market.</p> <p>Through user-friendly, customizable monitors for patients and flexible network access via the Internet for providers, Viterion TeleHealthcare makes telehealth easy.</p> <p>Viterion TeleHealthcare's products use highly reliable store-and-forward technology to relay vital sign measurements and personalized questions or advice, as well as digital video technology and Web access. The network is managed by Viterion TeleHealthcare, with stringent measures to ensure the safety and security of patient information, providing a turnkey solution for providers. Backed by this innovative technology, Viterion TeleHealthcare enables providers to customize the use of telehealth based on individual patient needs. TeleHealthCare specialists, experienced nursing and information technology professionals who partner with our customers, help to share and support best practices in telehealth.</p> <p>Viterion TeleHealthcare was established when it became evident that Bayer's healthcare knowledge and Panasonic's technical expertise could create a company that makes telehealth so easy to implement that it becomes the standard for delivering affordable, quality healthcare, especially for patients with chronic diseases.</p>
<p><b>STRATEGIC DIRECTION</b></p>	<p>- focus on Home Care and Disease Management <i>"We have selected these two market segments because they offer the greatest opportunity to improve the quality of life for individuals with chronic disease and are the fastest growing sectors looking for technology to help reduce the cost of delivering healthcare."</i> Pramod Gaur, President and CEO</p>


	<p>- market an integrated solution, Viterion's unique web-based secure clinical information management system. <i>No additional investment or in-house servers are required by the provider to implement the Viterion patient monitoring systems. Since Viterion servers are accessed through the Internet, several providers can have secure access to the same data, making it easy for home care agencies and disease management companies to share results with the patient's physicians and hospital.</i></p> <p>- provide support services. <i>Viterion also has a unique approach to customer service. Telecare coordination specialists will work with customers to help them achieve success with telehealth. This will include sharing of best practices and providing support during the initial pilot stage where the clinical provider determines the best implementation of telehealthcare to achieve their clinical and business objectives.</i></p>
<b>RESEARCH</b>	- focus on development of 'easy to use' technology
<b>PARTNERS</b>	NA
<b>CEO</b>	Pramod Gaur, Ph.D., Vice President and General Manager TeleHealthcare Business, Bayer Diagnostics and President and CEO, Viterion TeleHealthcare LLC
<b>VP BUSINESS DEVELOPMENT</b>	John Blackwood, MS, MBA Vice President, Global New Business Development
<b>CSO</b>	David A. Okrongly, Ph.D. Senior Vice President of Global Research and Development, Bayer HealthCare, LLC, Diagnostics Division

## Spacelabs Medical

<p><b>PROFILE</b></p> 	<p>5150 220th Avenue SE Issaquah, Washington 98027 United States</p> <p>Phone: (425) 657-7200 Fax: (425) 657-7212 Toll Free: (800) 522-7025 Email: info@spacelabshealthcare.com</p> <p>Based in Issaquah, Wash., Spacelabs is a global manufacturer and distributor of patient monitoring systems for critical care and anesthesia, wired and wireless networks and clinical information connectivity solutions, ambulatory blood pressure (ABP) monitors and medical data services.</p> <p>Spacelabs has an installed base of approximately 100,000 patient monitoring units worldwide, including around 60,000 in the U.S. and around 10,000 units in Europe. In addition, there are approximately 30,000 Spacelabs ABP monitors installed on a worldwide basis.</p> <p>Spacelabs has distribution partnerships in approximately 80 countries and sales or regional offices worldwide. Spacelabs employs approximately 800 employees worldwide. Spacelabs Medical is an OSI Systems Company, <a href="http://www.osi-systems.com">www.osi-systems.com</a>.</p>
<p><b>STRATEGIC DIRECTION</b></p>	<ul style="list-style-type: none"> <li>- improving and complementing existing medical diagnostic technologies. <i>Spacelabs Medical develops medical monitoring systems aimed at lowering false alarm rates, thereby reducing time demands on physicians and nurses, and improving patient identification accuracy, thereby reducing physician and nursing errors.</i></li> <li>- leverage technical capabilities of the parent company. <i>We believe that one of our primary competitive strengths is our expertise in designing and manufacturing, at cost effective rates, specialized opt-electronic devices and value-added subsystems for our own end products both in security and medical businesses and for the products of our original equipment manufacturer customers</i></li> </ul>
<p><b>RESEARCH</b></p>	<ul style="list-style-type: none"> <li>- Spacelabs Medical and its Dolphin subsidiary are pursuing cable-free medical sensors and other wireless solutions that will allow for medical monitoring, patient data, transmission, alarm notifications and other information to be instantly transmitted at any time to any location</li> <li>- the medical monitoring and anesthesia systems group also continues to improve and develop its medical diagnostic tools aimed at bone</li> </ul>

	metabolic diseases, such as osteoporosis, and patient monitors and accessories that utilize pulse oximetry technologies.
<b>PARTNERS</b>	- <a href="#">Emergin</a> - <a href="#">Masimo</a>
<b>CEO</b>	Deepak Chopra CEO  David Tilley President Spacelabs Medical
<b>VP BUSINESS DEVELOPMENT</b>	Nikhil Mehta Vice President Business Development
<b>CSO</b>	Roy Hays Chief Technology Officer

