



<http://www.youtube.com/watch?v=rhjBAHr4xo4>

Verizon Fraud Management for Healthcare

Changing the Game

Edward Caputo
October 21, 2011





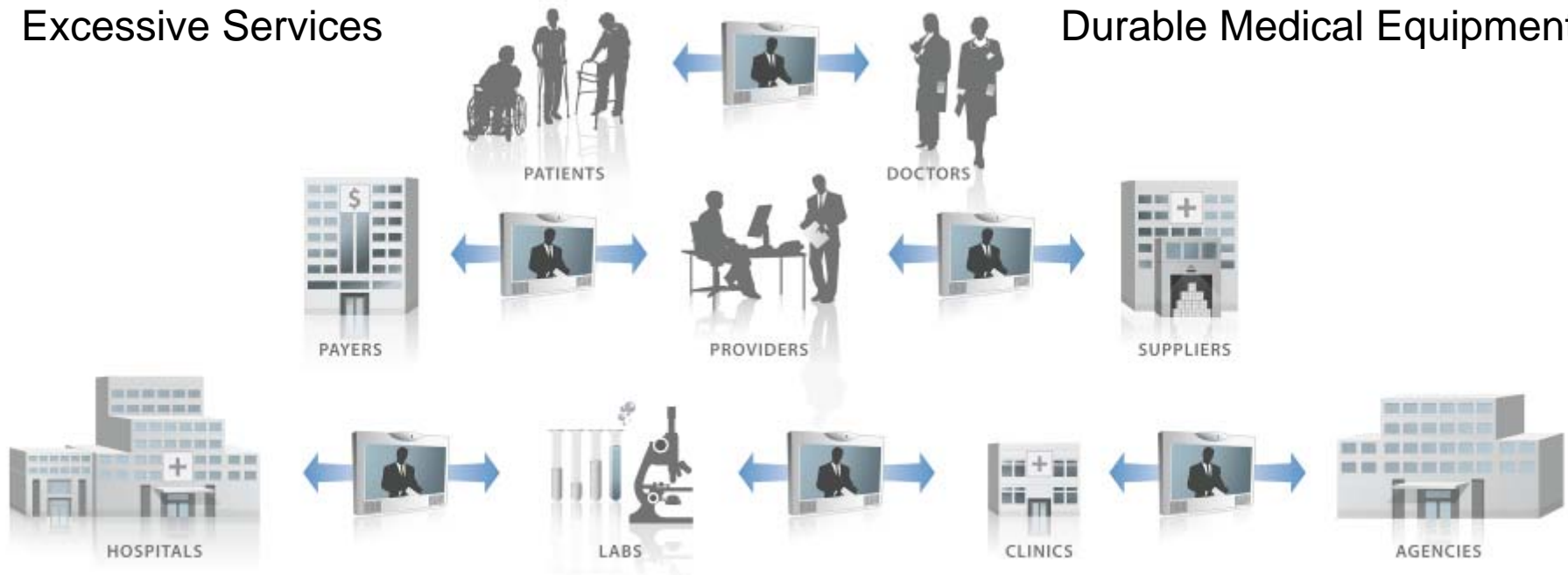
Healthcare Fraud, Waste and Abuse Overview of Market Drivers

- Spending On Healthcare In The U.S. In 2009 Was \$2.5 Trillion Or 17.6% Of GDP (National Health Expenditures, CMS)
 - CBO Projections: 25% - 2025, 37% - 2050, 49% - 2082
 - CBO Projections: Medicare/Medicaid Spending 7% - 2025, 12% - 2050, 19% - 2082
- Healthcare Fraud, Waste And Abuse Is Estimated To Have Added \$260 Billion Or Over 10% Annually To U.S. Health Expenditures
 - Rapidly Expanding Due To Organized Crime - Ease, Speed And Size Of Payoff
 - Fueled By Explosion Of Medical Identity Theft
- New U.S. Health Reform Law (PPACA) Will Inject Millions Of New “Covered” Individuals Into The Healthcare System Further Increasing Losses
- Increasing Pressure To Decrease Budget Deficits (Federal/State) And Increase Margins (Health Insurers) Is Driving Significant Market Demand For A Solution
- Federal Government Spent \$1.8 B In FY10 Growing To \$2.3 B By FY15 To Fight Fraud And Put A Dent In Criminal Enterprises

