



# INVESTOR PRESENTATION

**BioProspect Limited  
(ASX:BPO)**

**DECEMBER 2013**





## **OVERVIEW**

- **BPO has entered into a land mark acquisition of the worlds first quantitative analysis for depression**
- **Depression is estimated to cost US economy US\$83 billion a year with the cost in Australia estimated at \$15 billion annually**
- **This patented innovative unique technology is non intrusive, quick, objective, decisive and will revolutionise the diagnosis and treatment of mental health**
- **Invatec has concluded thousands of tests over the past decade, and are about to enter into independent validation trials**
- **Early stage discussions are under way with major pharmaceutical companies for distribution**
- **Complete roll out of the technology is projected for 2014/15**



## INVATEC MANAGEMENT TEAM

### **Dr Stephen Addis - *Director***

- Head of Psychiatry at Fremantle Hospital in Western Australia 2005 to 2013. Currently Director of Coast Clinic WA (private), and Consultant Psychiatrist at Fremantle Hospital.
- Graduated Medicine 1982, Queens University Belfast. Masters Degree in Science 1992. Specialist training and qualifications in Psychiatry from the UK, Canada & Australia.
- Ten years of clinical research into the effects of mental illness upon the circadian heart rate.
- Principal Investigator on various pharmaceutical company research projects.
- Presented extensively at local & international conferences.

### **Claude Solitario - *Director***

- Over 25 years of extensive involvement in the development of new and emerging technology, with considerable experience in licensing and commercialisation of intellectual property
- Managed significant capital raisings from a wide variety of sources including private equity, government grants, and debt financing
- Held Board and senior management positions for companies in biotechnology, automotive technology, communications.



## **INVATEC - USA MANAGEMENT TEAM**

### **Dr Matt Mesnik**

- Chief Medical Officer of MinuteClinic, the originator of retail healthcare in the US. Established over 550 clinics in 25 states across America with 300 physicians and 2,500 nurse practitioners and physician assistants.
- Medical Director of Ativa Medical - bringing to market the first lab-on-a-chip medical lab analyzer, MicroLab.
- Chief Medical Officer of QuickCheck Health - developing rapid, over the counter, home diagnostic tests for common illnesses.
- Co-founded Express HealthCare, a state-of-art urgent care clinic in Blaine, Idaho.

### **Spencer Lein**

- Over 25 years of experience in the medical technology industry, particularly in commercialisation of advanced medical technologies.
- Founded QRS Diagnostic LLC, a Deloitte Fast 50 Technology Rising Star in 2003 and 2004.
- Served on numerous advisory boards including the University of Minnesota's VALUE Advisory Board in the Department of Biomedical Engineering.
- Currently the mHealth Strategist for a Fortune 1000 medical distribution company and the Founder of a medical device import/export company located in Minneapolis, Minnesota.



