IHS Electronics & Media

Wearable Technology – Market Assessment

An IHS Whitepaper

September 2013

IHS Electronics & Media

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Introduction

- IHS' aim in writing this white paper is to provide a brief overview of the world market for wearable technology, assess the overall market drivers and forecasts for growth in the Wearable Technology market, over the next five years.
- This white paper is based on IHS's reports, ***World Market for Wearable Technology – A Quantitative Market Assessment – 2012, Sports and Fitness Monitors – World – 2013,*** and the upcoming ***World Market for Wearable Technology – 2013 Edition*** (publishing October 30,2013).
- The new report provides a more detailed assessment of the current and future outlook for wearable technology, with further quantitative analysis such as revenues, unit shipments and average selling prices of wearable devices in 2012 and 2013; and forecasts growth for the years 2014 to 2018.
- The report and this paper assess five applications of wearable technology and twenty three product categories within those applications, these include:

Application	Product Categories	
Healthcare and Medical	Activity Monitors	Imaging Products
Fitness and Wellness	Bluetooth Headsets	Insulin Pumps
Infotainment	Blood Pressure Monitors	Other, Audio Earbuds
Industrial	Continuous Glucose Monitors	Patches
Military	Defibrillators	PERS
	Drug Delivery Products	Pulse Oximetry
	ECG Monitors	Sleep Sensors
	Emotional Measurement	Smart Clothing
	Fitness & Heart Rate Monitors	Smart Glasses
	Foot Pods & Pedometers	Smart Watches
	Hand-worn Terminals	
	Hearing Aids	
	HUD	

Definitions

- IHS adopted the following definitions for the product types included in the scope of this research. Only products that match these definitions have been included in the market statistics of this report.
- **Wearable Technology**
  - These are products that must be worn on the user's body for an extended period of time, significantly enhancing the user's experience as a result of the product being worn. Furthermore, its must contain advanced circuitry, wireless connectivity and at least a minimal level of independent processing capability.
  - This definition of Wearable Technology stipulates two tests that products must pass to be considered within the scope of this research.
    - **Test 1** - ***Wearable*** – being worn for an extended period of time, with the user experience significantly enhanced as a result.
    - **Test 2** - ***Smart*** – having advanced circuitry, wireless connectivity and independent processing capability.

    These are forthwith referred to as the two tests of Wearable Technology.
- **Applications**
  - Five categories of wearable technology are assessed in this report and defined as follows:
    - Fitness and Wellness - Devices which pass the two tests of wearable technology and are used in the monitoring of activity and emotions.
    - Healthcare and Medical - Devices which pass the two tests of wearable technology and require FDA or equivalent approval. They are used in monitoring of vital signs, as well as for augmenting senses.
    - Industrial and Military – Devices that pass the two tests of wearable technology and receive/transmit real-time data in military and/or industrial environments.
    - Infotainment - Devices that pass the two tests of wearable technology and are used to receive and transmit real-time information for entertainment or enhanced lifestyle purposes.

Scope - Wearable Technology Market

- The following table shows an overview of the five applications for wearable technology and the products included within each of those applications.

Application	Product Categories	
Healthcare and Medical	Blood Pressure Monitors	Insulin Pumps
	Continuous Glucose Monitoring	Smart Glasses
	Defibrillators	Patches
	Drug Delivery Products	PERS
	ECG Monitors	Pulse Oximetry
	Hearing Aids	
Fitness and Wellness	Activity Monitors	Sleep Sensors
	Emotional Measurement	Smart Glasses
	Fitness & Heart Rate Monitors	Smart Clothing
	Foot Pods & Pedometers	Smart Watches
	Heads-up Displays	Other, Audio Earbuds
Infotainment	Bluetooth Headsets	
	Head-up Displays	
	Imaging Products	
	Smart Glasses	
	Smart Watches	
Industrial	Hand-worn Terminals	
	Heads-up Display	
	Smart Clothing	
	Smart Glasses	
Military	Hand-worn Terminals	
	Heads-up Display	
	Smart Clothing	

Wearable Technology – Vendor Landscape

Source: IHS World Market for Wearable Technology – 2012, 2013

Wearable Technology Developments

Smart garment

- Smart Glasses such as Google Glass have begun shipping
- Heads up displays for gaming include Microsoft Kinect
- Market shifts in activity monitors market – Jawbone buys BodyMedia
- Pebble Smart Watch begins shipping
- Stretch and bend sensors in clothing increasingly available
- Sony, Samsung and Qualcomm launch new smart watches
- Apple files patent for smart watch technology
- Microsoft files patent for smart glass technology
- Continuous, light-based heart rate monitoring enters sports market

