



2018 North American Remote Patient Monitoring  
New Product Innovation Award



2018  
**BEST PRACTICES**  
AWARDS

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## Background and Company Performance

### *Industry Challenges*

The US healthcare system remains committed to improving patient outcomes while reducing the costs associated with expert care. However, we are far from achieving this goal. For example:

- Per capita spending for healthcare continues to rise. According to the Centers for Disease Control and Prevention (CDC), it reached \$9,990 in 2015.<sup>1</sup> In 2016, it increased 3.6% to \$10,348.<sup>2</sup>
- Nationally, total health expenditures rose to \$3.2 trillion in 2015,<sup>3</sup> and increased 4.3% to reach \$3.3 trillion 2016.<sup>4</sup>
- The overall share of gross domestic product related to healthcare spending was 17.9% in 2016, up from 17.7% in 2015.<sup>5</sup>

Although healthcare costs are rising, remote patient monitoring (RPM) is considered to have the strong potential to reverse this trend by improving patient outcomes in a variety of ways. This includes reducing hospital readmissions, because tracking patients' adherence to prescribed medication regimens and lifestyle management plans after they leave the hospital is more efficient than relying on longer stays or in-person, scheduled appointments. RPM remains far from ubiquitous, however, although the situation is improving and there are signs that we may be closer to resolving long-standing issues, such as the lack of a standard reimbursement formula or security and privacy concerns. The Centers for Medicare and Medicaid Services (CMS) evaluates changes to telehealth reimbursements annually, and many states offer telehealth parity rules that include RPM. For 2018, the CMS has left more room for analyzing RPM data under CPT Code 99091. Although still a long way from what the RPM advocates want to see, this move appears to be part of a path that will eventually cover RPM implementations.

A variety of technology-based companies are aiming to enable a wider implementation of RPM. In January 2017, Frost & Sullivan predicted that "In remote patient monitoring, traditional medical device manufacturers are beginning to feel some pressure from the many start-ups offering smaller, integrated, and easy-to-use devices that are managed by smartphone apps. mHealth is increasing as the enabler that will drive connectivity and continue to influence the realization of a functional Internet of Medical Things."<sup>6</sup> Although this is indeed occurring, the incumbent RPM service providers are also seeing opportunities to partner with larger, global technology providers that are aiming to make a difference by offering platforms to better manage RPM. For example, Frost & Sullivan is

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<sup>1</sup> <https://www.cdc.gov/nchs/fastats/health-expenditures.htm>

<sup>2</sup> <https://www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/nationalhealthexpenddata/downloads/highlights.pdf>

<sup>3</sup> Ibid CDC

<sup>4</sup> Ibid CMS

<sup>5</sup> Ibid CMS

<sup>6</sup> [https://www2.frost.com/files/3214/8830/8451/2017\\_Frost\\_Sullivan\\_Predictions\\_in\\_Digital\\_Health.pdf](https://www2.frost.com/files/3214/8830/8451/2017_Frost_Sullivan_Predictions_in_Digital_Health.pdf)

impressed by the exciting potential for the Intel® Health Application Platform (HAP) and the Flex® IoT Compute Engine to stimulate progress needed for RPM to become a standard of care.

## *New Product Attributes and Customer Impact*

### **Match to Needs**

The Intel HAP is well-aligned with the needs associated with RPM. According to Intel, the platform is an “innovative application software and reference platform designed to enable healthcare ecosystem solution providers to develop a variety of new and exciting usage models, including health use cases.” Specific attributes associated with the product include:

- Improved management of RPM deployments where a consumer-owned Android device acts as a data hub.
- A stable software environment that eliminates disruptive system updates that could take a relevant device offline for several hours. Intel ensures robust peripheral-to-cloud connectivity.
- True data ownership because data is encrypted and stored until it can be forwarded to the back-end location designated by the solution owner or provider. Intel does not own patient and other medical data.
- Advanced security methodologies to help protect trusted data.
- Verified peripherals. Intel supports a growing selection of interoperable peripherals, such as blood pressure monitors, and scales across many RPM use cases.
- Flexible app development. Intel enables solution providers to layer their own or relevant Android-based, value-added apps.

The Flex IoT Compute Engine is described as the first design to implement the combination of the Intel HAP software with an optimized hardware design specification that will increase customer support and improve product development. Frost & Sullivan industry research recognized that the combined solutions are well-matched to the needs of RPM service providers and their patients.