## Card Guard

<p><b>PROFILE</b></p> 	<p>Rundbuckstrasse 6                  CH-8212 Neuhausen am Rheinfall                  Switzerland                  Tel: +41 52 632 00 50                  Fax +41 52 632 00 51-                  email: users@cardguard.com</p> <p>Headquartered in Switzerland, Card Guard is a leading company of healthcare technologies and solutions, specializing in advanced telehealth systems and monitoring services for high-risk and chronically ill patients.</p> <p>Card Guard has wholly-owned subsidiaries in the United States, the Netherlands, Japan, Brazil, including its R&amp;D center in Israel. Among its subsidiaries, Card Guard owns LifeWatch, Inc. a leading US-based cardiac monitoring service provider; and Instromedix, a US based manufacturer of telecardiology products.</p> <p>Card Guard's newest wireless healthcare system, the PMP4, provides the tools required for screening, monitoring, and the management of General Consumer Health, Disease management and fitness. The PMP4 Wireless Medical monitors measure and transmit medical data to handheld devices, which can then be uploaded to a dedicated Web-Based Medical Center where both physicians and patients may access by using any browser. Card Guard's PMP4 suite of products include portable and wireless based devices such as: 1 and 12- lead Self check ECG monitor, Spirometer, Pulse Oximeter, Weight Scale, three types of Blood Pressure devices, and an SDIO blood Glucose monitor.</p> <p>Card Guard also manufactures a line of traditional products for the telehealth market, including 1 to 12-lead ECG event recorders, looping recorders, a diagnostic 12-lead ECG, Spirophone, Fetal Maternal Monitors, and telemedicine software packages. Card Guard AG currently employs approximately 406 people worldwide.</p>
<p><b>STRATEGIC DIRECTION</b></p>	<p>- wireless monitoring of chronic diseases</p> <p><i>"Throughout 2005, Card Guard expanded successfully in accordance with its vision of becoming a leading global provider of remote healthcare monitoring services," says Frost &amp; Sullivan Research Analyst Namrata Sundaresan. "Through a series of strategic alliances, Card Guard has not only cemented its position in the U.S. patient monitoring market, but has also begun to set standards in the remote patient monitoring market."</i></p> <p><i>In a recent strategic alliance with Humana Innovation Enterprises, Card Guard formed Sensei Inc., which will operate primarily as a wireless</i></p>

	<i>health and wellness distribution platform and will offer personalized guidance to consumers. Subscribers will receive customized nutrition and weight loss information, fitness notifications including medication reminders and other health related contents through their cell phones and/or personal digital assistants"</i>
<b>RESEARCH</b>	<p>- creation of wireless medical devices that can be seamlessly integrated into telehealth programs e.g. PMP4 suite of wireless monitors</p> <p>- e.g. subsidiary company LifeWatch has entered into a long-term agreement with major device maker Guidant to provide a range of monitoring services for cardiac patients that have been implanted with Guidant devices.</p>
<b>PARTNERS</b>	<p><a href="#">Humana</a>  <a href="#">Guidant</a>  <a href="#">Samsung</a></p>
<b>CEO</b>	Yacov Geva - Chairman & CEO - Card Guard AG
<b>VP BUSINESS DEVELOPMENT</b>	Reuven Freudinger - Vice President of Business Development and Global Marketing
<b>CSO</b>	Reuven Nanikashvili - President Card Guard Scientific Survival, Ltd. and Chief Technology Officer, Card Guard AG

## Health Hero Network

**PROFILE**



Health Hero Network, Inc.  
2000 Seaport Blvd, Ste. 400  
Redwood City, CA 94063  
Phone: 650-779-9100  
Fax: 650-779-2100

Health Hero Network develops and markets the Health Buddy® system for health improvement. The Health Buddy system serves as the interface between patients at home and care providers, facilitating patient education and monitoring of chronic conditions. The system includes monitoring technologies, clinical information databases, Internet-enabled decision support tools, health management programs and content development tools. Through increased communication, behavior modification, and prevention, the Health Buddy system improves the quality of care.

Based in Redwood City, California. Health Hero Network's systems are protected by over 55 issued US patents.

<http://www.healthhero.com>. For more information on the Health Buddy Program please visit:

<http://www.healthbuddy.com/medicare>.


Leading healthcare institutions working with Health Hero Network include The Veterans Administration, Laredo Medical Center, APS, Walter Reed Army Medical Center and others. Leading pharmaceutical companies are sponsoring Health Hero programs for research, patient education, and compliance management. The Health Buddy system also continues to spread throughout the healthcare industry through a range of devices to be manufactured by a growing list of Health Hero licensees in the United States and Europe, including medical device and technology companies.

Renowned for ease of use, Health Hero® technology empowers patients and the people who care for them by improving patient self-care and behavior while enabling care providers to access timely information and intervene before conditions become acute. These benefits start with the Health Buddy® appliance, Health Buddy® Web, and other licensee devices that allow patients to communicate with healthcare professionals by answering a few daily questions related to their medical condition and activities with the push of a button. Health Hero® iCare Desktop™ web services and software then stratify and present this data to empower healthcare professionals to quickly identify problems and take corrective action.

Health Hero Network offers health management programs delivering personalized daily monitoring and patient education in order to promote


	positive behavior change and provide timely, relevant, and actionable information to care providers. Health Hero Network customers are using programs, delivered on the Health Buddy® system, in heart failure, cardiovascular disease, diabetes, asthma, COPD, post-acute care, mental health, and many other chronic conditions.
<b>STRATEGIC DIRECTION</b>	<ul style="list-style-type: none"> <li>- continue introduction of devices that feature ease of use</li> <li>- expand user base for Health Buddy device through licensing partnerships with large HHAs and medical institutions</li> </ul>
<b>RESEARCH</b>	- Health Hero Network has an extensive patent portfolio with over 55 issued U.S. patents covering fundamental technologies and services for personal health improvement, chronic care and data-collection. The company continues to expand its patent coverage by filing applications to protect new innovations and by refining pending applications, many of which date back to November 1992
<b>PARTNERS</b>	<a href="#">Abbey Healthcare</a> <a href="#">McKesson</a> <a href="#">American Medical Alert Corporation</a>
<b>CEO</b>	Stephen J. Brown President and CEO
<b>VP BUSINESS DEVELOPMENT</b>	Gary Paladin, Senior VP of Worldwide Marketing.
<b>CSO</b>	Geoffrey Clapp Chief Technology Officer