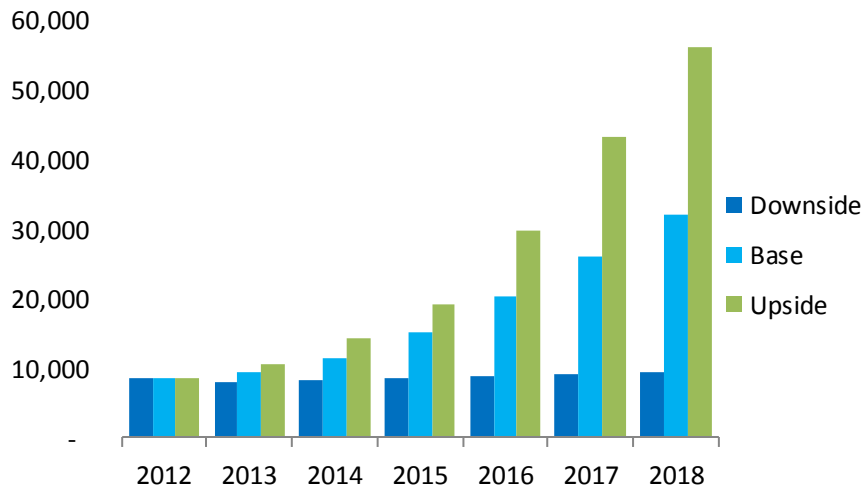
Search articles on Electronics360:

- Wearable Technology Makes a Fashion Statement
- Google Glass Holds Promise for Improved Health Care
- Intel Launches Low-Power Processors for Wearables, IoT

Overview of the World Market for Wearable Technology

Preliminary Scenario Forecast - Wearable Technology

Millions $US



Source: IHS Inc. September 2013

Past and present:

- Hearing aids
- Performance monitors (activity, heart rate)
- Headsets

Future:

Social and infotainment will lead, followed quickly by health, wellness and medical:

- Smart Glasses
- Smart Watches
- Glucose Monitoring
- Drug Delivery
- Smart Clothing

- The downside forecast is conservative, assuming that the adoption of wearable technology will be limited by factors including lack of products, poor user compliance and lack of an overall enhanced experience from devices that are wearable as compared to non-wearable products.
- The base scenario represents a reasonable adoption rate for wearable technology based on enhanced user experience and technological success. This scenario remains limited by factors such as lack of reimbursement in medical applications, lack of product introductions by major suppliers and improved functionality of non-wearable devices.
- The upside scenario represents a best-case for wearable technology adoption. It assumes significant success of wearable products based on successful introduction of new technology, such as smart glasses, smart watches, non-invasive glucose monitoring, and widespread availability of products from major brands.
- IHS has presented these forecast scenarios to reflect the uncertainty in the long-term future of wearable technology and the varying factors that will affect future outcomes. Details of the uptake of wearable technology in each product within the five main applications are provided in the associated report, World Market for Wearable Technology – 2013 Edition.

Wearable Tech: Key Enabling Technology

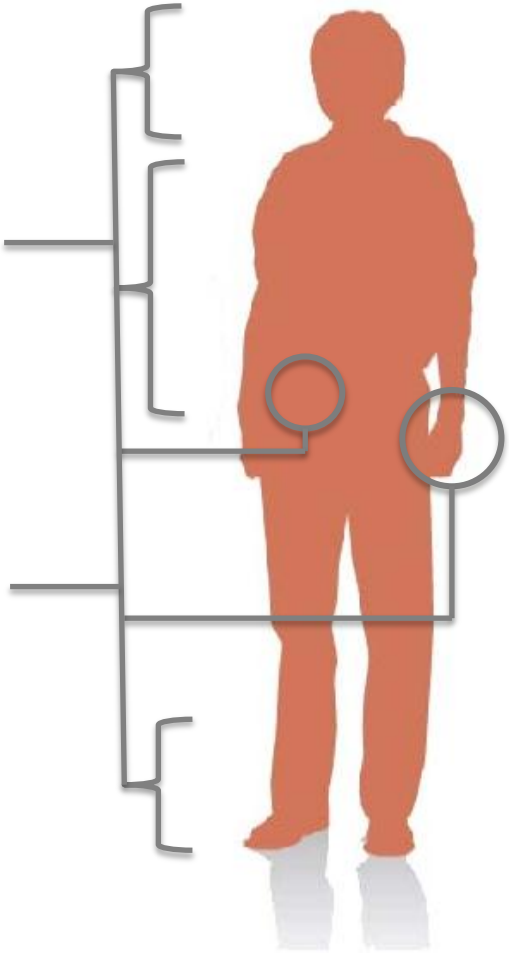
MEMS: Multisensor combo packages, easy to implement 9-axis inertial measurement units (IMUs), with the requisite sensor fusion software algorithms, made it simple to use the sensors in a wide range of wearable.