### **Positioning**

Intel leverages its expertise to apply technology to transformation. The company can cite success in achieving this result in various vertical markets. At this juncture, Intel believes that healthcare is at the tipping point where the successful indicators that illustrate improved patient outcomes associated with RPM offer an opportunity to expand the scale of RPM to many more patients, with the ultimate goal of helping make remote care a medical standard of care for the widest possible set of relevant conditions and treatment protocols. Intel has introduced a program to address a compelling need in the healthcare industry: a way to better manage RPM and increase the value of the growing stream of patient data it is generating. The company has utilized white papers, conference presentations, and an informative Web site to illustrate that it has the thought leadership

needed to drive a disruptive change in the industry. Intel is positioning IT expertise combined with a deep understanding of the healthcare workflow.

The next phase of digital health will present opportunities to market participants that are part of the intelligence chain of the technology stack. Intel has advocated extending the value of RPM beyond chronic condition management and post-acute care to a wider population. Intel is focused on the ways that RPM is gaining momentum and has become more financially viable in the industry because of the influence of consumer-grade fitness trackers. This will be favorable in the shared-risk, value-based reimbursement model that offers a better prognosis for success than the reimbursement-focused model that creates barriers to extending RPM programs beyond small-scale trials and implementations. Intel has presented strong evidence that it understands this important dynamic and is seen as a thought leader on this issue.

Frost & Sullivan believes the opportunity to transform the robust stream of RPM-generated data to intelligence is important, and that Intel has positioned well as a valuable technology partner for healthcare industry participants to finally fulfill the promise of RPM.

### **Design**

Intel has presented a technology design for solutions using the Intel HAP in conjunction with the Flex IoT Compute Engine to address the immediate needs to reduce potential provider penalties for readmission and improve care for aging populations and the growing number of people with one or more chronic diseases.

Initially, the design is presented for five use cases: RPM, assisted living monitoring, chronic disease management, post-acute care management, and clinical drug and therapy trials. Intel has built an integrated solution that includes the Intel HAP designed for products and services that offer enterprise-grade stability, security, and longevity. The design also promises improved total cost of ownership for providers. The Flex IoT Compute Engine is stated to be the first design to implement the combination of the Intel HAP software and the optimized hardware design specification.

Frost & Sullivan is confident that Intel has introduced a well-designed technology capability that covers all components of an RPM deployment.

### **Brand Equity**

Intel has outstanding brand equity. According to Forbes, Intel has a brand value of \$32.3 billion,<sup>7</sup> making it one of the world's most powerful brands. Attributes associated with this criterion include quality, innovation, trust, reliability, and commitment. Intel's reputation is further enhanced by the fact that it produces the central processing unit (CPU) chips that run computers around the world. In fact, the familiar "Intel Inside" label has become a symbol for companies that produce the technology needed to enable other products to work.

For example, the decision to purchase a PC is often based more on which Intel chip is running the system than on the PC's brand name. Although Intel is not a medical device

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<sup>7</sup> <https://www.forbes.com/pictures/fell45elff/no-6-intel/#5d245a433e39>

supplier, the company is well-known by healthcare IT leaders and is often viewed as a trusted advisor and agnostic strategic partner. In addition, Intel has engaged healthcare experts and has been a visible advocate of increasing the potential for data analytics to revitalize the healthcare industry.

### **Commitment to Innovation**

Despite its brand power, Intel has never lost sight of the value of innovation. The company consistently strives to improve the performance of its chips by managing a constant update and improvement program. The familiar chips have increased computers' speed and performance and reduced their size yet allowed them to remain affordable. This value proposition is known as Moore's Law, which is an observation made by Intel co-founder Gordon Moore in 1965 that the number of transistors per square inch on integrated circuits had doubled every year since their invention<sup>8</sup>.

Intel is extending its commitment to innovation by aiming at the RPM market with an approach that is likely to overcome many of the long-standing market and technical challenges plaguing RPM and result in more rites of passage not just for providers but for regulators and payers as well. Once this is accomplished, the path to reaping the benefits associated with RPM will be clear. Frost & Sullivan is confident that Intel's commitment to RPM innovation will improve the health-related outcomes of millions of patients.

### **Reliability**

The Intel-Flex partnership will result in a smart edge computing device that is not regulated by the US Food and Drug Administration. This device is paired with a software platform that combines data from multiple devices and transfers the information to a healthcare provider.