## Medtronic

<b>PROFILE</b> 	<p>710 Medtronic Parkway Minneapolis, MN 55432-5604</p> <p>Phone: (+1-763) 514-4000 Fax: (+1-763) 514-4879</p> <p>Medtronic (NYSE:MDT), is the world leader in medical technology providing lifelong solutions for people with chronic disease. The company offers products, therapies and services that enhance or extend the lives of millions of people. Each year, 5 million patients benefit from Medtronic's technology, used to treat conditions such as diabetes, heart disease, neurological disorders, and vascular illnesses. Medtronic Vascular combines a host of expertise to offer state-of-the-art solutions for coronary vascular, peripheral vascular, endovascular, and neurovascular disease.</p>
<b>STRATEGIC DIRECTION</b>	<ul style="list-style-type: none"> <li>- focus on growing their pacemaker business by adding value through remote monitoring of pacemaker</li> <li>- created Carelink network to provide RPM for their pacemakers</li> </ul>
<b>RESEARCH</b>	<ul style="list-style-type: none"> <li>- Medtronic, Inc. has begun a U.S. pilot evaluation with Carematix, Inc. to assess the efficacy and convenience of remotely monitoring physiological heart data, weight and blood pressure in the management of heart failure.</li> </ul> <p>Patients with heart failure (NYHA Class II, III or IV) and a Medtronic implantable cardioverter-defibrillator (ICD) or cardiac resynchronization therapy ICD (CRT-D) device will participate in the evaluation, called REACH HF (Remote Evaluation using Augmented CareLink Network transmissions for the management of Heart Failure).</p> <p>Patients will regularly transmit physiological information from home to clinicians using both the Medtronic CareLink(R) Network and the Carematix(TM) Wellness System. With the Medtronic CareLink Network, patients transmit comprehensive heart rhythm activity data from their implantable cardiac device to a secure server using a portable monitor that is connected to a standard phone line.</p>
<b>PARTNERS</b>	<a href="#">Carematix</a>
<b>CEO</b>	<p>Art Collins, Chairman and CEO</p> <p>William Hawkins, President and COO</p>


	Stephen Mahle Executive Vice President and President, Cardiac Rhythm Management
<b>VP BUSINESS DEVELOPMENT</b>	Michael Demane Senior Vice President and President Europe, Canada, Latin America and Emerging Markets
<b>CSO</b>	Stephen N. Oesterle, M.D. Senior Vice President for Medicine and Technology  Reggie Groves, Vice President of Medtronic Patient Management.

## [Draeger Medical Systems](#)

<p><b>PROFILE</b></p> 	<p>3135 Quarry Road Telford, PA 18969 U.S.A.</p> <p>Phone: 215-721-5400 ext. 2310 Fax: 215-721-5808</p> <p>Draeger Medical is a manufacturer of medical equipment, the largest division of Draegerwerk AG and a 65:35 joint venture company between Draegerwerk AG and Siemens AG.</p> <p>The company offers products, services and integrated CareArea Solutions throughout the patient care process - Emergency Care, Peri-operative Care, Critical Care, Perinatal Care and Home Care.</p> <p>With United States headquarters in Telford, Pennsylvania and world headquarters in Lübeck, Germany, Draeger Medical employs nearly 6000 people worldwide.</p>
<p><b>STRATEGIC DIRECTION</b></p>	<ul style="list-style-type: none"> <li>- deploy a convergence of several in-house technologies originally developed for the clinical monitoring market " <i>Drager Medical has the unique distinction of being the only company in the market to integrate a hospital-wide wireless patient monitoring network</i></li> <li>- partnerships with smaller companies to access technology</li> <li>- example of partnership is Pulsion joint venture that created the Infinity® PiCCO SmartPod™, which integrates PULSION’s less invasive PiCCO-Technology for monitoring of complete circulatory function including continuous cardiac output with Dräger Medical’s Infinity patient monitoring.</li> </ul> <p><i>PULSION’s PiCCO-Technology provides lower-risk, continuous monitoring of cardiac output (C.O.), cardiac filling status, and water content in the lungs*. PiCCO-Technology can replace the right heart catheter, which is currently used for advanced hemodynamic monitoring, by providing a lower risk, but more comprehensive approach for guiding therapy in critical care patients. The Infinity PiCCO SmartPod supports both adults and pediatric patients.</i></p> <p><i>Infinity patient monitors provide continuous patient vigilance and data collection throughout the continuum of care. Clinicians simply plug the PiCCO Pod into the monitor and have immediate access to a range of PiCCO-Technology parameters.</i></p>

<p><b>RESEARCH</b></p>	<p>- working toward a single solution for patient monitoring in healthcare environment</p> <p>- example Infinity OneNet is described as a <i>"ground-breaking technology that effectively establishes a single unified wireless infrastructure throughout the hospital that supports both monitoring and hospital information systems. Until the launch of this system, the patient monitoring network functioned as a standalone entity, discrete from the network of the hospital.</i></p> <p><i>This often sets up barriers to technology and workflow innovation made possible by the widespread deployment of wireless monitoring. However, Infinity OneNet has ushered in a paradigm shift. "With the adoption of Drager Medical's innovative Infinity OneNet solution, hospitals can elevate their monitoring networks to true IT standards of performance and reliability," says Ajay. Moreover, the compliance to the 802.3 Ethernet and Wi-Fi standards and the effective management of wireless bandwidth has helped this innovative system provide effective segmentation of the network based on hospital needs. This is particularly suited for the transfer of life-critical data such as patient alarms vital signs information.</i></p> <p><i>"Drager Medical has emerged as the only company that has leveraged the prospective benefits associated with the deployment of a common shared wireless network infrastructure within a hospital setting," concludes Ajay.</i></p> <p><i>"With the system delivering cost-effectiveness, high productivity and flexibility, the Infinity(R) OneNet networking solution is positioned to become an industry standard and has the potential to yield considerable advantages"</i></p>
<p><b>PARTNERS</b></p>	<p><a href="#">Cisco</a></p> <p><a href="#">Pulsion</a></p>
<p><b>CEO</b></p>	<p>Marcus Aben, President and CEO, Draeger Medical Systems</p>
<p><b>VP BUSINESS DEVELOPMENT</b></p>	<p>Bob Tice, President, North American region</p>
<p><b>CSO</b></p>	<p>NA</p>