Healthcare Fraud Waste and Abuse Ecosystem

Falsified Billings
Not Medically Necessary
Up-coding/Unbundling
Undelivered Services
Excessive Services

Organized Crime
Stolen Identities
Kickbacks
Illegal Drug Market
Durable Medical Equipment





Healthcare Fraud Management Solution Overview

- **Verizon's Healthcare Fraud Management Solution:**
 - Solves The “Needle In The Haystack” Problem
 - Manages Risk Through Intervention Prior To Payment
 - Transforms The “Pay And Chase” Payment Integrity Process
- **Can Be Delivered As A Comprehensive “Managed Service”**
 - Fraud Management Software Platform
 - Software Hosting
 - Healthcare Fraud Operations
 - Reporting And Analytics
 - Data Integration
 - Technical Help Desk
- **Related Services**
 - Fraud Assessment
 - HIPAA, Security/Privacy
 - Identity Management





Healthcare Fraud Management Value Proposition

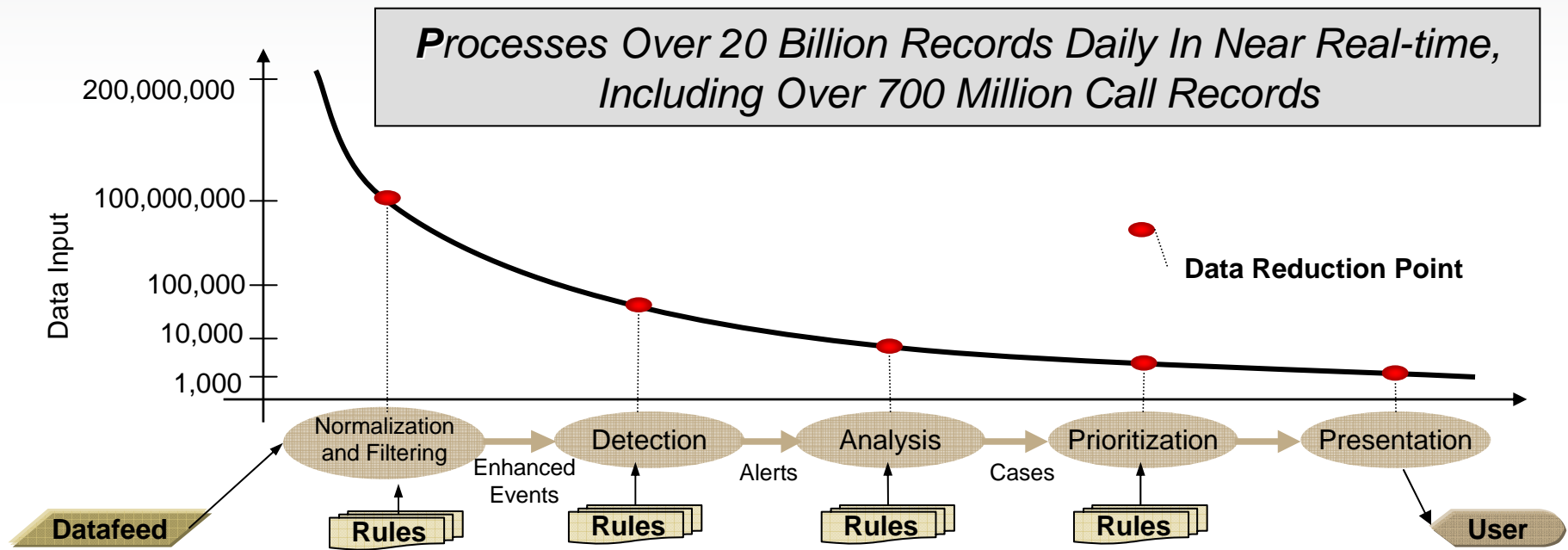
- **Verizon's Fraud Management Solution Allows Organizations To:**
 - Prevent Losses Before They Occur Due To Near Real Time Pre-payment Interventions
 - Monitor 100% Of Claims Versus Sampling Methodologies
 - Increase Operations Efficiencies By Delivering Actionable Results
 - Optimize Workflow And Track All Fraud Case Management Activities
 - Create Faster Responses To Address Potential Risks
 - Provide Strategic Insight Into Systemic Issues To Drive Improvements Or Make Necessary Policy Changes
 - Generate Executive Level Management Reports To Measure Results And Determine ROI



Verizon Fraud Management for Healthcare Solution Overview



Verizon Fraud Management: “Finding the Needle in the Haystack”