## THE MARKET – LARGE AND GROWING

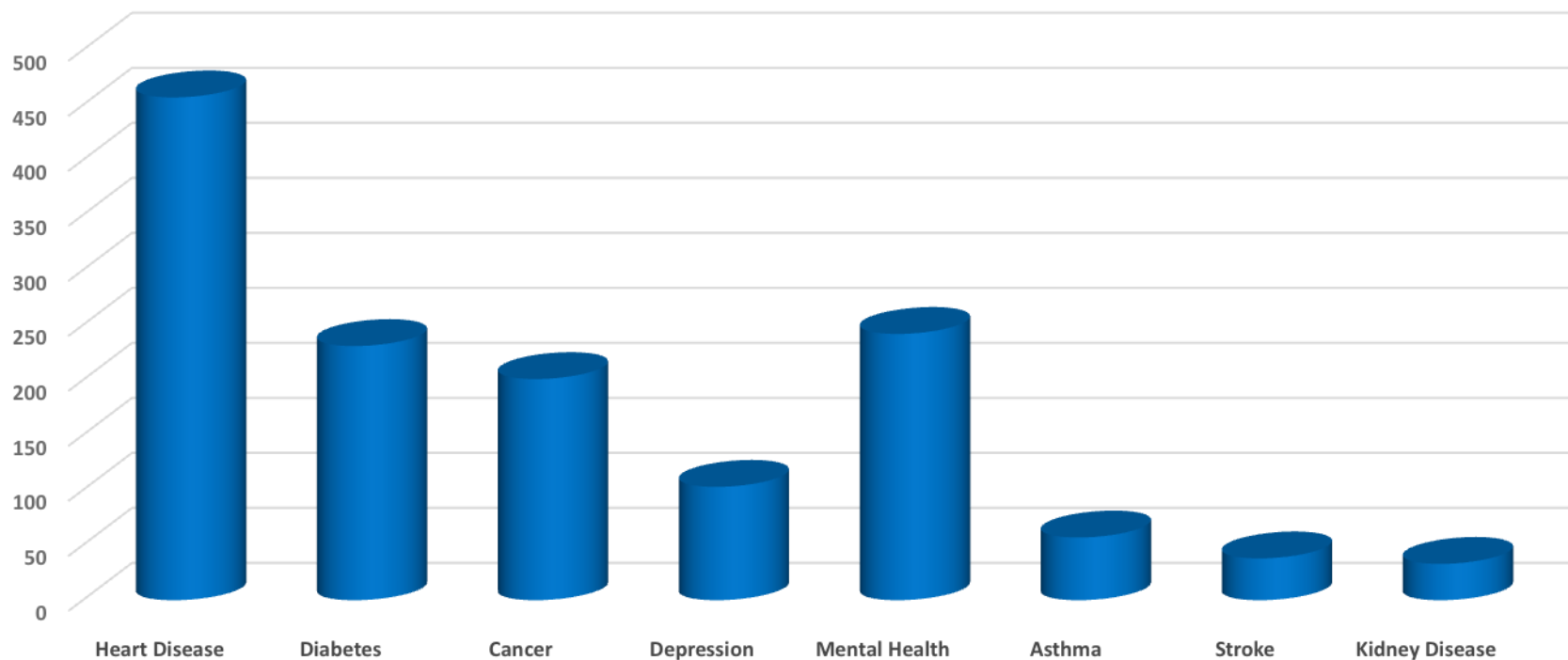
- World Health Organization estimates depression is the leading cause of disability
- Over 350 million people worldwide suffer from some form of stress disorder (WHO)
- 26% of adults in the US (approx. 58m people) suffer from a diagnosable mental disorder in a given year
- Mental disorders are the leading cause of disability in the U.S.
- Depression adversely affects common chronic conditions such as arthritis, asthma and diabetes; results in increased absenteeism and reduced productivity in the workplace
- The International Labour Organization estimates that stress can cost over 10% of GNP
- Demand for curbing depression and other mental health conditions on the rise globally.
- “The need for screening for and early detection of depression in primary care services is unarguable” (World Federation for Mental Health)





# MARKET OVERVIEW – UNITED STATES

ANNUAL COST OF MAJOR AFFLICTIONS IN THE USA





***To put the market opportunity into context it is the same as having a test that can diagnose all forms of cancer before they become a medical concern***





## THE PROBLEM

- Currently there is no objective, evidence-based test for mental illness
- Researchers have so far been unable to find specific biomarkers like brain scan results or genetic tests to definitively diagnose conditions like depression
- Diagnosis is generally based on consensus, as there may be a range of symptoms
- Patients often endure a battery of tests to discount other potential physical illness with a mental health disorder the final step. As a result, diagnosis of mental illness is subjective and often too late
- Due to the subjective approach, there is potential for inadequate or incorrect diagnosis, resulting in the potential for inappropriate or ineffective treatment
- All the above places a huge cost and burden on the healthcare system.