## Intel Digital Health Platforms Group

<p><b>PROFILE</b></p> 	<p>2200 Mission College Blvd.                  Santa Clara, CA 95052                  (408) 765-8080</p> <p>Intel Corp. is set to revolutionize the digital healthcare space with its solutions and applications designed to accelerate the development processes in healthcare information systems, acute care solutions, and personal health and wellness.</p> <p>The chipmaker is engaged in developing an Information technology-based ecosystem that can deliver mission critical healthcare related information to the medical community as and when required.</p>
<p><b>STRATEGIC DIRECTION</b></p>	<ul style="list-style-type: none"> <li>- established a Digital Health Group in 2005</li> <li>- working to create rugged home health care platforms that use existing chips</li> <li>- has already developed a blue-tooth enabled wireless stethoscope</li> <li>- rationale for market entry is that ICT driven solutions for RPM etc will require Intel product; Intel wants to be the chip standard for medical IT and 'smart home' solutions</li> </ul>
<p><b>RESEARCH</b></p>	<ul style="list-style-type: none"> <li>- very exploratory</li> <li>- <i>"This is a new focus for Intel. Now we are trying to provide healthcare-specific platforms that can create market opportunities for OEMs, ODMs and ISVs to apply information technology in order to help the healthcare industry solve some of the basic problems," explained, Doug Busch, vice president and chief technology officer at Intel, Digital Health Group. He was speaking at the recently concluded IDF in San Francisco.</i></li> <li>- <i>"The global medical community has got its own specific problems and we are trying to solve these problems with the help of information technology from the chip level to the device level of engineering," Busch added.</i></li> <li>- <i>"We are working on these concept platforms, which would be used as nodes for service providers. While we move forward with this concept platform, we are taking into considerations like mobile, hands free usage, contamination control, water-proofing, noise-free operation, sensor integration, automation, inferencing and easy data mining," he explained.</i></li> </ul>

*Intel's healthcare tablet – concept platform is pen-enabled, drives true mobility with integrated sensors, RFID bar code readers, a built in camera, stethoscope and a built in infection control system.*

- Intel is preparing to trial a laptop-like device that could aid in the care of people suffering from Parkinson's disease. The device conducts a battery of tests to measure their symptoms and stores the data for doctors to access. Intel researchers plan to begin medical trials of the machine, which they say can be used to tracks the patients' symptoms more closely by repeating the tests weekly at home versus a doctor's office visit every few weeks, with about 60 patients in January.

*Intel isn't poised to enter the medical devices business with the tester, however. Instead, the device represents one of numerous opportunities the chipmaker sees in applying its forte—designing chips and the systems that surround them—to health care. To that end, researchers inside the company's labs—many of whom are now affiliated with the Digital Health Group following the reorganization—have been experimenting with numerous ways to use fairly standard computer chips, software and networking technologies, including RFID (radio frequency identification) tags, to assist doctors and their patients as well as aid in the care of aging populations around the globe.*

*"This is not going to make a laptop replace a nurse. That's not what we're thinking," said Manny Vara, a technology strategist inside Intel's research labs, while demonstrating several of Intel's health care-oriented research projects for Ziff Davis Internet during an event in New York City. However, "We think some of this is very promising," he said.*

*The company's researchers, in another health-related project demonstrated on Thursday, have devised a high-tech baby monitoring system, which will help parents track their babies' health automatically. Although Intel is not in the business of selling RFID tags or pill boxes, it does stand to gain from the digitization of health care. The Parkinson's tester for example, uses hardware Intel originally created for PDAs, Vara said. It could also be modified to measure motor skills to track the recovery of stroke victims.*

*Discerning what a person is doing by tracking her movements throughout her house takes a fair amount of computing horsepower, potentially opening up new opportunities for Intel-processor servers.*

*Eventually, data culled from the high-tech baby monitoring research project could yield greater home PC sales or spark upgrades, if the hooks needed to carry it out were added to its processors and chipsets for desktops or notebooks.*

<b>PARTNERS</b>	NA
<b>CEO</b>	<a href="#">Louis J. Burns</a> Vice President General Manager, Digital Health Group
<b>VP BUSINESS DEVELOPMENT</b>	Eric Dishman, Manager, Digital Health Group
<b>CSO</b>	Douglas F. Busch Vice President Chief Technology Officer, Digital Health Group

## 3.0 Top 10 Canadian Product Development Companies with an interest in community/home care

### 3.1 Product Development Companies

In Canada, the RPM product development field consists of a small number of domestically owned smaller SMEs and subsidiaries of larger multinational firms. Many of the products used in Canadian RPM initiatives that were reviewed incorporate technology developed by the industry leaders identified in Section 2.0.

An example is found in Eastern Canada:

*In New Brunswick, the technology is being provided by Honeywell HomMed Health Monitoring System, which is based across the continent in Victoria, B.C. In each of the 30 EMP@home patient's residences sits a HomMed Sentry monitoring unit. And each day, a gentle voice from the Sentry guides the patient through a simple three-minute procedure to gather their vital signs.*

*While similar telehomecare efforts are going on elsewhere in the country, EMP@home is no longer "yet another telehealthcare pilot". It has made the leap from a pilot to a budgeted-for demonstrator project for the entire province.*

*"The strategic aim is to replicate EMP@home in every healthcare district of New Brunswick," says Valerie Hagerman, the regional telehealth director for River Valley Health and the co-chair of the EMP@home implementation committee.*

[Canadian Healthcare Technology October 2005 print edition]

Honeywell HomMed Health Monitoring has made further inroads into other regions across the country. They have worked with stakeholders in the health system to assist in a successful strategy into Canada.

*In New Brunswick, the technology is being provided by Honeywell HomMed Health Monitoring System, which is based across the continent in Victoria, B.C.*

*At the time of writing, Honeywell HomMed had penetrated the Canadian market with 130 Sentry and Genesis home monitors, all speaking gently and guiding patients not only in New Brunswick, but also in Quebec, Ontario, Manitoba, and Alberta.*

*HomMed accelerated that early market lead, reports Brown, by putting a year of effort into meeting Health Canada's 13485 ISO standard for medical devices. And by adding the Genesis monitor to its line-up.*

*That plug-and-play facility has Kathryn Crone thinking of other uses. Crone is the executive director of CareConnect, a co-operative telehealth network that links all hospitals, including the Ontario Heart Institute, in Eastern and South-eastern Ontario. It is CareConnect's job to assist its partner hospitals both with the choice and funding of its*

*telehealth systems. CareConnect advice, and a \$160,000 contribution arranged with the Ontario Ministry of Health and Long-Term Care, set the Heart Institute and Struthers up with the HomMed system.*

[Canadian Healthcare Technology October 2005 print edition]

Additional projects are ongoing into this marketplace.

