

---

**STUDENTSHIP AGREEMENT**

BETWEEN

EUROPEAN HYDRATION INSTITUTE,

*FACULTY OF HUMAN KINETICS  
TECHNICAL UNIVERSITY OF LISBON,*

*MRS. ANA CATARINA MATIAS,*

And

*PROF. ANALIZA SILVA*

---

---

## PARTIES

**Fundación European Hydration Institute**, a Spanish Foundation duly incorporated under the laws of Spain, with registered office at Plaza Pablo Ruiz Picasso, 1, Torre Picasso, Planta 28, 28020 Madrid (Spain), duly represented by Dr. Jane Holdsworth, of legal age, of British nationality, holder of passport number 110580974. The Foundation was duly incorporated before the Notary Public of Madrid, Mr. Francisco Javier Cedrón López-Guerrero, on 23<sup>rd</sup> December 2010, under number 2,662 of his records and duly registered with the Foundation's Registry under the authority of the Ministry of Education under number 1364 (hereinafter referred to as "**EHI**");

*Faculty of Human Kinetics, Technical University of Lisbon*, a Portuguese University, with registered office at Estrada da Costa, 1495-688 Cruz Quebrada, Portugal, and Tax Identification Number PT501621288 (hereinafter the "**University**"), duly represented by *Mr. Carlos Alberto Ferreira Neto*, President of legal age, Portuguese nationality and holder of *national identity document* number in force 01588549

*Prof. Analiza Silva*, of legal age, Portuguese nationality, with domicile for these purposes at [Estrada da Costa, 1499-002 Cruz-Quebrada, Portugal, holder of *national identity document* number in force 10289157 Adjunct Faculty Professor (hereinafter the "**Supervisor**"), on *her own name and behalf*; and

*Mrs. Ana Catarina Matias* of legal age, Portuguese nationality, with domicile at *Estrada da Costa, 1499-002 Cruz-Quebrada, Portugal* and holder of *national identity document* number in force 12587454 5 ZZ6 (hereinafter the "**Student**"), on *her own name and behalf*.

EHI, the Student, the University and the Supervisor are hereinafter jointly referred to as the "**Parties**" and separately as a "**Party**".

## WITNESSETH

- I. Whereas EHI is a not for profit Foundation established to advance knowledge and understanding of all matters relating to human hydration and aims to encourage and support research projects on human hydration by granting financial contributions to graduate students.
- II. Whereas the University has the necessary technical and human resources for the implementation of research projects.
- III. Whereas in the framework of the EHI Graduate Student Awards Programme 2013, EHI has awarded the Student a financial contribution for the implementation of the project "*Development and Validation of Methods to Assess Total Body Water Extracellular and Intracellular water in Highly Active Adults*" (hereinafter the "**Project**").
- IV. Whereas the Parties, in accordance with the foregoing, agree to sign this



european hydration  
institute

**STUDENTSHIP AGREEMENT** (hereinafter the "**Agreement**") pursuant to the terms and conditions provided in the following

## CLAUSES

### 1. PURPOSE OF THE STUDENTSHIP AGREEMENT.

1.1 The purpose of this Agreement is to establish the terms and conditions under which the Parties may cooperate to govern the funding and conduct of the studentship to enable the Student to implement the Project described in Annex I to the Agreement (the "**Studentship**").

1.2. Annex I must contain a summary of the Project, including the objective, the duration, the methodology, expected outcomes, estimated budget and any plans for dissemination of results.

1.3. The Student shall complete the Project related to human hydration according to the terms and conditions established in Annex I.

### 2. NATURE OF THE AGREEMENT.

The nature of the Studentship is educational and it is considered as an internship period complementary to the Student's studies at the University. Consequently, the Studentship granted under the present Agreement does not imply any kind of salary or remuneration in favour of the Student and no labour relationship is created between the Student and any of the Parties.

### 3. TERM AND PERIODS.

3.1. The Agreement shall enter into force as from the date of its signature in counterparties (the "**Starting Date**"), although it produces effects as from the date stated in Annex I. The Agreement shall have the duration of the Project, as stated in Annex I.

### 4. CONTRIBUTION AND PAYMENT.

4.1. The total financial contribution to be paid by EHI for the purpose of funding and conducting the Project shall be of **5,000 EUR** (hereinafter "**Financial Contribution**").