- Scalable, Cost Effective Infrastructure To Quickly Identify Anomalies Such As:

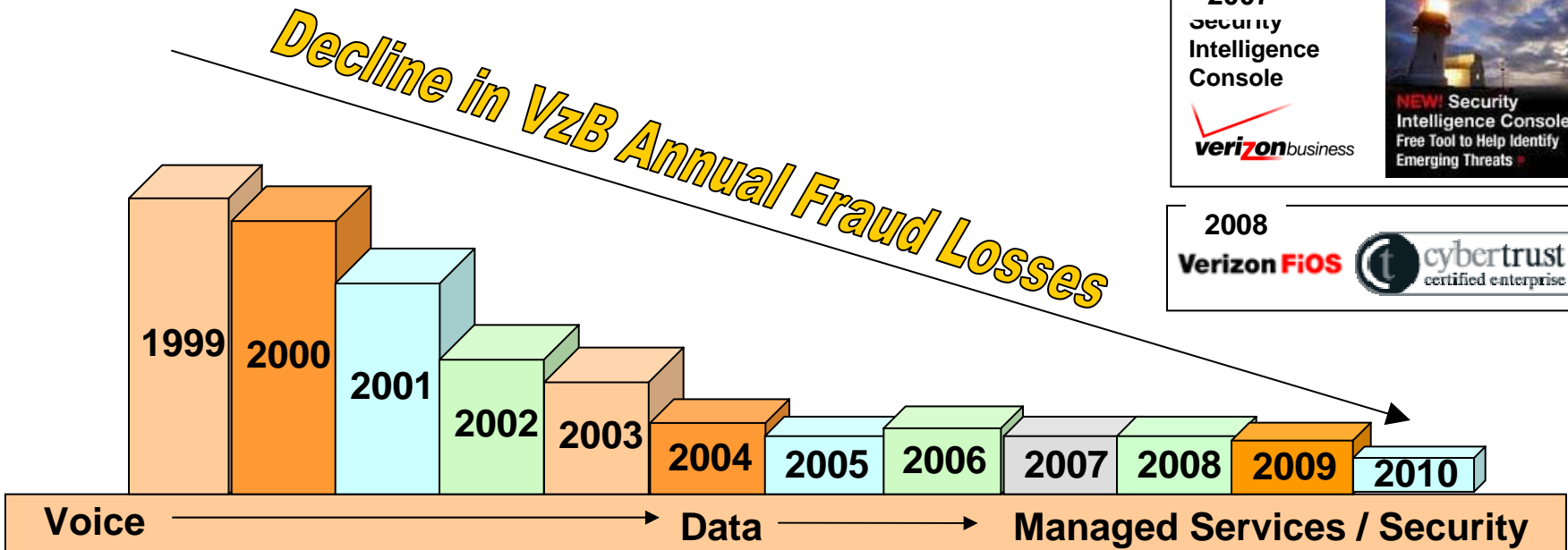
- **Fraud**
- **Security Breaches**
- **Network Quality Issues**

- Based On Patented Algorithms Refined Over More Than A Decade For:

- **Data Reduction**
- **Pattern Recognition**
- **Artificial Intelligence**

The Evolution of Verizon Fraud Management

1997 VZ Fraud Management Launched For Option 2 	2002 Prepaid Remote IP Access 	2005 Option 1 & 2 Monitoring Consolidated	2006 Consolidated VzT & VzB Fraud Systems IT drives savings with patented fraud platform
1999 International VZ Fraud Management 	2003 Network Management 	2005 Managed Security With NetSec 	2007 Security Intelligence Console NEW! Security Intelligence Console Free Tool to Help Identify Emerging Threats
			2008 Verizon FiOS certified enterprise



Over The Last 10 Years, Fraud Operations Is Monitoring More Than 10 Times The Traffic With Less Than Half The Staff