*On the Canadian scale, however, no telehomecare initiative is currently bigger than the one that's been under way in the Toronto suburb of East York for the past two years. It was developed and is now led by Lynda Atack and Diane Duff. Both are registered nurses who earned their PhDs and now teach at the college and university level.*

*The three-year, \$2.3 million East York Telehomecare (EYTHC) project is not only providing telehomecare using a broadband-based monitoring system from American Telecare, of Eden Prairie, Minn., it also has significant E-learning and research components.*

*"Telehomecare is still relatively new, so there are very few formal training programs for healthcare providers working in this area," says Richard Johnson, president of Centennial College, one of the EYTHC project's founding partners – and where project co-leader Lynda Atack teaches nursing science.*


*"We've used funding from the Ontario Innovation Trust to help create online courses, and video learning opportunities for our care providers," says Atack. "And we've been able to establish a telehomecare research centre at Centennial as well."*

Source: Canadian Healthcare Technology October 2005 print edition


The apparent inroads made into major Canadian test projects and service initiatives by the larger industry players may at least partially explain both the small number of domestic RPM product development companies and the small size of most existing domestic entrants.

Canadian product development companies active in the RPM field are presented in a tabular form commencing on the next page.



## PHD Medical

<b>PROFILE</b> 	100-500 Morgan Rd BAIE-D'URFÉ, Quebec H9X 3V1 (514) 694-0367 1(888) 201-0210 Fax: (514) 694-4280 <a href="http://www.phdmedical.com">http://www.phdmedical.com</a>
<b>STRATEGIC DIRECTION</b>	<p>PHD Medical Inc. (PHD Medical) designs and develops software and hardware applications for the medical community in the areas of home health diagnostics and Telehealth. PHD Medical was established in January 2003.</p> <p>PHD Medical healthcare solutions are designed to improve the delivery and management of home diagnostic testing. The company is certified under ISO 13485, which complies with European Council Directive on Medical Devices EEC/93/42.</p> <p>The company's Televisit system combines PC based videoconferencing capabilities with integrated medical devices such as a pulse oximeter and a non-invasive blood pressure monitor with a software application that manages medical data, appointment scheduling, and communications. With the Televisit system, clinicians in a hospital or clinic have the ability to conduct medical examinations on home care patients without incurring the loss of time or expense of travel to remote locations.</p>
<b>RESEARCH</b>	<p>PHD Medical Inc. designs innovative products and services to meet the unmet demand and the specific needs of the home diagnostic and telemedicine markets in Canada and the world. Through its network of technical and clinical experts, PHD Medical provides revolutionary solutions that enhance patient care and management.</p>
<b>PARTNERS</b>	NA
<b>CEO</b>	John McAllister President; Chairman of the Board
<b>VP BUSINESS DEVELOPMENT</b>	Jeremy T. Brouillette Executive Vice President; Director
<b>CSO</b>	Dr. Robert T. Brouillette, Medical Director

## [Auto Control Medical](#)


<p><b>PROFILE</b></p> 	<p>6695 Millcreek Dr., Unit 5                  Mississauga, ON                  L5N 5R8                  Toll Free : 1-800-461-0991                  Tel.: (905) 814-6350                  Fax: (905) 814-6355  <a href="http://www.autocontrol.com/">http://www.autocontrol.com/</a></p> <p>Auto Control is a privately-owned Canadian company with origins in Ontario and Quebec. From offices in Toronto and Montreal, it distributes healthcare through pharmacies and homecare stores coast to coast.</p> <p>Auto Control Medical has focused on self-monitoring products including LifeSource digital home blood pressure monitors, the Animas IR 1200 insulin infusion pump and accessories, LifeSource heart rate monitors, digital and ear thermometers and personal scales, Respironics respiratory products, UltiCare insulin syringes, Unifine Pentips insulin pen needles, MyHealth temple thermometers and pedometers.</p> <p>The development of a strong focus on self-monitoring devices plays an important role in Auto Control Medical's success. The introduction of new items in Auto Control's product line involves considerable groundwork. Auto Control's reputation for product knowledge, training sessions and effective communication all serve to help bring new innovative products to market quickly and effectively.</p> <p>The company has been featured six times in Profit Magazine's list of Canada's Fastest Growing Companies.</p>
<p><b>STRATEGIC DIRECTION</b></p>	<ul style="list-style-type: none"> <li>- the company focus on self-monitoring devices will continue into the future</li> <li>- recognize that the introduction of new items in Auto Control's product line involves considerable groundwork</li> </ul>
<p><b>RESEARCH</b></p>	<p>NA</p>
<p><b>PARTNERS</b></p>	<p>NA</p>
<p><b>CEO</b></p>	<p>Grant Reynolds, President</p>
<p><b>VP BUSINESS DEVELOPMENT</b></p>	<p>Robert Burgy, Vice-President</p>
<p><b>CSO</b></p>	<p>NA</p>

## March Healthcare


<p><b>PROFILE</b></p> 	<p>555 Legget Drive, Tower B Ottawa, ON K2K 2X3 Canada Phone: 613-591-8181 <a href="http://www.marchhealthcare.com">www.marchhealthcare.com</a></p> <p>The company's telehealth application platform supports a wide range of remote monitoring and health maintenance solutions, from data-only acquisition to high-quality remote video visits.</p> <p><b>Responsive</b> March Healthcare was founded in 2004 in response to rising healthcare costs, an aging worldwide population and a shortage of healthcare providers. The company is a wholly-owned subsidiary of March Networks Corporation.</p> <p><b>Health Monitoring Kit</b> The Health Monitoring Kit (HMK) supports telemonitoring capabilities through the assessment of patient vital signs. The HMK is a portable, Class 1 Bluetooth-enabled device.</p>  <p>In February 2006 the Kit was approved for sale in the United States, Europe and Canada by the U.S. Food and Drug Administration (FDA) and Health Canada, and the receipt of a Product Certificate of Registration for CE Marking.</p> <p>March Healthcare has also received ISO-13485:2003 certification, confirming that the company's quality management system meets the necessary standards for supplying medical devices and related services.</p>
<p><b>STRATEGIC DIRECTION</b></p>	<p>Leveraging its expertise in telecommunications, networked video, and Internet protocol (IP)-based monitoring systems, the company has developed a world-class telehealth offering that is widely regarded to be at the forefront of this emerging industry</p> <p>Designed to address multiple telemonitoring programs, ranging from data-only acquisition to high quality remote video visits, the scalable, flexible and proven telehealth application platform is positioned to meet industry needs today and in the future.</p>
<p><b>RESEARCH</b></p>	<p>Leveraging its expertise in networked video, telecommunications and Internet protocol (IP) based monitoring systems</p>
<p><b>PARTNERS</b></p>	<p>From the company's Partner Section:</p> <p><i>Typically, healthcare organizations are funded by predictable income</i></p>