4.2. The University shall assume the economic management of the Studentship and, for such purpose, EHI shall disburse the University the Financial Contributions as follows:

- A **pre-financing** of half of the total Financial Contribution shall be disbursed within 30 days following the Starting Date.



european hydration  
institute

The University shall then, in accordance to what it has been expressly agreed in Annex 1:

- a) Use the pre-financing to obtain any requisite material, equipment and personnel; if appropriate, for the purposes of ensuring that the Project may be carried out diligently, and within the scope allowed by the funding provided by EHI, or any other party;
  - b) Reimburse the pre-financing to the Student as stipend fees, if appropriate.
- A **final payment**, consisting on the other half of the total Financial Contribution, upon EHI's approval of the Student's final report.

The University shall then, in accordance to what it has been expressly agreed in Annex I:

- a) Use the funding for any activities or measures so required for completion and/or dissemination of the Project;
- b) Reimburse the due amounts to the Student, as stipend fees.

4.3. Payment by EHI to the University of the Financial Contribution is subject to the prior issuance of an invoice, or other type of receipt, by the University to EHI and shall be made by means of a bank transfer into the following bank account:

Bank account holder: *Conselho de Gestao da Faculdade de Motricidade Humana*

Bank: *Banco Santander Totta*

Account number: 000318406181020      SORT Code: 0018

IBAN Code: PT50 0018 00031 8406181020 95      SWIFT: TOTAPTPL

4.4. EHI shall also decide, **at its sole discretion and criteria**, to reimburse the costs the Student shall incur up to a maximum of **1,000 EUR** for the presentation of the research outcomes to EHI, such as costs related to the use of post certified means, travel and accommodation costs, where applicable. For such purposes, the Student must have to account for every costs which shall be reported and paid in Euro.

4.5. The University, or any other third party, shall assume whatsoever expense arising for the Project which exceeds the estimated breakdown of budget and Financial Contribution of EHI.

## **5. OBLIGATIONS OF THE PARTIES**

### **5.1. Obligations for EHI:**

- Make the payments in the form described in Clause 4 above.
- Comply with the confidentiality, dissemination and industrial and intellectual obligations assumed under this Agreement and the Annex I thereto.



#### 5.2. Obligations on the **University**:

- Undertakes to provide all the necessary materials, facilities, equipment and assistance to perform the Project as foreseen in Annex I.
- Use the Financial Contribution as described in clause 5 above.
- Monitoring and supervising the development of the Project, through the Supervisor.

#### 5.3 The **Student** shall:

- Ensure that the Project and the final report are carried out as specified herein and in Annex I under the guidance of the Supervisor.
- Inform EHI in due time of any event or change in circumstances which are likely to have an effect on the performance of the Project, inter alia:
  - Any modification relating to the information having served as a basis for the award of the Studentship;
  - Any personal grounds or events affecting the implementation of the Project.
- Comply with any other obligations set out under this Agreement.

#### 5.4 The **Supervisor** shall:

- Advice and guide to the Student on the implementation of the Project.

### **6. FINAL REPORT.**

6.1 On completion of the Project the Student shall submit to the Science Advisory Board of EHI (hereinafter, the “**SAB**”) a **final report**, within 30 days of completion of the Project (the “**Final Report**”). This Final Report shall present the final results and conclusions of the Project, describe their use and dissemination, and include description of any concrete achievements, such as publications. Likewise, the Final Report shall provide a summary of the way in which the Financial Contribution made by the EHI has been deployed and should relate to the budget agreed at the outset of the Project and detailed in Annex I.

6.2 The Final Report shall be in English.

6.3 EHI shall evaluate the Final Report referred above in the following 30 days as from its submittal by the Student (hereinafter the “**Resolution Time Limit**”).

The absence of a response from EHI within the Resolution Time Limit shall not imply its approval. However, EHI should send a written reply to the Student.

6.4 In this sense, EHI may decide to:

- a) Approve the Final Report, in whole or in part, or make the approval subject to certain conditions;

- b) Reject the Final Report by giving an appropriate justification and, if appropriate, start the procedure for termination of the Agreement established in clauses 11.1.b) and 11.1.c).
- c) Suspend the Resolution Time Limit and the payment if:
- The Final Report is not completed or if some clarification or additional information is needed.
  - There are doubts concerning the eligibility of costs claimed in the financial statement.
  - If the work carried out does not comply with the provisions of the Agreement and its Annex I.
  - If there is a suspicion of irregularity committed by the Student in the performance of the Project.