Wireless Life Sciences Alliance Wireless Health 2011 Conference

October 10-13, 2011



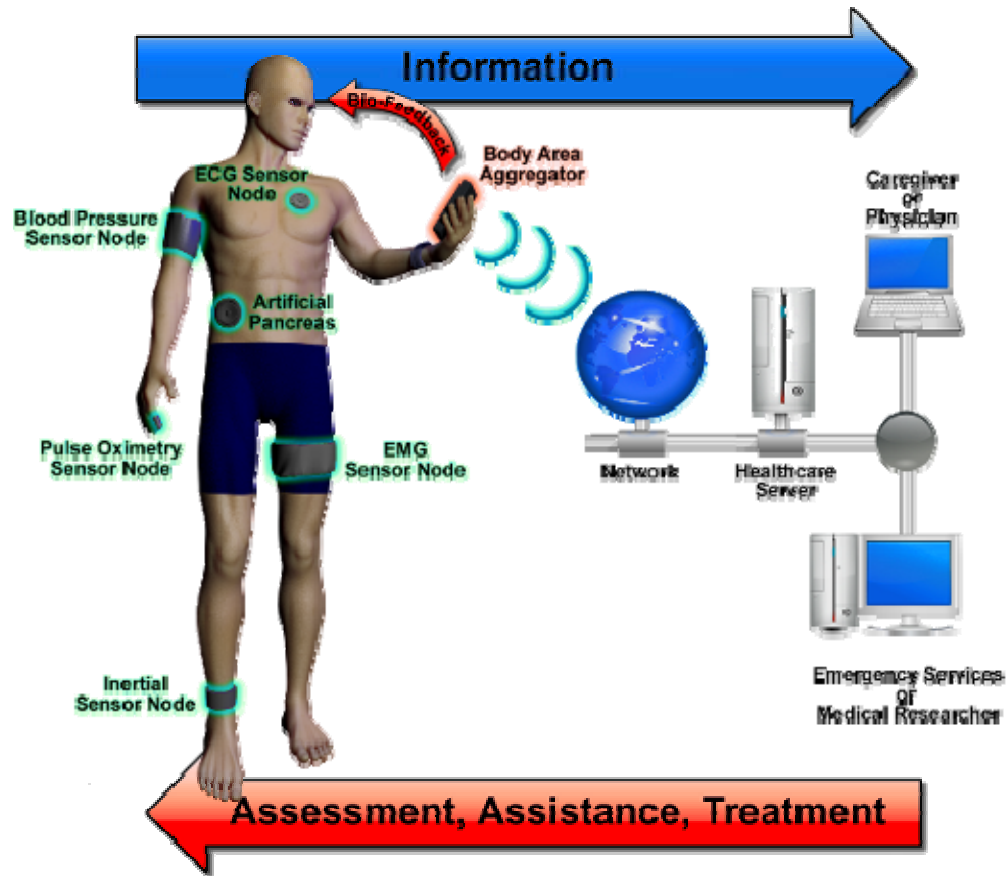
Wireless-Life Sciences
Alliance



WLSA Wireless Health 2011

- Academic and Industrial Research Forum for Wireless Health
- Mission
 - Include and Promote International Community to Accelerate Development and Adoption of Wireless Technologies to Improve Quality of Care and Reduce Costs
- Proceedings:
 - Papers – 14 Total
 - Individual Conditions Assessment – 3 Presentations
 - Advances in Biomedical Sensing For Wireless Health – 2 Presentations
 - Context Guided Wireless Health Monitoring – 3 Presentations
 - Inference Guided Wireless Health – 2 Presentations
 - Energy, Computing, and Bandwidth Resource Efficiency in Wireless Health Systems – 2 Presentations
 - Vanguard – 2 Presentations
 - Demos – 21 Total
 - Devices – 10
 - Systems – 11

UVA CENTER FOR WIRELESS HEALTH





UVA Center For Wireless Health

- **The UVA Center for Wireless Health**
 - Established In 2009
 - Coordinate Research Efforts In This Area Across The University And With Collaborators At Other Institutions
 - Ongoing Projects
 - In-home Sensors For Identifying Signs Of Depression
 - Body-worn Sensors For Fall Risk Assessment
 - Artificial Pancreas That Combines Blood Glucose Sensing And Insulin Pumping For Type I Diabetics
 - Center's Projects Include The Use Of Novel Wireless Technologies To Collect Data On Real Patients
 - Results And Experiences From These Deployments Inform The Engineering Research That Yields Subsequent Technology Generations And Enables Additional Medical Applications

(<http://wirelesshealth.virginia.edu/home>)