	<p><i>sources, such as public reimbursement programs or private health insurance. They operate with small capital budgets and rarely have the Information Technology (IT) infrastructures or resources needed to independently deploy technology solutions on a wide scale.</i></p> <p><i>To address these challenges, March Healthcare has developed a unique partnership model for telehealth deployment that includes both product and service offerings.</i></p> <p><i>We partner with best-in-class network and IT service providers to address technology and infrastructure requirements. We then work with these technical partners to provide healthcare organizations with 'one-stop shopping' applications that enable remote visiting capabilities. The result is an end-to-end technology solution that is transparent and seamless to end users.</i></p>
<b>CEO</b>	<p>Sir Terence Matthews is Chairman of March Networks Corporation (parent company)</p> <p>Peter Strom is President and Chief Executive Officer of March Networks (parent company)</p>
<b>VP BUSINESS DEVELOPMENT</b>	<p>Chief Operating Officer Christine Cimaglia</p>
<b>CSO</b>	<p>Timon LeDain, VP Engineering</p>

## Vigil Health Solutions


<b>PROFILE</b> 	2102-4464 Markham St Victoria, British Columbia V8Z 7X8 (250) 383-6900 1 (877) 850-1122 Fax: (250) 383-6999 <a href="http://www.vigil.com">http://www.vigil.com</a>
<b>STRATEGIC DIRECTION</b>	<p>Vigil Health Solutions Inc. (TSX-V: VGL) is a publicly held company providing healthcare services and products internationally.</p> <p>Vigil's nurse call and dementia monitoring technology guides care of and monitors seniors living in long-term care facilities. The proprietary technological platform, the Vigil Integrated Care Management System™ (Vigil System), includes nurse call, a wireless call system, voice nurse call, resident check-in, bed monitoring and a non-invasive monitoring system for dementia residents, the Vigil Dementia System.</p> <p>Total Sales for fiscal year ended March 31, 2005 were \$1.13M          Number of Employees 17</p>
<b>RESEARCH</b>	- focus on long term care facilities and monitoring / information management solutions
<b>PARTNERS</b>	NA
<b>CEO</b>	Troy Griffiths, President
<b>VP BUSINESS DEVELOPMENT</b>	Jacquie Brennan, Vice President, Operations
<b>CSO</b>	Scientific Advisory Board

## Medical Intelligence

<p><b>PROFILE</b></p> 	<p>1170 Grande Allée Ouest, Québec (Québec)          G1S 1E5 CANADA          Tel.: 418 527 3869 / 1 888 527 3869          Fax: 418 527 8364  <a href="http://www.medicalintelligence.ca">http://www.medicalintelligence.ca</a></p> <p>Medical Intelligence is active in the development and marketing of “human tele-security” technologies integrating artificial intelligence, telemetric devices, telecommunications and GPS positioning. We developed the wireless portable digital ECG (patent pending) that is integrated with the accessory that is also patented (pending) known as VPS (Vital Positioning System™).</p> <p>Medical Intelligence Inc. was founded in February 2001 in Quebec City, Canada, from a concept first developed in 2000. Over the years, Medical Intelligence inc. was backed by its founding shareholder, Net Création Inc. in its R&amp;D efforts and to protect its intellectual property rights, in priority with the US Patent Office in Washington.</p> <p>The activities focus on the development and marketing of these technologies rather than the manufacture or production of accessories. Production is left to partners specializing in this field.</p> <p>VPS is the first portable cardiac alert system linked to GPS that automatically contacts 911 - without victim involvement – during a major cardiac event; using GPS to locate the victim in record time.</p> <p>Since 1987, the team at Net Création, the company behind Medical Intelligence, have been respected expert marketing consultants. In 1999, the team chose to specialize in the creation of technological products based on market studies.</p> <p>To gain a better understanding of Medical Intelligence target markets, Net Création recently directed the communications and marketing strategies for two major Quebec-based healthcare-related networks, New Look Eyewear and Epiderma clinics.</p>
<p><b>STRATEGIC DIRECTION</b></p>	<p>The company wants to become a major player in the global revolution in security and telemetrics, both linked to wireless telecommunications networks to enable automatic alarm applications.</p> <p>Medical Intelligence is determined to become the leader in the growing “human tele-security” industry by integrating information technologies with the healthcare sector.</p>

<b>RESEARCH</b>	The vision is to develop and distribute personal telemetric devices integrating the security of wireless telecommunications alarms that will enhance the quality of life of persons afflicted with health conditions.
<b>PARTNERS</b>	NA
<b>CEO</b>	Stéphane Bergeron, MD President and CEO
<b>VP BUSINESS DEVELOPMENT</b>	Gilles Poitras
<b>CSO</b>	M. Jean-François Montplaisir Vice President Technologies