Bluetooth Low Energy (Smart): Optimized for low-power operation and naturally supports the power requirements of sensor accessories.

Long-term evolution: Energy harvesting

Telehealth: 75% POTS, steady transition to cellular gateways and mobile phone. By 2020, cellular will be dominant transmission method

All Other Wearable: Other than pedometers, rapidly approaching 100% wireless connectivity, smartphone is hub, stresses importance of apps



Market Drivers - Infotainment

Smartphone Adoption

Smartphone installed base of 4.2 billion cellular handsets in 2018

- 485 million smartphones were estimated to have been shipped in 2011.
- In 2016, over 1.2 billion smartphones are forecast to be shipped worldwide as the smartphone market experiences rapid growth.

As the number of smartphone users grows and the smartphone becomes the hub of information for its users, there will be an increasing number of devices that will connect to and exchange data with smartphones.

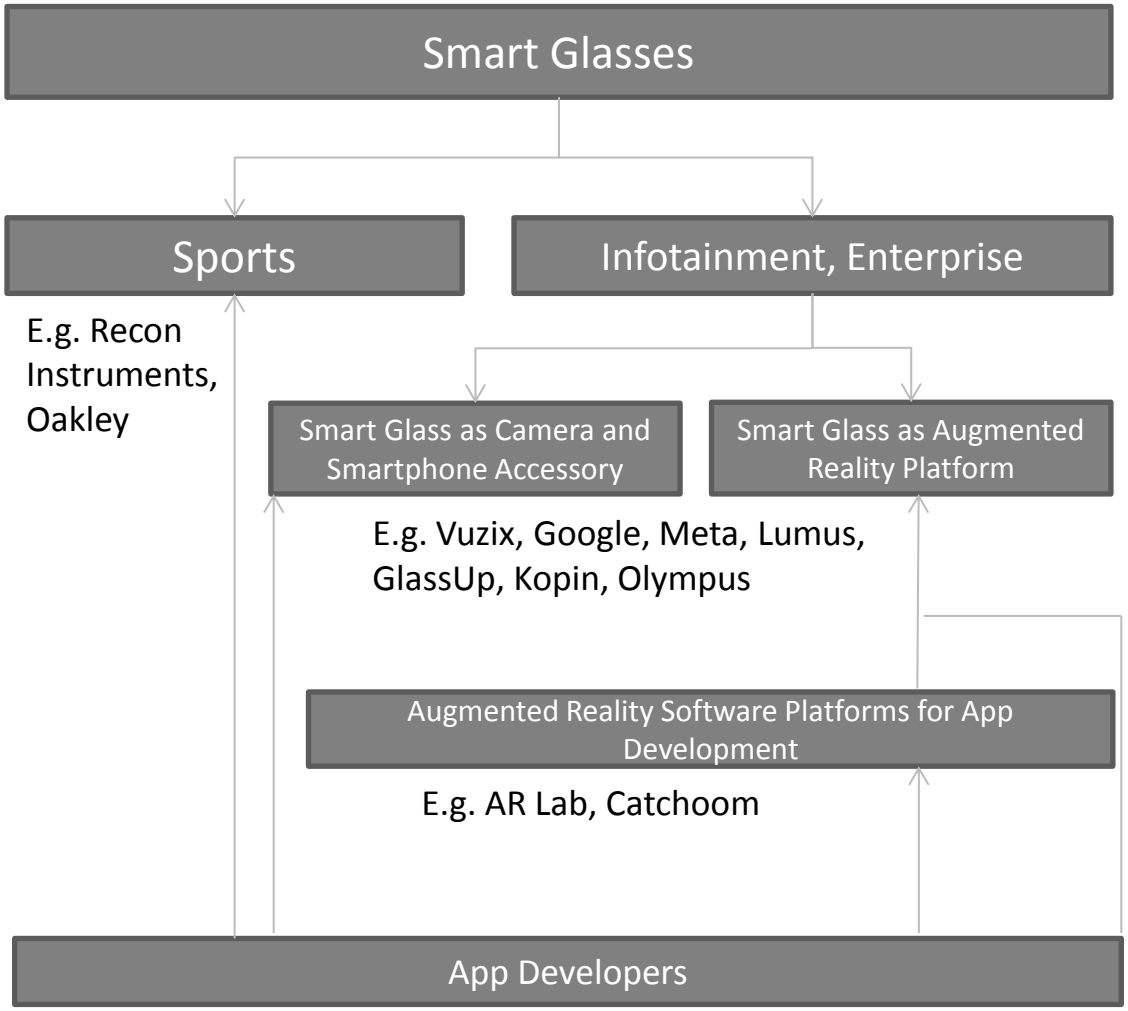
Smart Watches and Smart Glasses are expected to increasingly share data with smartphones.