UVA Center For Wireless Health - Projects

Real-Time Depression Monitoring

- Depression Is A Major Health Issue
 - Often Unrecognized And Untreated
 - Leads To Many Other Medical Problems
 - Reduced Social Interactions
 - Less Personal Hygiene
 - Increased Alcohol Use
 - Ignoring Medication For Current Medical Conditions
- Goal : Complete The Implementation Of A Real-time Depression Monitoring Product For The Home
 - Runs 24/7 Detect Signs Of Depression Early (In Real-time) As Well As Monitor Those Already Diagnosed With Depression
 - Multi-modal To Increase Accuracy And Provide Caregivers With Accurate Information To Aide In Their Care Giving And Diagnosis
 - Can Also Be Used To Provide Information About The Effectiveness Of Any Treatment
 - End Result Improved Quality Of Life And Possible Improvement Of Other Medical Conditions And Problems Caused By Or Related To The Depression



UVA Center For Wireless Health - Projects

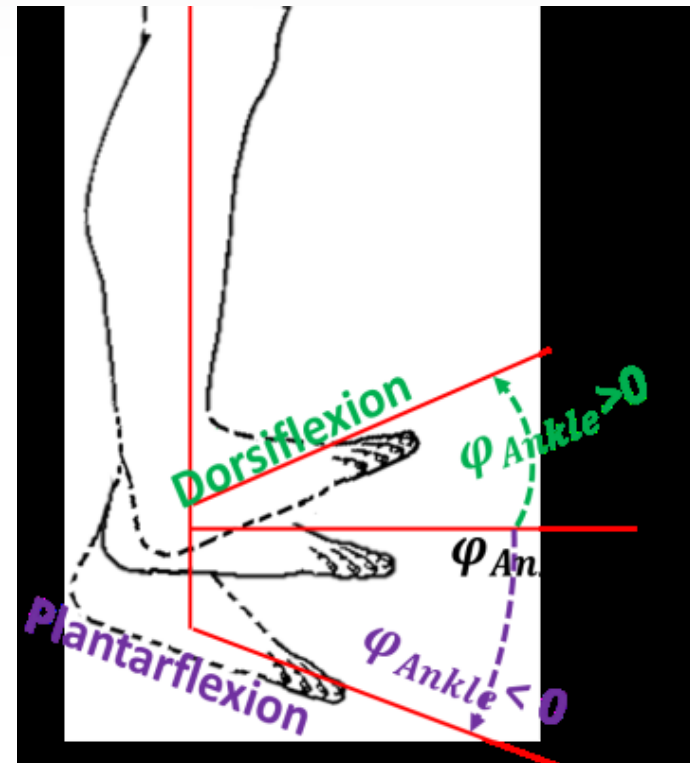
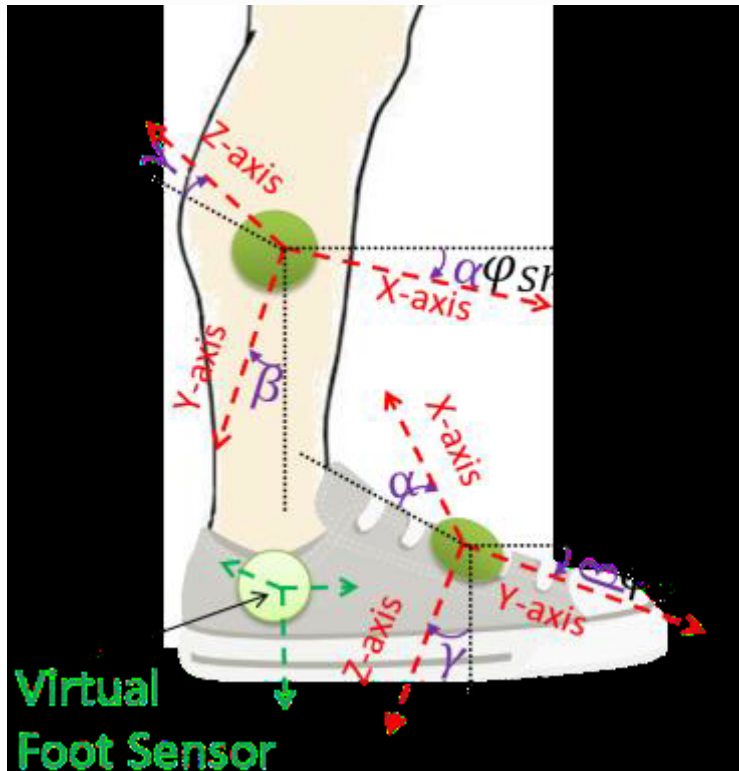
- Cohesive Set Of Integrated Wireless Sensors, A Touch Screen Station, And Associated Software
 - **Acoustic Sensing**
 - Voice Pitch, Utterance Duration, And Amplitude Have Been Used In Pre And Post-treatment Studies To Help Detect Signs Depression
 - Challenge Is To Implement These Solutions To Work At Real-time In Natural Home Settings Requires A Number Of Novel Extensions
 - Include Filters, Vocal Discrimination, And Real-time Segmentation
 - **Caregiver Displays**
 - User Interfaces For Caregivers
 - For Each Patient, An Overview Of The Current Behavior Factors, Sleeping Quality, Hygiene, PHQ Score, Weight, Eating, Social Level, And Mood Are Presented
 - Each Factor Is Represented On A 5-point Scale Representing The Anomalous Nature Or Danger Of That Factor
 - Multiple Factors That Are Highly Correlated Can Be Brought Up And Compared For Analysis
 - **Patient Interface**
 - Runs On The Touch Screen And/Or Tablet Placed In An Accessible Room Inside The Patient's Apartment
 - Multi-purpose Interface Serves As A Health Trainer, Social Planner, And Mood Journal
 - Personal Behavioral Factors Are Shown To The Patient, Providing Objective Measurements For Positive Feedback
 - Social Planner Manages A Record Of Activities That Are Occurring In The Patient's Assisted Living Care Center, Senior Center, Or Other Organization