## THE GAME CHANGER

- The current International benchmarks for diagnosis are the DSM (the US Diagnostic & Statistical Manual) and the ICD (the International Classification of Diseases).
- These were challenged by the US National Institute of Mental Health (“NIMH”) earlier this year
- The NIMH is an agency of the United States Department of Health and the largest research organization in the world specializing in mental illness.
- Earlier this year the NIMH stated:

*“We will no longer endorse DSM5, as it has fundamental flaws and we are actively seeking a diagnostic system that is evidence based”*

*‘It is critical to realise that we cannot succeed if we use DSM categories as the gold standard.’*

*“We need a quantitative method for diagnosing depression”*



## THE NEED

Demand for a diagnostic tool that:

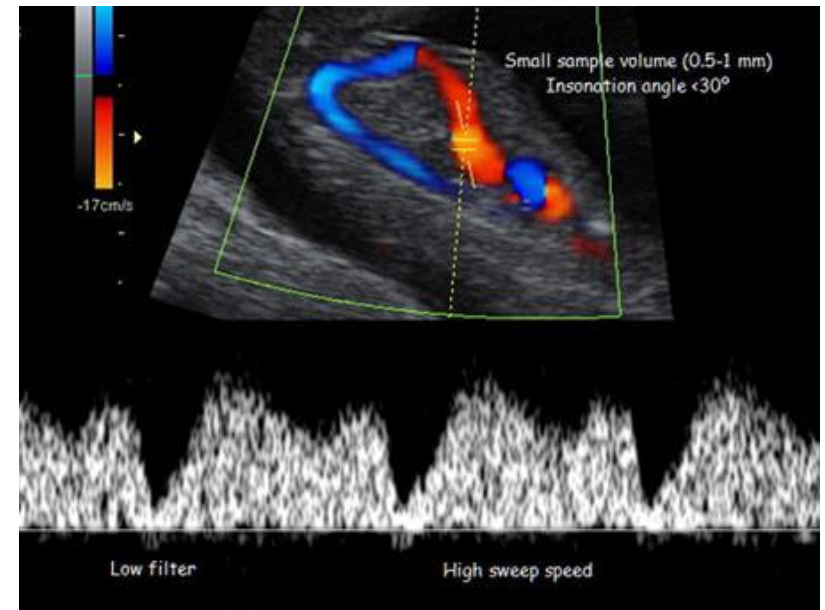
1. Can objectively diagnose a stress related illness from specific individual data gained from the patient.
2. Provides immediate result to both the individual and the medical practitioner allowing for treatment efficacy.
3. Allows for the ongoing management of the patient during treatment to ensure the assigned treatment is working.





## THE SOLUTION

- For the past 10 years, Invatec has been developing an innovative, NON-INVASIVE test for the diagnosis of mental illnesses.
- Extensive clinical research, comparing physician diagnosis with heart-rate derived diagnosis in over one thousand subjects, has demonstrated the success of this approach.
- In the several diagnostic categories thus far investigated (major depressive disorder, generalized anxiety disorder, acute psychosis, panic disorder and delusional disorder), the correlation between expert clinician and objective heart rate based diagnosis has been highly successful (averaging 90%+ in everyday clinical practice)





## THE SOLUTION

Invatec's diagnostic test for mental illness is:

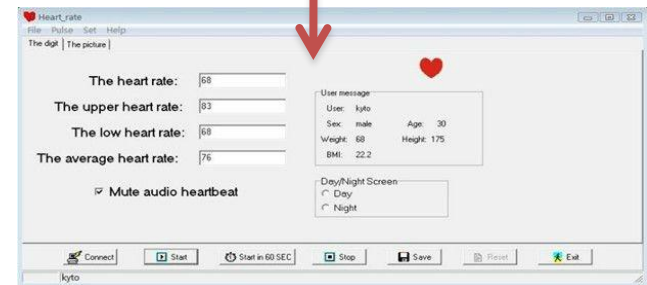
- Objective as it does not rely on input from the patient, thereby counteracting the subjective element of the diagnosis.
- Evidence Based
- Simple and unobtrusive as it only requires a sample of the patients heart rate over a 24 hour period.
- Provides an effective measure of clinical change from medication and/or lifestyle changes





## THE SOLUTION

1. The patient is required to use a specific heart rate monitor for a 24-hour period to capture heart rate data.
2. Data is then transferred via the web to a central server where the proprietary algorithms will analyse the data.
3. The individual's diagnostic report is produced immediately and available to both the medical practitioner and/or patient