In the event EHI suspends its approval of the Final Report, the University, the Student and the Supervisor, shall be duly informed of the reasons why the Resolution Time Limit is suspended and the conditions to be met for the lifting of the suspension.

The suspension will be lifted as from the date when the additional information, clarifications or amendments requested about the final report are received by EHI.

## **7. COMMUNICATIONS AND DISSEMINATIONS**

7.1 The University, the Student and the Supervisor shall, throughout the duration of the Project and the Agreement, take appropriate measures to highlight the financial support of EHI.

7.2 Any publicity made by the University, the Student or the Supervisor in respect to the Project, in whatever form and on or by whatever medium, must specify that the Project has received research funding from EHI and display the EHI emblem and logo, as well as that it reflects only the author's views and that EHI is not liable for any use that may be made of the information contained therein.

7.3 EHI is authorized to publish, in whatever form and on or by whatever medium, the financial support given to the Project and publish the following information:

- The name of the University (including its logo), the Student and/or Supervisor;
- The general purpose of the Project in the form of a summary of the final report or any other kind of abstract containing, at least, the context or background of the Project and its purpose, basic procedures used, main findings (giving specific effect sizes and their statistical significance, if possible), principal conclusions and description of any achievements;
- The amount and rate of the Financial Contribution of EHI granted to the Project;
- The list of dissemination activities and/or patent (applications) relating to results;



european hydration  
institute

- The details/references and the abstracts of scientific publications relating to results and, the published version or the final manuscript accepted for publication; according to the rights of use conferred to EHI by virtue of Clause 8 below;
- Any picture or any audiovisual or web material provided to EHI in the framework of the Project.

The University, the Student and the Supervisor shall ensure that all necessary authorizations for such publication have been obtained and that the publication of the information by EHI does not infringe any rights of any third parties.

7.4 Dissemination activities shall be compatible with the protection of intellectual property rights, confidentiality obligations and the legitimate interests of the owner of the foreground.

7.5 Any dissemination activity shall be reported in the plan for the use and dissemination of foreground, including sufficient details/references to enable EHI to trace the activity. With regard to scientific publications relating to foreground published before or after the Final Report, such details/references and an abstract of the publication must be provided to EHI at the latest two months following publication. Furthermore, an electronic copy of the published version or the final manuscript accepted for publication shall also be provided to the EHI.

## **8. INDUSTRIAL AND INTELLECTUAL PROPERTIES RIGHTS**

8.1. All Industrial or Intellectual Property Rights belonging to one Party are and shall remain the exclusive property of the Party owning it (or, where applicable, the third party from whom its right to use the Industrial or Intellectual Property has derived).

8.2. Any Intellectual Property Right obtained from the implementation of the Project (“**Arising Intellectual Property Right**”) shall vest and be owned absolutely by the University or the Student, as the case may be under the applicable law in the country where the University is established.

8.3. The University and/or the Student hereby grant to EHI, a royalty-free, irrevocable, non-transferable, non-exclusive, right and license to use its Arising Intellectual Property for the sole purpose of internal research and development. This notwithstanding the right of EHI to publish, in whatever form or by whatever medium, the financial support given to the Project, and certain information as set forth in Clause 7.3 above.

## **9. PERSONAL DATA PROTECTION**

According to the Spanish Data Protection Act 15/1999, of December 13<sup>th</sup>, EHI hereby informs to the Student, the Supervisor and the legal representative of the University, who expressly and unequivocally consent the collection of their personal data provided, into a personal data file whose controller is Fundación European Hydration Institute, located at Plaza de Pablo Ruiz Picasso 1, Torre Picasso, Planta 28, 28020-Madrid (Spain) where Student and Supervisor may exercise their rights of access, rectification, cancellation and objection, for the purposes of managing the Project’s Studentship granted and also publishing in whatever form and on or by whatever medium (Internet, radio, television, etc.) their personal data regarding to the Project.

## **10. RIGHT OF ASSIGNMENT**

Due to the special circumstances taking into consideration for the formalization of the Agreement, neither of the Parties shall have the right to assign it or whatsoever right or obligation arising therefrom or subrogate to whatsoever person with regard to their legal position.