Gaming Market

77 million registered PlayStation users and 35 million Xbox registered users worldwide

- Growing from only 50,000 Xbox users in 2002 the fast growing gaming market represents a significant opportunity for augmented reality devices such as heads-up displays and smart glasses, which aim to enhance gaming experience.

Smart Glasses - Market Structure, Applications



Applications for smart glasses and other headwear:

- Infotainment & Gaming
- Advertising
- Cycling & Running (navigation)
- Diabetes mgt., label reader
- Surgery
- Accessing patient records
- Patients education
- Wayfinding
- Hearing augmentation (bone conduction transducer, speech to text)
- Emergency responders
- Operating Room
- Telemedicine
- Remote patient monitoring
- Project Planning
- Sports Brain Injury

Market Drivers – Healthcare, Sports and Fitness

Telehealth & Consumer Medical Devices

Worldwide public and private health expenditure estimated at $7.3T in 2012. Growing 7% annually.

Demographic and Social Trends:

- Rising average life expectancy, higher ratio of seniors, increased prevalence of chronic disease.
- Larger proportion of patients requiring long-term care.
- Need to decrease length of hospital stay.

Increased preventive care, provide residential outpatient monitoring, decrease readmission rates. Personal care consumption to grow from $1.7T in 2012 to $2.2T in 2017. Telehealth patients to near 2M by 2018.

Sports & Fitness Monitors

Worldwide health club members estimated at 140M at the end of 2012.

Demand From Several User Groups:

- Professional athletes
- Recreational Fitness Consumers
- Clinical and Military research
- Corporate Wellness programs
- Chronic Disease management

The top 20 names in the sports, fitness, health and wellness the industry experienced a 10.3% CAGR in revenue over the last 3 years. Proving the resilience of the industry in tough economic conditions.

Market Drivers – Healthcare, Sports and Fitness

The key market drivers for telehealth and consumer medical devices include:

- Rising average life expectancy, a higher ratio of seniors, increased prevalence of chronic disease
- Larger proportion of patients requiring long-term care
- And a need to decrease length of hospital stays

By increasing preventive care and providing residential monitoring it is possible to decrease readmission rates and improve patient outcomes. There are several hurdles to be overcome, but there is significant work being done by the American Telemedicine Association and the Continua Health Alliance to work through regulatory and equipment interoperability issues.

As part of our 2012 telehealth report, we also forecast that the number of patients using a residential gateway to transmit physiological information to a clinician will grow to nearly 2M by 2018.

Market Drivers: Sports & Fitness

Sports and fitness monitors will benefit from demand from several user groups including:

- Professional athletes
- Recreational Fitness Consumers
- Clinical and Military research
- Corporate Wellness programs
- And Chronic Disease management

All of these are forecast with continued growth. Positive signs for the sports, fitness, health and wellness industry overall are that, when considering to top 20 names including Nike, Adidas, Under Armour, Amer and GNC, the industry saw 10% growth in revenue over the last 3 years. We also estimate that worldwide health club membership grew to 140M at the end of 2012.