## Brytech

<p><b>PROFILE</b></p> 	<p>BRYTECH Inc.                  240-600 Peter Morand Cres.                  OTTAWA, Ontario                  K1G 5Z3                  (613) 731-5800                  1(800) 263-4095                  Fax: (613) 731-5812  <a href="http://www.brytech.com">http://www.brytech.com</a></p>
<p><b>STRATEGIC DIRECTION</b></p>	<p>BRYTECH Inc. is an ISO 9001:2000 registered company with experience in designing and manufacturing commercial products for the health care and telecommunications markets. With access to the expertise of more than 20 associates including engineers, physicists, biologists, chemists, economists, behavioural scientists, computer scientists and technologists, BRYTECH can research innovative solutions, produce prototypes and deliver finished products.</p> <p>Product Remote physiological monitor                  Versatile portable monitoring system enabling the recording and relay of data from numerous vital-sign sensors to a remote site via cell phone, WiFi and internet technologies</p> <p>Total Sales \$500,000 to \$999,999 <i>(Strategis listing by company)</i></p>
<p><b>RESEARCH</b></p>	<p>The medical products division is actively developing the next generation of portable patient monitors. The company holds a number of patents involved with non-invasive vital-signs monitoring. The company is currently developing its next generation of wearable patient monitors.</p> <p>- the company has been in business for 18 years. The focus is on R&amp;D for product development with a longer term plan for commercialization.</p>
<p><b>PARTNERS</b></p>	<p>BRYTECH Inc. is interested in establishing distribution in new market areas. There is an interest in joint ventures and in technology transfer agreements. As well BRYTECH is interested in collaborating with organizations that have marketing and distribution capabilities in the areas of health care monitors.</p>
<p><b>CEO</b></p>	<p>Earl Bryenton, President                  (613) 731-5800  <a href="mailto:earlbryenton@brytech.com">earlbryenton@brytech.com</a></p>
<p><b>VP BUSINESS DEVELOPMENT</b></p>	<p>NA</p>
<p><b>CSO</b></p>	<p>NA</p>

## 4.0 Canadian Research and Research Groups engaged in community/home care technology development

Canadian research and research groups are presented in a tabular form commencing on the next page. Emphasis was placed on discovering groups engaged in research and development for home care applications. Groups principally involved with social science research or facilitation of commercialization (e.g. the University of Calgary e-Health office at (<http://www.ehealthindustry.com/ehealth/bins/index.asp>) were excluded.

### TR LABS

<b>PROFILE</b>	<p>TRLabs creates innovative technologies and trains students to enhance ICT expertise and improve Canada's global competitiveness. Labs in Edmonton, Calgary, Saskatoon, Regina, and Winnipeg employ 250. With 55 partner members representing a unique synergy of industry, government, and university, research focuses on future network needs and demands: data networking, digital media, health, home technologies, network systems, photonics, and wireless communications. In its 19-year existence, TRLabs has trained 810 highly skilled university graduates, created 290 technologies adopted for use by companies, and generated 157 patents issued or filed.</p> <p>The vision for TRLabs' eHealth research is to be recognized by the health sector and the ICT industry in Western Canada as a leader in ICT research and development applied to improve the efficiency, effectiveness, and safety of health care delivery. Telehealth refers to the use of ICT to provide clinical care to patients located at a distance. This includes: patient monitoring and provision of services directly to patients; and assisting the practice of medicine with access to shared information among health care professionals in a secure environment.</p>
<b>RESEARCH THRUST</b>	<p>This activity has significant synergy with TRLabs' home technologies research initiative in that the core functions of home networks, such as home automation and monitoring, are central to the provision of health care within the home environment. TRLabs is also currently involved in research applying expertise in signal processing to develop automatic pre-screening of signals from monitoring devices, so that long-term data signals can be obtained and busy physicians and specialists can focus on the most salient features or segments of the signals collected.</p>
<b>CURRENT PARTNERSHIPS</b>	<p><a href="http://www.trlabs.ca/trlabs/acrobat/05_annual_report.pdf">http://www.trlabs.ca/trlabs/acrobat/05_annual_report.pdf</a></p>
<b>RESEARCH DRIVER</b>	<p>Chris Haugen Director, Edmonton Operations Lab: Edmonton</p>

	t: (780)441-3826 TRLabs Adjunct Scientist Dr. Zahra Mousavi
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## Bell University Lab

<b>PROFILE</b>	<p>The purpose of the Bell University Laboratory in Health Communications is to support the development of innovative research projects in <i>health informatics</i> and <i>electronic health communication and learning</i>. The investigators in Health Communications have established fruitful collaborations with faculty members in other Bell Laboratories at the University of Toronto. Investigators from the Departments of Computer Science and Mechanical and Industrial Engineering and the Faculty of Law are actively engaged in our Health Communications research projects. These collaborations now make health-related content available to all the Bell University Laboratory investigators to advance the testing and development of their informatics and communication research.</p> <p>The Bell University Laboratory and Project Investigators are committed to creating health communication deliverables relevant for the future development of marketable tools and services for a broad range of professional and public applications. The Faculty of Medicine provides an important interface with the hospital and community sectors where electronic communication is rapidly expanding.</p>
<b>RESEARCH THRUST</b>	<p>There are a number of advantages to homecare, which include greater patient independence, improved quality-of-life and lower healthcare costs. However, achieving homecare for patients with complex chronic conditions and requiring complex therapies is difficult. The medical technologies are complex and at time poorly designed for the home which creates anxiety for the patient already worried about providing their own care. Home Nocturnal Hemodialysis is a superior alternative to conventional renal replacement therapy. The University of Toronto is a pioneer of this renal replacement modality, which has already achieved proven clinical benefits with the potential for greater patient independence and cost savings without continual heavy investment in dialysis infrastructure.</p>
<b>CURRENT PARTNERSHIPS</b>	NA
<b>RESEARCH DRIVER</b>	Christopher Chan, MD, Assistant Professor of Medicine, University of Toronto & Director of Home Hemodialysis, Toronto General Hospital, University Health Network, Toronto, ON