## **11. TERMINATION OF THE AGREEMENT ON THE INITIATIVE OF EHI**

11.1. EHI may terminate at its sole discretion the Agreement in the following cases:

- a) Where the Student for any reason is no longer in the position to continue working under the Project;
- b) In case of non-performance or poor performance of the work or breach of any substantial obligation under this Agreement that is not remedied following a written request to the Student to rectify the situation within a period of 15 days;
- c) Where the Student has deliberately, or through negligence, committed an irregularity in the performance of the Project with EHI;
- d) Where the required Final Report is not submitted or EHI does not approve the report submitted, according to what it is established in Clause 6 above;
- e) For major technical or economic reasons substantially adversely affecting the completion of the Project;
- f) In case of force majeure, where any reactivation of the Project after suspension is impossible.

11.2. Termination of the participation of the Student at EHI's initiative shall be notified to the Student, with a copy addressed to the University and the Supervisor, and shall take effect on the date indicated in the notification.

11.3. When the Agreement is terminated at EHI's initiative, the Student shall have the right to claim the reimbursement of the costs incurred up to the date of termination, when such termination is not due to the negligence of the Student and provided that the conditions set forth in clause 5 above are met. For such purposes, within 30 days after the effective date of termination, the Student, in consultation with the Supervisor, shall submit the Final Report referred to in Clause 6 relating to the work carried out up to that date and the costs incurred. In the absence of receipt of such documents within this time-limit, EHI may determine not to make any further reimbursement and not to take into account any further cost claims and, where appropriate, require the reimbursement of any pre-financing due by the Student. In case of negligence of the Student, the pre-financing paid by EHI according clause 4.2 above, shall be reimbursed by the University to the EHI.

## **12. COMMUNICATIONS AND NOTICES.**



12.1 Any notice or other communication that can or should be done under this Agreement, and especially for the purposes of the implementation of the Project, shall be in writing and must be made to the persons and addresses listed below:

▪ **The Student:**

Fax Number: +(351) 21 415 1248

Email: [cmatias@fmh.utl.pt](mailto:cmatias@fmh.utl.pt)

▪ **EHI:**

Attn. Dr. Jane Holdsworth

Fax Number: +34 93-4516304

Email: [jholdsworth@europeanhydrationinstitute.org](mailto:jholdsworth@europeanhydrationinstitute.org)

▪ **The University:**

Attn. *Mr Carlos Alberto Ferreira Neto*

Fax Number: +(351) 21 415 1248

Email: [cneto@fmh.utl.pt](mailto:cneto@fmh.utl.pt)

▪ **The Supervisor:**

Attn. *Prof. Analiza Silva*

Fax Number: +(351) 21 415 1248

Email: [analiza@fmh.utl.pt](mailto:analiza@fmh.utl.pt)

### **13. LIMITATION OF LIABILITY**

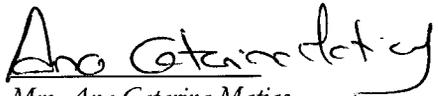
No action shall lie for any matter arising under this Agreement against the Supervisor or the Student. As a consequence of the foregoing, the University undertakes any liability arising from a breach of the Agreement by the Student or the Supervisor, provided that there is wilful misconduct or gross negligence as set forth in clause 11.1 b) and c) of this Agreement, and that as a result of said breach of the Agreement a damage is caused to EHI. In any cause such liability shall not exceed three times the value of the Agreement.

None of the Parties to this Agreement shall be liable to any other Party for consequential losses howsoever arising from default of any other Party.

### **14. GOVERNING LAW AND JURISDICTION.**

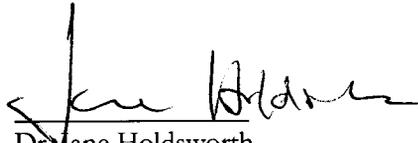
This Agreement will be governed and interpreted in accordance with Spanish law and the Parties hereby relinquish their right to whatsoever other jurisdiction and irrevocably and unconditionally submit to the exclusive jurisdiction of the Courts of Madrid to solve whatsoever conflict or matter that arises or is related to this Agreement.

In witness whereof, the Parties sign this Agreement in four counterparts, and for one single intent and purpose, with one counterpart being given to each Party.