Market Drivers: Sports and Fitness

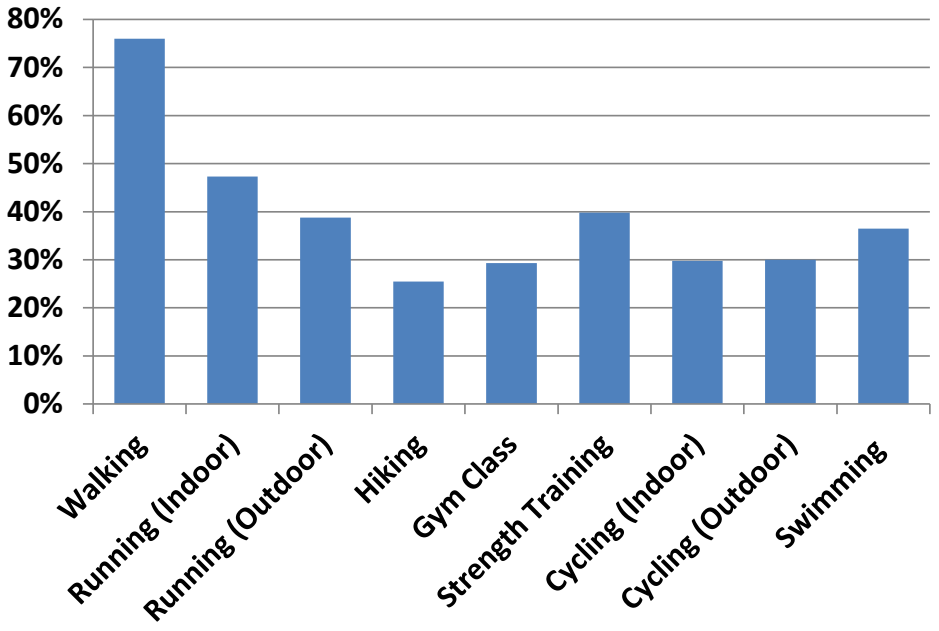
Metrics Tracked

Distance	45%
Calories Burned	21%
Targets	8%
Speed	7%
Heart Rate	7%
Time Elapsed	4%

Fitness Device Ownership

HRM w/Strap	20%
Cycling Computer	18%
HRM without Strap	11%
GPS Watch	10%
Handheld GPS	10%
Foot pod	8%
None	26%

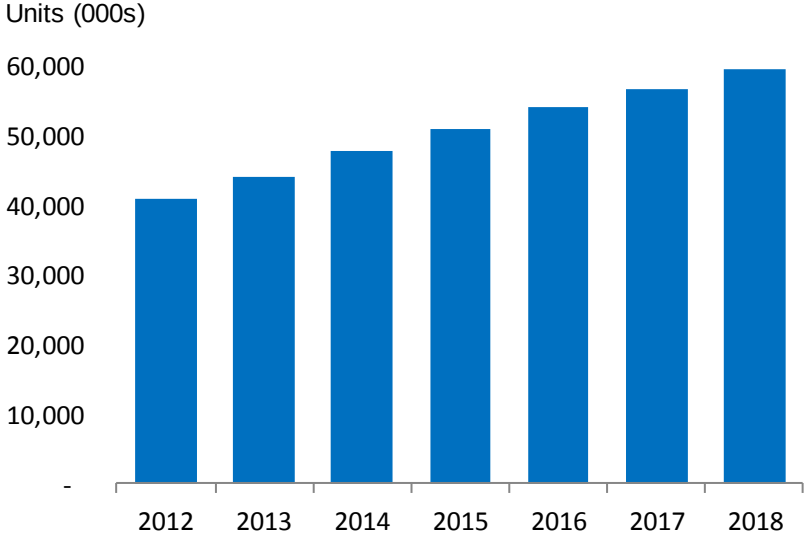
Top 20 sports, fitness, and health apps = 230M installs.



From IMS Research survey: US and UK respondents that owned a smartphone, app and exercised at least once per week.

Market Drivers: Performance Monitoring

World Shipments for Performance Monitors



Source: IHS Inc. September 2013

Source: IHS Sports & Fitness Monitors – World – 2013 Report

Worldwide revenue 2017 is forecast to reach $2.3 billion in 2017. Cumulatively, over 250 million of these devices will ship over the next 5 years.