This pairing will enable remote care services to easily and reliably capture health data and send blood pressure updates, weight readings, or other important information to medical providers to facilitate ongoing monitoring of health issues. The IoT Compute Engine is a white-box solution that dramatically simplifies the collection and sharing of RPM information, saving money for providers while also enabling new monitoring scenarios.

Intel is also creating an ecosystem of medical-grade RPM service providers. The goal is to increase reliability by providing:

- A stable application platform;
- Uncompromised data ownership;
- Form factor flexibility; and
- A fully secured, open platform.

The ecosystem of service providers includes Aventyn, Care Innovations, CareSpan, HealthSaas, Sensogram, and Vivifyhealth. Frost & Sullivan believes that the Intel® HAP

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<sup>8</sup> <https://www.investopedia.com/terms/m/mooreslaw.asp>

and ecosystem of partners will ensure that patients and providers are confident in the reliability of their RPM solution.

### *Conclusion*

Intel realizes that RPM can improve outcomes while reducing healthcare costs, and has developed a platform that offers a strong potential to expand the number and scale of RPM implementations. The company has partnered with Flex to create a solution that will be offered to an ecosystem of established RPM service providers. This innovative approach comes at a time where many industry experts are concerned about several long-standing challenges and barriers, such as the lack of a consistent reimbursement formula and security and privacy concerns among patients and providers. The Flex IoT Compute Engine built with the Intel HAP will improve the likelihood that RPM can live up to its long-awaited promise, and continue toward becoming a new medical standard of care where RPM can have a dramatic positive impact on improving care while reducing costs.

With its strong overall performance, Intel Corporation has earned Frost & Sullivan's 2018 New Product Innovation Award.

## 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

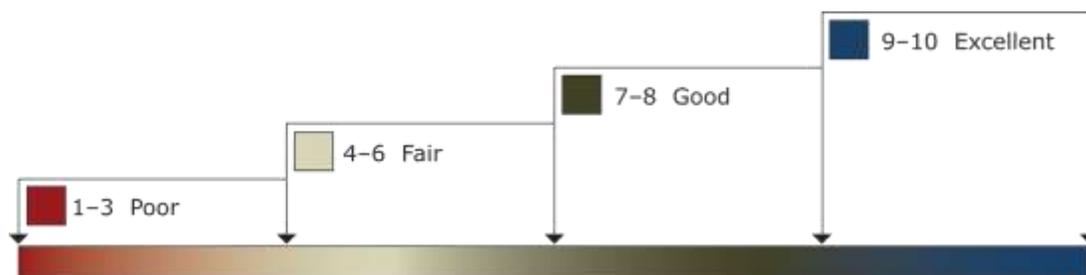
- Criterion 1: Price/Performance Value
- Criterion 2: Customer Purchase Experience
- Criterion 3: Customer Ownership Experience
- Criterion 4: Customer Service Experience
- Criterion 5: Brand Equity

## Best Practices Award Analysis for Intel Corporation

### Decision Support Scorecard

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows our research and consulting teams to objectively analyze performance, according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation. Ratings guidelines are illustrated below.

#### RATINGS GUIDELINES



The Decision Support Scorecard is organized by New Product Attributes and Customer Impact (i.e., these are the overarching categories for all 10 benchmarking criteria; the definitions for each criterion are provided beneath the scorecard.). The research team confirms the veracity of this weighted scorecard through sensitivity analysis, which confirms that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, we have chosen to refer to the other key participants as Competitor 2 and Competitor 3.

<i>Measurement of 1-10 (1 = poor; 10 = excellent)</i>			
<b>New Product Innovation</b>	New Product Attributes	Customer Impact	Average Rating
<b>Intel</b>	<b>10</b>	<b>10</b>	<b>10.0</b>
Competitor 2	8	8	8.0
Competitor 3	7	8	7.5

### *New Product Attributes*

#### **Criterion 1: Match to Needs**

Requirement: Customer needs directly influence and inspire the product’s design and positioning.

#### **Criterion 2: Reliability**

Requirement: The product consistently meets or exceeds customer expectations for consistent performance during its entire life cycle.

#### **Criterion 3: Quality**

Requirement: Product offers best-in-class quality, with a full complement of features and functionalities.

#### **Criterion 4: Positioning**

Requirement: The product serves a unique, unmet need that competitors cannot easily replicate.