Mrs. Ana Catarina Matias

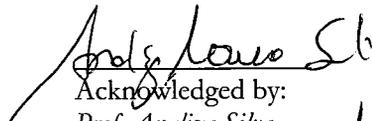
Date of signature: 23/4/2013



Dr. Jane Holdsworth

Fundación European Hydration Institute

Date of signature: 21/6/13



Acknowledged by:

Prof. Analiza Silva

Date of signature: 23/4/2013



By Mr. Carlos Alberto Ferreira Neto for

Faculty of Human Kinetics, Technical

University of Lisbon

Date of signature: 16/05/13

**Annex I:** *“Development and Validation of Methods to Assess Total Body Water, Extracellular and Intracellular water in Highly Active Adults”*

**Background:**

Hydration status and its effects on exercise, work performance and health have been in debate in recent years. Total body water (TBW) is comprised by intracellular (ICW) and extracellular water (ECW) compartment. A constant fluid distribution is important to minimize the effects of a water deficit in response to exercise. At the cellular level, ICW is a good predictor of body-cell mass whereas fluid distribution represented by exchanges in ICW and ECW, is a relevant indicator of health and disease, and should be included in clinical settings. Dilution methods are used to accurately assess TBW and ECW, through the administration of deuterium and bromide, respectively. A detailed review<sup>1</sup> indicated that a 3–4% reduction in hydration resulted in a 2% decrease in strength, power and high-intensity endurance though alternative measures of fluid balance have been used. So far only two studies have been conducted to understand the role of body fluids on performance using state-of-the-art techniques<sup>2,3</sup>. According to the authors

reductions in ICW resulted in decreased muscular upper-body power and forearm strength in judo athletes<sup>2,3</sup>. Therefore, valid methods for assessing body fluids are determinant at the clinical settings. Given the cost and impractical use of dilution techniques, unifrequency bioelectrical impedance analysis (BIA) has been suggested as an alternative method to assess TBW and its compartments. Though several unifrequency BIA-based prediction equations using a non-athletic adult population have been proposed for TBW estimation<sup>4</sup>, only one solution was proposed for ECW assessment<sup>5</sup>. Consequently their validity in highly active adults is still unknown and should be analyzed. Additionally, newly proposed solutions to assess TBW and its compartments are required in this specific population.

#### Statement of the question:

Briefly, using a sample of highly active adults, the purposes of this project are:

- a) To validate BIA-based equations for TBW, ECW, and ICW prediction;
- b) To develop and cross-validate new BIA-based models to predict TBW and its compartments.

This investigation will address an important scientific problem with relevant implications on performance and health. The state-of-the-art methods included further add unique characteristics to this project.

#### Proposed Methodologies:

Sample recruitment and screening will take place in Lisbon due to the proximity to sports clubs and the Athletes High-Performance Center.

The inclusion criteria are: a) age  $\geq 18$  years, b) at least 2 h/day of training or moderate-to-vigorous physical activity, c) not taking medication or supplements.

This study will use an observational cross-sectional design and the measurements will be conducted in Exercise and Health Laboratory, after an overnight fast.

TBW will be assessed by the deuterium dilution technique using a stable mass spectrometer (PDZ, SerCon, UK). Baseline urine will be collected and a deuterium dose ( $^2\text{H}_2\text{O}$ ) of 0.1g/kg of weight will be administered. After a 4h equilibration period, a new urine sample will be collected. The amount of  $^2\text{H}_2\text{O}$  in the isotope dilutions will be analyzed and dilution volumes will be used to calculate TBW.

ECW will be assessed by the bromide dilution technique using an ionic chromatograph (DionexSO, CA, USA). Baseline saliva will be collected and a sodium bromide (NaBr) dose of 0.03 mg/kg of weight will be administered. After a 3h equilibration period, a new saliva sample will be collected. The dilution space is calculated as the difference between bromide concentrations 3h post-dose and baseline saliva. ICW will be calculated as the difference between TBW and ECW.

The BIA model 101 (Akern, Florence, Italy) will be used as the alternative technique for estimating TBW and ECW. After a 10-minute period of rest in supine position, four electrodes will be placed on the dorsal surfaces of the right hand and foot. Measures of resistance and reactance will be used in BIA-based equations for assessing TBW and ECW.