Included in forecast:

- **Hear Rate Monitors (with and without chest strap)**
- **Sports & Running Computers**
- **Outdoor Pursuits Computers**
- **Cycling Computers**
- **Activity Monitors**
- **Pedometers**

Impact expected from:

- **Smartphones**
- **Smart Watches**
- **Smart Clothing**
- **Smart Glasses**
- **and new light-based HRM from Basis, Mio (Philips), and Valencell's PerformTek**

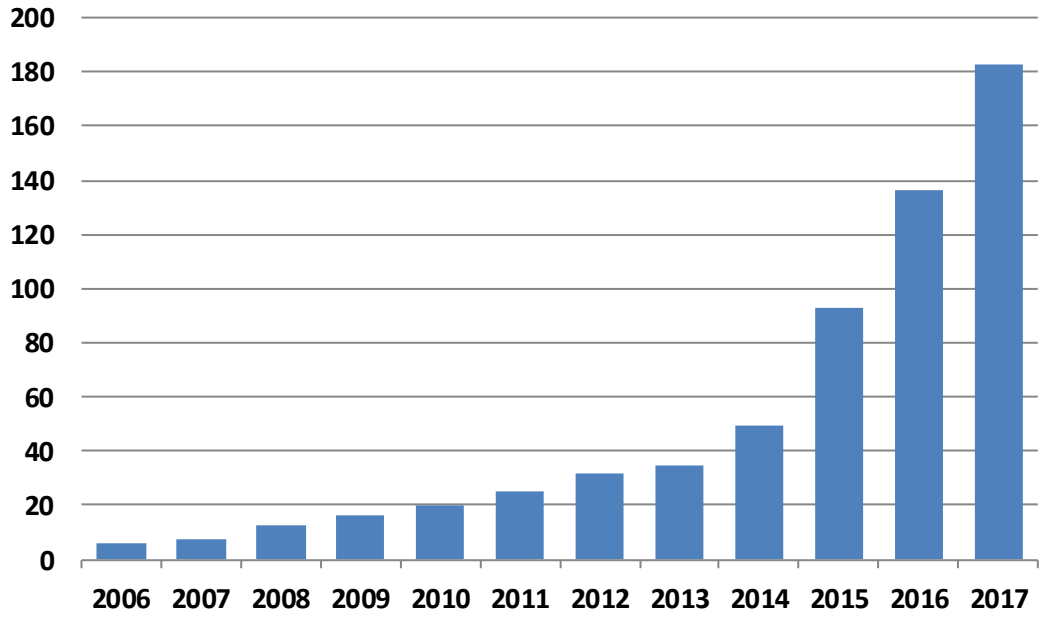
Wearable Tech: MEMS Volume Forecast

2012 & 2013: Majority of units shipping into sports and fitness devices.

- 42% CAGR between 2012 and 2017
- MEMS revenue in 2012 will be $110 million
- Will become 8th largest revenue driver within consumer and mobile devices behind handsets, media tablets, laptops, standalone projectors, gaming, and cameras

MEMS in Fitness & Other Wearable Consumer Devices

Millions of Units



Source: IHS

From IHS MEMS Market Tracker Database – Consumer and Mobile – H1 2013.

Market Drivers – Industrial and Military

Industrial

The market for wireless devices in industrial applications is forecast to grow at a compound annual growth rate of 18.0% from 2011 to 2015.

Industrial applications of Wearable Technology include the use of heads-up displays in production lines, hand-worn terminals in logistics and warehousing and smart clothing to track user location and detect industrial gases.

Hand-worn terminals are projected to account for the majority of wearable products in industrial applications.

Military

Programs include US Future Force Warrior (FFW); Project Wundurra in Australia; Israeli Integrated Advanced Soldier (IAS); UK Future Infantry Soldier Technology.

HUDs that provide information on maps and routes and improve situational awareness.

Also includes smart clothing that sense and transmit physiological parameters such as blood pressure and body temperature and adjust clothing temperature accordingly.

Featured Author

Shane Walker
Associate Director, Medical Devices & Healthcare IT

Shane Walker manages the consumer medical devices and healthcare IT research portfolio at IHS. Shane recently joined the company through the acquisition of IMS Research where he managed a broad range of consumer electronics research including next generation user interfaces, encoding, Internet video, secure media delivery and digital signage. Shane's current medtech coverage areas include telehealth, medical displays, sports monitoring and other wearable technology. Shane has authored numerous syndicated reports, provided strategic market analysis for end equipment manufacturers, and speaks regularly at industry events.

Before joining IHS, Shane spent several years in the computer software sector as a sales director for a leading CAD developer. He conducted competitive intelligence and developed marketing strategy for an international VAR network. Shane received his BA from the University of West Florida and an MBA in Corporate Finance from St. Edward's University in Austin, TX.

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