UVA Center For Wireless Health – Projects

Longitudinal Study Of Efficacy Of Ankle-Foot Orthosis On Children With Cerebral Palsy

- Individuals With Walking Disabilities As A Result Of Cerebral Palsy (CP), Stroke, Muscular Dystrophy, Brain Injury, Or Many Other Conditions Are Often Prescribed Ankle Foot Orthosis (AFOs), As To Aid In Walking
- United CP Reports That An Estimated 764,000 People In The U. S. Have One Or More Symptoms Of CP
 - More Than 50% Of These Individuals Are Prescribed Orthosis
- Prescription Of AFOs Usually Has Several Treatment Goals
 - Facilitating Walking By Controlling The Position Of The Ankle And Providing A Base Of Support
 - Preventing Contractures By Putting Muscles In A Lengthened Position And Providing Variable Ranges Of Motion
 - Preventing Deformity By Controlling The Position Of The Foot/Ankle
- **This Project Seeks A Novel Solution For Assessing The Efficacy Of AFOs In A Continuous And Non-invasive Manner. Ankle Joint Angle Is Identified As An Important Metric For This Assessment. By Using Wireless Inertial Body Sensor Network (BSN) Based Motion Capture Sensor, We Present A Promising Solution That The Longitudinal Monitoring Of Performance Of AFOs Is Possible**





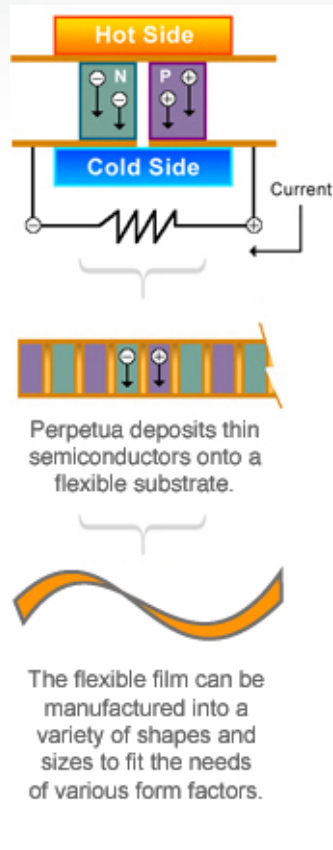
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Power Generation For Wireless Devices

