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2015

RX ROBOTS
PRESCRIPTION FOR PAIN RELIEF

2015 North American Robotic Patient Care and Support New Product Innovation Award

FROST & SULLIVAN

50 Years of Growth, Innovation & Leadership

Contents

Background and Company Performance

Industry Challenges

Pediatric patients are often among the most challenging treatment segments to serve for care givers. Beyond the complexities of having to scale treatments for a wide range of patient types; children are susceptible to higher degrees of stress and anxiety than adults. Anxiety triggering events can encompass a wide range of care including procedures involving needles, simple minimal invasive procedures, to the general distress of a new or unknown experience for the patient (e.g. a diagnostic scan). A great deal of research shows that mental angst can directly manifest as physiological symptoms that can impact the outcome and effectiveness of a given treatment. Moreover, as a child becomes progressively fretful and fidgety, error risks increase during a procedure.

In order to deal with these issues, many care providers have patient support programs that by virtue of mitigating stress factors can also:

- Reduce the need for sedatives

- Reduce the need for repeat procedures

- Shorten procedure time

- Improve satisfaction

Patient support programs align nicely with the current healthcare industry shift towards greater focus on patient satisfaction and quality of care. Unique to pediatric care, there is the added dimension of 'parent satisfaction'. When translating conceptual strategies to practical applications, many care facilities face challenges while implementing new initiatives on an already overburdened staff of skilled clinical personnel. For this area of need, an unique trend is emerging with the employment of robots towards patient care and support. Rather than an alternative to direct patient engagement, these robots actually are able to augment the effectiveness of care that the care giver is able to provide.

Particularly in the case of children, who are familiar with robots within the canon of children's literature and animated feature films; these humanoid robots are able to engage and set the patient at ease in a way an adult care giver could not.

The Novel MEDi Robot Revolutionizes Pediatric Patient Care

Newly founded and headquartered in Calgary, Alberta, Canada, RxRobots, Inc. is the developer of MEDi™—a humanoid robot that combines "**M**edicine and **E**ngineering **D**esigning **I**ntelligence" to interact with pediatric patients during anxiety producing and/or painful procedures to help manage their pain.

Bringing a Unique Experience during a Distressing Event

Hospitals can be a scary place, especially for a child. Hospitals may be a place of healing, but to a child hospitals may be equated with needles, strangers in uniforms, mysterious equipment, and boring wait times. But RxRobots, Inc. hopes to bring a less frightening experience to children through its humanoid robot, MEDi™.

MEDi™ stands just 58 centimeters tall—the perfect size to interact with children. Through its programming, MEDi™ performs simple and entertaining activities to reduce anxiety levels in children and even parents. MEDi™ sings, dances, tells stories, and plays games—all of these interactions can help reduce anxiety that often precedes a pending procedure. Once the procedure begins, MEDi™ talks to the child explaining what is about to happen, what it should feel like, and even performs behavioral techniques with the child, such as breathing, to help manage pain and anxiety.

For the past three years, MEDi™ has been used at Alberta Children's Hospital (Canada); and in a recent study conducted there ("Humanoid Robotics in Health Care: An Exploration of Children's and Parents' Emotional Reactions"), 57 children were administered flu vaccinations while interacting with MEDi™. The research concluded that children who interacted with MEDi™ during the flu vaccination procedure reported 50% less pain than children who did not interact with MEDi™.

Re-imaging Robots in Healthcare

Robotic technology is not new to healthcare—accurate, precise techniques that automate processes and simple procedures are prevalent in areas such as pharmaceutical automation and complex surgical procedures. Particularly in those high risk procedures, robotic assist tools can offer a level of dexterity and control that are not possible by even the most skilled surgeons. Utilizing robotics towards patient support, on the other hand derives value through an added dimension of intuitive interaction.

Originally derived from the NAO platform designed by Aldebaran Robotics, MEDi™ is uniquely tailored via its programming by RxRobots, Inc. to "use humanoid technology to integrate young patients and their families into the delivery of care."

MEDi™ is developed using cognitive and behavioral-based research led by Dr. Tanya Beran, RxRobots' Founder and Chief Scientific Officer. Through the integration of a cute, friendly, and procedurally intelligent robot, Dr. Beran observed that children actually think that MEDi™ is alive. Even to an adult observer (i.e., parent), it might appear that MEDi™ is actually anticipating and responding to the procedural process. However, MEDi™'s patient interactions are highly choreographed based upon routine procedures set by the hospital's administration and then carried out by the hospital's staff. For example, when a child is being administered a flu shot, the healthcare staff selects the appropriate program for MEDi™ to follow. Working in sync, the healthcare staff actually prepares the area for shot injection and administered the shot while MEDi™ talks to the child, explaining what

will happen during each step of the process, and providing coaching and distraction to reduce their pain, anxiety, and fear.

RxRobots develops programs that are customized to hospitals' procedural needs, and through synchronization of these routine-based procedures, MEDi™ becomes a "companion, educator, and pain coach" for children.

While Aldebaran's NAO robot is more routinely used in educational class room settings, RxRobots modified its design for pediatric applications. The petite size and roundish features are non-threatening to children. Further, its plastic casing is highly durable and can withstand the rigorous sanitization protocols required in a hospital setting to prevent the transmission of contagions.