#### **Criterion 5: Design**

Requirement: The product features an innovative design, enhancing both visual appeal and ease of use.

### *Customer Impact*

#### **Criterion 1: Price/Performance Value**

Requirement: Products or services offer the best value for the price, compared to similar offerings in the market.

#### **Criterion 2: Customer Purchase Experience**

Requirement: Customers feel they are buying the most optimal solution that addresses both their unique needs and their unique constraints.

#### **Criterion 3: Customer Ownership Experience**

Requirement: Customers are proud to own the company’s product or service and have a positive experience throughout the life of the product or service.

**Criterion 4: Customer Service Experience**

Requirement: Customer service is accessible, fast, stress-free, and of high quality.

**Criterion 5: Brand Equity**

Requirement: Customers have a positive view of the brand and exhibit high brand loyalty.

*Decision Support Matrix*

Once all companies have been evaluated according to the Decision Support Scorecard, analysts then position the candidates on the matrix shown below, enabling them to visualize which companies are truly breakthrough and which ones are not yet operating at best-in-class levels.



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

Frost & Sullivan analysts 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 <b>Monitor, target, and screen</b>	Identify Award recipient candidates from around the globe	<ul style="list-style-type: none"> <li>Conduct in-depth industry research</li> <li>Identify emerging sectors</li> <li>Scan multiple geographies</li> </ul>	Pipeline of candidates who potentially meet all best-practice criteria
2 <b>Perform 360-degree research</b>	Perform comprehensive, 360-degree research on all candidates in the pipeline	<ul style="list-style-type: none"> <li>Interview thought leaders and industry practitioners</li> <li>Assess candidates' fit with best-practice criteria</li> <li>Rank all candidates</li> </ul>	Matrix positioning of all candidates' performance relative to one another
3 <b>Invite thought leadership in best practices</b>	Perform in-depth examination of all candidates	<ul style="list-style-type: none"> <li>Confirm best-practice criteria</li> <li>Examine eligibility of all candidates</li> <li>Identify any information gaps</li> </ul>	Detailed profiles of all ranked candidates
4 <b>Initiate research director review</b>	Conduct an unbiased evaluation of all candidate profiles	<ul style="list-style-type: none"> <li>Brainstorm ranking options</li> <li>Invite multiple perspectives on candidates' performance</li> <li>Update candidate profiles</li> </ul>	Final prioritization of all eligible candidates and companion best-practice positioning paper
5 <b>Assemble panel of industry experts</b>	Present findings to an expert panel of industry thought leaders	<ul style="list-style-type: none"> <li>Share findings</li> <li>Strengthen cases for candidate eligibility</li> <li>Prioritize candidates</li> </ul>	Refined list of prioritized Award candidates
6 <b>Conduct global industry review</b>	Build consensus on Award candidates' eligibility	<ul style="list-style-type: none"> <li>Hold global team meeting to review all candidates</li> <li>Pressure-test fit with criteria</li> <li>Confirm inclusion of all eligible candidates</li> </ul>	Final list of eligible Award candidates, representing success stories worldwide
7 <b>Perform quality check</b>	Develop official Award consideration materials	<ul style="list-style-type: none"> <li>Perform final performance benchmarking activities</li> <li>Write nominations</li> <li>Perform quality review</li> </ul>	High-quality, accurate, and creative presentation of nominees' successes
8 <b>Reconnect with panel of industry experts</b>	Finalize the selection of the best-practice Award recipient	<ul style="list-style-type: none"> <li>Review analysis with panel</li> <li>Build consensus</li> <li>Select recipient</li> </ul>	Decision on which company performs best against all best-practice criteria
9 <b>Communicate recognition</b>	Inform Award recipient of Award recognition	<ul style="list-style-type: none"> <li>Present Award to the CEO</li> <li>Inspire the organization for continued success</li> <li>Celebrate the recipient's performance</li> </ul>	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10 <b>Take strategic action</b>	Upon licensing, company is able to share Award news with stakeholders and customers	<ul style="list-style-type: none"> <li>Coordinate media outreach</li> <li>Design a marketing plan</li> <li>Assess Award's role in future strategic planning</li> </ul>	Widespread awareness of recipient's Award status among investors, media personnel, and employees

## 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 participants and for identifying those performing at best-in-class levels.

### 360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS



## 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 more than 50 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on six continents. To join our Growth Partnership, please visit <http://www.frost.com>.