October 11, 2011



Convert Body Heat To Electric Energy



- **Based Upon The Seebeck Effect**
 - Thermoelectric Generators (TEGs) Convert Temperature Differences Across Dissimilar Materials Into An Electrical Potential, Or Voltage
- **When Connected To A Load, Such As A Wireless Sensor, This Voltage Difference Causes Current Flow And Renewable Power Is Delivered**
- **Historically, Thermoelectric Generators Have Been Constructed With Discrete Pairs Of Brittle Thermoelectric Materials Sandwiched Between Solid Porcelain Plates, Resulting In A Rigid And Bulky Package**
- **Perpetua's Innovative Approach Applies Thin Semiconductors Onto A Flexible Substrate Using Cost-effective And Scalable Semiconductor Manufacturing Techniques**
 - Enable Perpetua To Combine Large Numbers Of Thermocouples Easily And Reliably
 - Modules With Much Higher Voltages Than Conventional Thermoelectrics
- **Key Differentiating Elements Of Perpetua's Thermoelectric Technology Include:**
 - Higher Voltages
 - Ease Of Varying Power To Match Customer Requirements (Cost-effective Sizing)
 - Much Lighter Weight Than Traditional Materials
 - Flexible Film Can Accommodate Multiple Package Shapes And Sizes
 - Cost-effective Semiconductor Manufacturing Techniques That Are Highly Scalable
- **Perpetua Flexible Thermoelectric Film Can Save Companies 50% Or More Compared To Current Battery Systems**
 - Allow More Sensor Data To Be Collected
 - Providing Significant Competitive Advantages

(<http://perpetuapower.com/technology.htm>)



<http://www.youtube.com/watch?v=hzw6Pzv0fnY>

Physical Rehabilitation Adherence

October 12, 2011





Rehabilitation Exercise Feedback on Android Platform

Rehabilitation Exercise Feedback

- VITFIZ - A Mobile Exercise System
 - Provision Of Personalized Feedback To Patients Performing Rehabilitation Exercise
 - Facilitates Effective Implementation And Management Of Rehabilitation Exercise For Patients In The Home Setting Between Visits To The Clinic Effective Tool For Increasing Accuracy Of Exercise Technique And Motivation To Perform Exercise
- Poor Adherence To Rehabilitation Exercise Programs Prescribed By Physical Therapists Is A Well Known Problem
 - 65% Of Patients Self Reporting Being Either Non-Adherent Or Partially Adherent
- Adherence Comprises 2 Elements
 - Being Compliant With The Number And Frequency Of Exercises As Prescribed By The Therapist
 - Carrying Out Each Exercise With The Correct Biomechanical Alignment



Rehabilitation Exercise Feedback on Android Platform

- VITFIZ Deployed On An Android Platform
 - Android Smart-phone Used As The Sensor
 - An App Running On The Phone Sends Acceleration Data Over Bluetooth
 - An Android Tablet Used As The Feedback Device
 - Tablet Reads Acceleration Data Sent By The Phone Evaluates Patient's Movement Comparing It To The Motion Template
 - Instant Feedback Displayed On The Tablet Device In Order To Guide The Patient Through Exercise
- Feedback Can Be Displayed In Various Formats
 - Visual Feedback Method Where The Exercise Is Played Back Via A 3D Avatar
 - Information Is Displayed On Screen To Indicate If Any Incorrect Motions Have Been Performed

(trilcentre.org)



<http://www.youtube.com/watch?v=m3iDLtZL6yg>

Pressure Ulcer Prevention

October 13, 2011





A Wireless Biomedical Handheld Instrument for Evidence-Based Detection of Pressure Ulcers

- Pressure Ulcer (PU) Incidence Leads To Considerable Risk, In Particular For The Frail Elderly, And A Large National Healthcare Treatment Cost
- Recent Clinical Trials Demonstrated That Sub-epidermal Moisture (SEM) Present In Tissue May Be Measured By Interrogation Of Tissue Dielectric Properties And Are Associated With The Presence Of Erythema And Development Of Early Stage PU Conditions
- Wireless Handheld Device Has Been Developed That Introduces A Series Of Advances
 - Automated Measurement; Automated Measurement Method Assurance Including Application Of Proper Measurement Applied Pressure; And Wireless Energy Recharge Capability.
- Advances Previous Successful Prototype Development To Now Include A Complete Point-of-care Usage Product Termed The Sem.
- Scanner, Was Successfully Verified In Trials With 30 Subjects And Is Currently Deployed In Large Clinical Trials In Nursing Homes In Los Angeles

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A Wireless Biomedical Handheld Instrument for Evidence-Based Detection of Pressure Ulcers

- Average Cost For Treating PU As A Secondary Diagnosis In Acute Care Is Roughly \$43,000 Per Stay. ([CMS] 2010)
 - The Average Hospital Incurs \$400,000 To \$700,000 In Direct Costs To Treat Pressure Ulcers Annually
 - Most Of That Cost Is Not Reimbursable
 - Estimated That 20 Minutes/Day/Patient Of Nursing Time Is Related To Services For Pressure Ulcers. Hence, Patients' Skin Integrity Has Long Been An Issue Of Concern In Nursing Homes And Hospitals.