## THE HYPOTHESIS

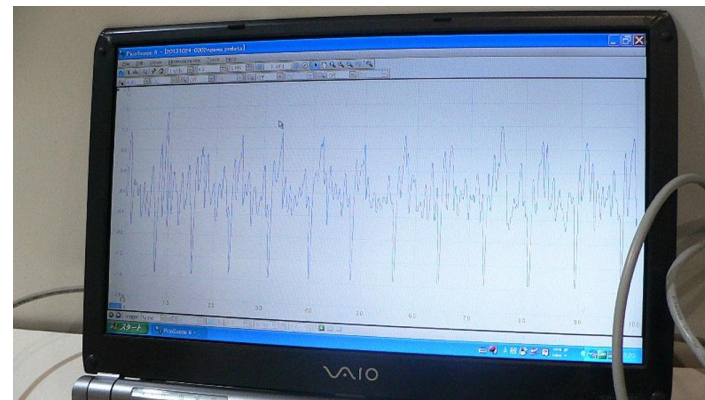
- The body's Autonomic Nervous System (ANS) works continuously to ensure appropriate reaction to internal and external influences.
- The ANS also maintains cardiovascular activity in its optimal range.
- It is well established that the ANS is influenced and affected by changes in mental state.
- When individuals are subjected to severe ongoing stress or anxiety provoking situations, the ANS and heart rate activity are disturbed.
- It is in this context that mental state-linked ANS disturbance is observed via the cardiovascular system, particularly during sleep when external influences are absent.
- Therefore the analysis of heart rate data represents a diagnostically significant methodology for assessing physiological dysfunction associated with psychiatric illness.





## CLINICAL FINDINGS

- Invatec has conducted over 10 years of research into the relationship between the autonomic nervous system, psychological state and heart rate activity
- Heart rate diagnosis from thousands of patients covering all major psychiatric diagnoses have been compared to clinical diagnosis
- Clinical testing has observed that heart rate data/patterns in patients with a psychiatric disorder are distinctly different to the heart rate data in those who are free of psychiatric illness
- Through our data analytic methods we have been able to recognise distinct 'identifiers' in heart rate data for depression and certain other mental illnesses.
- This allows for early diagnosis and treatment, facilitating the medical course of action
- Patients have been followed up with serial monitoring over extended periods of time. This has clearly demonstrated that normalization of test results begins to occur concurrently with clinical recovery. Where recovery/response to treatment does not occur the results remain abnormal





## CLINICAL FINDINGS

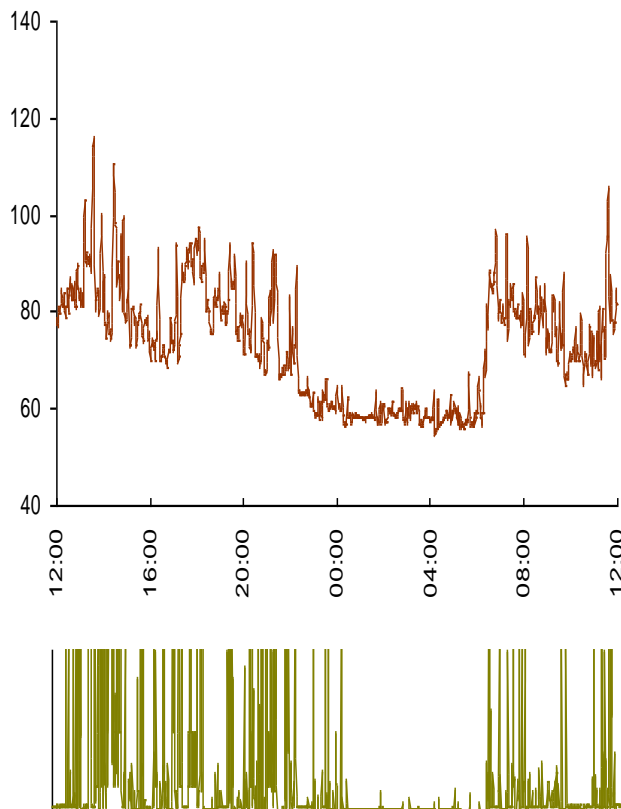
*Could potentially be  
used to diagnose/treat  
sleep and other mental  
health issues as well as  
Depression*