## [Centre for Global eHealth Innovation](#)

<b>PROFILE</b>	<p>We are a rapidly growing group of people who share the Centre's vision <i>to improve health for all through information and communication technologies (ICTs)</i>.</p> <p>We view ICTs as enablers to the acceleration of the transformation of the health system worldwide.</p> <p>Supporting the University Health Network (UHN)'s vision of global impact and exemplary patient care, we work in a collaborative style that emphasizes creativity and centredness on people.</p> <p>The Centre is a joint effort of UHN and the University of Toronto and was built with funds from the Canadian government, through the Canada Foundation for Innovation, and the Ontario Innovation Trust.</p>
<b>RESEARCH THRUST</b>	<p>There are a number of advantages to homecare, which include greater patient independence, improved quality-of-life and lower healthcare costs. However, achieving homecare for patients with complex chronic conditions and requiring complex therapies is difficult. The medical technologies are complex and at time poorly designed for the home which creates anxiety for the patient already worried about providing their own care. Home Nocturnal Hemodialysis is a superior alternative to conventional renal replacement therapy. The University of Toronto is a pioneer of this renal replacement modality, which has already achieved proven clinical benefits with the potential for greater patient independence and cost savings without continual heavy investment in dialysis infrastructure.</p>
<b>CURRENT PARTNERSHIPS</b>	Bell University Labs
<b>RESEARCH DRIVER</b>	<p><a href="#">Gunther Eysenbach</a>          Senior Scientist          Telephone: 416-340-4800 Ext. 6427          geysenba [at] uhnres.utoronto.ca</p>

## University of Alberta Wireless Wearable Physiological Monitor Project / Telehealth Technology Research Institute

<b>PROFILE</b>	<p>A University of Alberta project, the Wireless Wearable Physiological Monitor (WWPM) project, is entering its User Interface Trial phase, in collaboration with Capital Health. The device has the potential to improve the quality of health care through non-intrusive remote patient monitoring. Another anticipated benefit of consistent remote patient data collection is lower health care costs through a reduction in the incidents of re-hospitalization.</p> <p>Dr. Masako Miyazaki, principal investigator and integrator of the WWPM project, sees a day when nanotechnology and physiological monitoring will merge – the Wireless Wearable Physiological Monitor is the beginning of a new solution for health monitoring. Eventually, tiny biodegradable chips will be inserted into a patient, allowing care providers to constantly monitor patients.</p> <p>The Telehealth Technology Research Institute at the University of Alberta was established to focus on research and development of telehealth technologies. The institute works closely with the private and the public sectors and university faculties to promote development and utilization of technologies for remote health care providers</p>
<b>RESEARCH THRUST</b>	<p>- use of nanotechnology to provide remote patient monitoring</p>
<b>CURRENT PARTNERSHIPS</b>	<p>Seiko Instruments MI Laboratories Capital Health Region (Edmonton health authority)</p>
<b>RESEARCH DRIVER</b>	<p>Dr. Masako Miyazaki</p> <p>With the promising evidence that, under appropriate telecommunication infrastructures, Telehealth enhances the health care professional's ability to provide quality care regardless of their geographic location, Alberta Health and the Alberta Regional Health Authorities began their development and expansion of the Telehealth Network in Alberta. As a result, the CCHS Telehealth Centre sought the opportunity to delineate its role within the Telehealth field.</p>

## IATSL

### Intelligent Assistive Technology and Systems Lab

<p><b>PROFILE</b></p>	<p>For the past several years a growing area of research has been the development of new monitoring technologies for use by older adults in their own homes. These new systems and devices have been designed for a variety of tasks including, supporting older adults with the safe and independent completion of various activities, such as taking medication or self-care tasks, monitoring the health of the occupant, or automatically detecting emergency situations and calling for medical attention. The goal of these new technologies is to support aging-in-place—i.e. to help older adults remain in their own homes for as long as possible. These systems have used various types of monitoring equipment and hardware ranging from simple switches and motion sensors that are used to detect movement in a room, to more sophisticated systems such as computer vision that allows more in-depth information about a person to be determined.</p> <p>The area of home monitoring technology, and other associated systems such as reminding and prompting devices, has included this important information when designing new technologies. While these systems are designed to assist those living with age-related memory loss or dementia to remain at home in a safe environment for as long as possible, little or no hard data has been collected on user-acceptance of and/or consent to home monitoring among this population.</p>
<p><b>RESEARCH THRUST</b></p>	<p>- in-depth user studies to determine the types of technologies that older adults would accept into their own homes before developing this type of technology. This is especially true with respect to the types of systems that are being developed to monitor the actions of a person.</p>
<p><b>CURRENT PARTNERSHIPS</b></p>	<p>NA</p>
<p><b>RESEARCH DRIVER</b></p>	<p>Research Team            Alex Mihailidis, Ph.D. P.Eng. (University of Toronto)            Elizabeth Kelson (Simon Fraser University)            John Zettel (Centre for Studies in Aging)            Geoff Fernie, Ph.D. P.Eng. (Toronto Rehabilitation Institute)</p>

## 5.0 Conclusion

The primary purpose of the study was to identify potential areas of research and development that would correspond to product development activities and trends among leading companies and groups active in the remote patient monitoring field.

The principal finding is that growth in the RPM field will likely occur most rapidly in the remote monitoring of chronic diseases sector. Diagnosis and treatment of chronic diseases dominate present and projected health spending. Many leading companies reviewed are directing their RPM related research and development toward devices, systems and solutions that monitor these diseases. *Implication* - technology that monitors chronic diseases should be a major emphasis point for research and development that meets industry needs.

A secondary finding is the importance of quality partnerships in the RPM business. *Implication* - strategic partners that already have quality partnerships in place are likely necessary participants in any successful research and development effort, both as a market oriented influence on research direction and as an outlet for technology developed by the effort.

Along with quality partnerships, creation of technology that is interoperable and as capable as possible of being integrated into the systems and solutions of industry leaders is also a requisite for success. *Implication* – research and development should emphasize the creation of technology that 'plugs into' the devices, systems and solutions marketed by industry leaders. As well, because the RPM field involves the integration of medical devices and ICT, research and development efforts should feature multidisciplinary teams from both areas.

A collaborative response to industry pull is likely a technological and competitive requisite.

To achieve the scale and scope needed to create research and development activity that is meaningful to industry in the RPM area, intensive and ongoing collaboration between Canadian groups and companies involved in RPM is required. One example of such a collaborative approach is the [Healthware](#) project launched by the European Commission in 2005.

Exploration of the most effective form that this collaboration could take is recommended, through assessment of different structural models and creation of a business plan to guide collaboration.