#### Statistical Procedures:

To test the accuracy of the alternative solutions, comparison of means, linear regression, and agreement between methods will be performed. To develop new TBW, ECW, and ICW prediction equations, multiple regression analysis will be performed using all possible combinations of independent variables. Cross validation will be performed in 1/3 of the sample whereas 2/3 will be used for developing the models.

Prior data using a pooled sample of males and females indicated that the mean bias in assessing TBW by BIA compared to the reference method was 1.8kg with a standard deviation of 5.2kg

(normally distributed data). If the true difference in the mean response of matched pairs is 1.8kg, we will need 89 participants to reject the null hypothesis that this response difference is zero, with a power of 0.9 and a Type-I error of 0.05. Assuming that 10-15% of the data collection may have missing values or collection/treatment errors we will require approximately 100 participants.

Plan for dissemination the findings:

These findings are expected to highlight simple and useful tools for assessing and monitoring TBW, ECW, and ICW in highly active adults, and ultimately help to improve health and performance.

Four key points will be used to disseminate the results: international congresses, publications in international journals, educational resources to be posted in the laboratory electronic website, and educational sessions to athletes and sports science professionals. Furthermore, information regarding good practices to monitor hydration will be provided to the general public, mainly those engaged in recreational physical activity. Several communication resources, including fact sheets and outlets will be used for this purpose.

References:

1. Judelson, DA, Maresh, CM, Anderson, JM, Armstrong, LE, Casa, DJ, Kraemer, WJ, Volek, JS. Hydration and muscular performance: does fluid balance affect strength, power and high-intensity endurance? *Sports Med*, 2007, 37(10):907-21.
2. Silva, AM, Fields, DA, Heymsfield, SB, Sardinha, LB. Body composition and power changes in elite judo athletes. *Int J Sports Med*, 2010, 31(10):737-41.

3.Silva,AM, Fields,DA, Heymsfield,SB, Sardinha,LB. Relationship between changes in total-body water and fluid distribution with maximal forearm strength in elite judo athletes. J Strength Cond Res,2011,25(9):2488-95.

4.Dioum,A, Gartner,A, Cisse,AS, Delpuch,F, Maire,B, Wade,S, Schutz,Y. Validity of impedance-based equations for the prediction of total body water as measured by deuterium dilution in African women. Am J Clin Nutr,2005,81(3):597-604.

5.Sergi,G, Bussolotto,M, Perini,P, Calliari,I, Giantin,V, Ceccon,A, Scanferla,F, Bressan,M, Moschini,G, Enzi,G. Accuracy of bioelectrical impedance analysis in estimation of extracellular space in healthy subjects and in fluid retention states. Ann Nutr Metab,1994,38(3):158-65.

### **Budget:**

We estimate a total cost of 6000 €, detailed as follows:

1. Several disposable laboratory consumables for biological sample collection are required, including: alcohol, cotton, vinyl protection gloves, laboratory material soap, cryotubes, pipette tips, sterile Pasteur pipette, urine sample cup, saliva sample tube, disposable cups for water, plastic boxes for frozen sample. These consumables have an estimated cost of 600€.
2. For the dilution techniques the following consumables will be required: Sodium bromide (200€), deuterium oxide (400€), platinum powder (200€), sodium carbonate (270€), magnesium Perchlorate(60€), daily calibration for mass spectrometer (100€) and ion exchange chromatography (200€) exetainers and glass flat bottom vial for Mass Spectrometer (450€), vials for Anion Exchange Chromatography (200€), Gas bottle of Nitrogen (100€), Helium (450€), and Hydrogen (200€).
3. Service acquisition for annual maintenance will be required: Anion Exchange Chromatography (1000€) and Ultra-Pure water equipment (500€), Mass Spectrometer (1000€).

4. For the BIA technique a total of 400 electrodes will be required (400€)

**Timetable:**

	<b>September to November 2013</b>	<b>December 2013</b>	<b>January 2014</b>	<b>February 2014</b>
Recruitment and data collection*				
Data treatment and data analysis				
Elaboration of educational resources for electronic website Educational sessions				
Preparation of peer-review papers and communication in international meetings				
EHI Report				

\* Sample recruitment and screening will be start at the end of August. A total of 5 participants per day can be assessed which means that between 1 months and up to 1 and half month, data collection will be completed.

**Start date:** 1<sup>st</sup> September 2013

**Completion date:** 28<sup>th</sup> February 2014

**Ethical Committee approval:** Granted Yes