# CLINICAL FINDINGS

## Normal



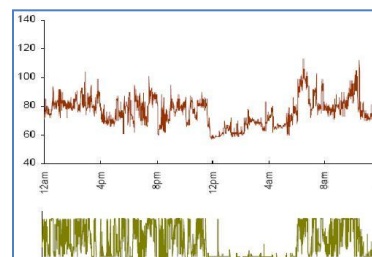
**Sleep rates are visibly lower and less variable than awake rates**

**Onset of sleep and moment of waking show a clear change in the mean trend**

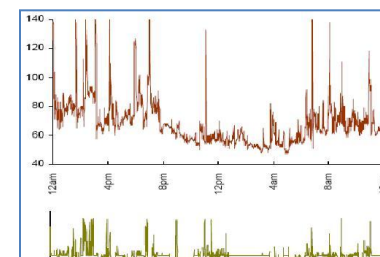
**Sleep and waking usually brief and occurs quickly**

**Body movement data clearly correlates with heart rate, with a cessation of movement during the sleep period.**

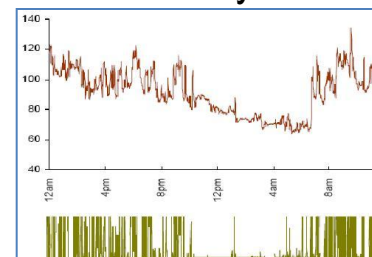
## Depression



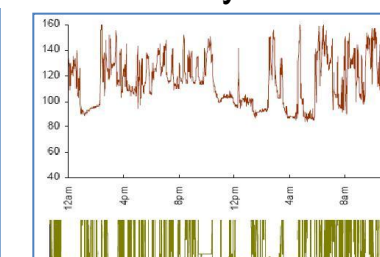
## Panic



## Anxiety



## Acute Psychosis





# TARGET MARKETS

## Medical

- GP's, psychiatrists, psychologists, therapists, counsellors

## Corporate Market

- Insurance companies, high risk occupations, private hospitals, professions, pharmaceuticals, self-help organisations

## Government

- Public hospitals, police, emergency services, military

## Elite Sport

## Consumer Market

- Potential Android/iPhone apps





# THE TRANSACTION – INVATEC/HEARTLINK

## STAGE ONE

- BPO conducting due diligence on project technology, using independent team of qualified medical health professionals and researchers
- BPO has 6 month option upon successful completion of due diligence to earn 35% of Invatec Health Pty Ltd by sole funding Invatec and independent Validation trials
- Trials planned to validate technology by leading medical researchers in Australia/Asia/US

## STAGE TWO

- On completion of Stage One investment, BPO has an option to acquire an additional 45% interest in Invatec via share sale from existing shareholders
- If both Stage One and Two are completed, BPO will secure 80% interest in Invatec via the issue of a 20% interest in BPO

## HEARTLINK TRANSACTION AGREEMENT (patent holder)

- Exclusive licence with Heartlink, registered holder of patents in Australia, Canada, Israel, New Zealand, Singapore and US in relation to heart rate analysis technology (related to Invatec)
- Licence for initial 2-year period (stage 1) followed by 25 years (stage 2) in return for a 10% interest in BPO and royalty.



## **BIOPROSPECT – AN EXPERIENCED IP MANAGER**

### **BioProspect's biotechnology assets include:**



AgriPro - animal health and nutrition products



Regen – range of innovative health and wellness products

Qcide - environmentally friendly treatment for household and agricultural pests

### **Investment in Frontier Petroleum**

- 300M shares retained after sale of 110M for \$1.8m in August 2013
- IPO anticipated Feb 2014 on the PSE
- Expected post-IPO value of holding US\$8-10M
- Will be divested to fund biotechnology program



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