Optimizing the Patient Experience with Benefits to Hospitals' Bottom Line

MEDI™ was first introduced, tested, and launched at Alberta's Children's Hospital—and the benefits have been significant. As a customer testimonial, Margaret Fullerton, Vice President at Alberta's Children's Hospital states, "…it has become quite clear that this technology significantly improves the health care experience for our young patients and their parents…We are fortunate to have access to the first robots in Canada specifically programmed to help children manage painful or stressful medical procedures. It's a useful—and very cool—technology." Currently, Alberta's Children's Hospital has four MEDi™ robots throughout its facility, and has plans to purchase more.

The retail costs of MEDI™ range from $15,000 to $30,000—depending upon the number of programs/applications needed. The basic $15,000 package includes the following:

- MEDi™ robot
- Android tablet
- Router
- Charger
- Application library
- Warranty
- Eight hours of consulting time
- Four hours of training related to fundraising opportunities with MEDi™

RxRobots works closely with its hospital customers to develop customized applications that align with the procedures MEDi™ will be required to perform—ensuring that customer investments are optimized.

As the healthcare industry shifts to an outcomes-based model, patient support programs are more highly valued, yet their success is not easily quantified. Therefore, the financial return on investment made in a patient support robot such as MEDi™ is not yet easily realized; however, as children are more cooperative with MEDi™, procedures can be completed more quickly. Also, when parents are willing to drive 40 miles to a facility with

MEDi™ over a facility without, hospitals can more easily understand the positive impact that robotic patient support programs can have not only on patient care but the bottom line.

An Eye on the Future

Currently, RxRobots' primary customers are large hospitals, but the company recognizes that MEDi™'s applications can extend beyond the hospital environment and into pharmacies, private clinics, and hospice facilities. RxRobots' expansion plans are consistent with Frost & Sullivan's projections as to where and how robotics could effectively be deployed for enhancing patient care and support.

Conclusion

Frost & Sullivan strongly believes patient care and support robotics are the way of the future; and particularly, RxRobots' MEDi™ solution will have a transformative effect on how pediatric patient care is delivered. This small, friendly humanoid robot is capable of enhancing pediatric patient care in a manner previously unaddressed. Accordingly, RxRobots has earned Frost & Sullivan's 2015 North American New Product Innovation Award for robotic patient care and support.

Significance of New Product Innovation

Ultimately, growth in any organization depends upon continually introducing new products to the market, and successfully commercializing those products. For these dual goals to occur, a company must be best-in-class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.

Understanding New Product Innovation

Innovation is about finding a productive outlet for creativity—for consistently translating ideas into high quality products that have a profound impact on the customer.

Key Benchmarking Criteria

For the New Product Innovation Award, Frost & Sullivan analysts independently evaluated two key factors— New Product Attributes and Customer Impact—according to the criteria identified below.

New Product Attributes

Criterion 1: Match to Needs
Criterion 2: Reliability
Criterion 3: Quality
Criterion 4: Positioning
Criterion 5: Design

Customer Impact

Criterion 1: Price/Performance Value
Criterion 2: Customer Purchase Experience
Criterion 3: Customer Ownership Experience
Criterion 4: Customer Service Experience
Criterion 5: Brand Equity

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often, companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry players and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS

Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan Awards follow a 10-step process to evaluate award candidates and assess their fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 **Monitor, target, and screen**	Identify award recipient candidates from around the globe	• Conduct in-depth industry research • Identify emerging sectors • Scan multiple geographies	Pipeline of candidates who potentially meet all best-practice criteria
2 **Perform 360-degree research**	Perform comprehensive, 360-degree research on all candidates in the pipeline	• Interview thought leaders and industry practitioners • Assess candidates' fit with best-practice criteria • Rank all candidates	Matrix positioning all candidates' performance relative to one another
3 **Invite thought leadership in best practices**	Perform in-depth examination of all candidates	• Confirm best-practice criteria • Examine eligibility of all candidates • Identify any information gaps	Detailed profiles of all ranked candidates
4 **Initiate research director review**	Conduct an unbiased evaluation of all candidate profiles	• Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles	Final prioritization of all eligible candidates and companion best-practice positioning paper
5 **Assemble panel of industry experts**	Present findings to an expert panel of industry thought leaders	• Share findings • Strengthen cases for candidate eligibility • Prioritize candidates	Refined list of prioritized award candidates
6 **Conduct global industry review**	Build consensus on award candidates' eligibility	• Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates	Final list of eligible award candidates, representing success stories worldwide
7 **Perform quality check**	Develop official award consideration materials	• Perform final performance benchmarking activities • Write nominations • Perform quality review	High-quality, accurate, and creative presentation of nominees' successes
8 **Reconnect with panel of industry experts**	Finalize the selection of the best-practice award recipient	• Review analysis with panel • Build consensus • Select winner	Decision on which company performs best against all best-practice criteria
9 **Communicate recognition**	Inform award recipient of award recognition	• Present award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance	Announcement of award and plan for how recipient can use the award to enhance the brand
10 **Take strategic action**	Once licensed, company may share award news with stakeholders and customers	• Coordinate MEDi™a outreach • Design a marketing plan • Assess award's role in future strategic planning	Widespread awareness of recipient's award status among investors, MEDi™a personnel, and employees

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best in class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages over 50 years of experience in partnering with Global 1000 companies, emerging businesses and the investment community from 31 offices on six continents. To join our Growth Partnership, please visit http://www.frost.com.