EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

Brussels, 4 June 2019

COST 028/19

DECISION

Subject: **Memorandum of Understanding for the implementation of the COST Action "Perinatal Mental Health and Birth-Related Trauma: Maximising best practice and optimal outcomes" (DEVoTION) CA18211**

The COST Member Countries and/or the COST Cooperating State will find attached the Memorandum of Understanding for the COST Action Perinatal Mental Health and Birth-Related Trauma: Maximising best practice and optimal outcomes approved by the Committee of Senior Officials through written procedure on 4 June 2019.

MEMORANDUM OF UNDERSTANDING

For the implementation of a COST Action designated as

COST Action CA18211
PERINATAL MENTAL HEALTH AND BIRTH-RELATED TRAUMA: MAXIMISING BEST PRACTICE AND OPTIMAL OUTCOMES (DEVoTION)

The COST Member Countries and/or the COST Cooperating State, accepting the present Memorandum of Understanding (MoU) wish to undertake joint activities of mutual interest and declare their common intention to participate in the COST Action (the Action), referred to above and described in the Technical Annex of this MoU.

The Action will be carried out in accordance with the set of COST Implementation Rules approved by the Committee of Senior Officials (CSO), or any new document amending or replacing them:

a. “Rules for Participation in and Implementation of COST Activities” (COST 132/14 REV2);
b. “COST Action Proposal Submission, Evaluation, Selection and Approval” (COST 133/14 REV);
c. “COST Action Management, Monitoring and Final Assessment” (COST 134/14 REV2);
d. “COST International Cooperation and Specific Organisations Participation” (COST 135/14 REV).

The main aim and objective of the Action is to The main aim and objective of this Action is to consolidate and disseminate evidence by seeking ways to prevent, minimise and resolve birth-related trauma, to optimise emotional & psychological outcomes for parents and families & to accelerate the translation of knowledge into best practices that can be shared across Europe lalalalalalalal. This will be achieved through the specific objectives detailed in the Technical Annex.

The economic dimension of the activities carried out under the Action has been estimated, on the basis of information available during the planning of the Action, at EUR 100 million in 2018.

The MoU will enter into force once at least seven (7) COST Member Countries and/or COST Cooperating State have accepted it, and the corresponding Management Committee Members have been appointed, as described in the CSO Decision COST 134/14 REV2.

The COST Action will start from the date of the first Management Committee meeting and shall be implemented for a period of four (4) years, unless an extension is approved by the CSO following the procedure described in the CSO Decision COST 134/14 REV2.

OVERVIEW

Summary

Unlike other sources of trauma, **perinatal or birth-related trauma** is relatively unrecognised. Evidence suggests up to 30% of women describe their birth experience as traumatic and experience some symptoms of intrusion, avoidance or hyper-arousal. Meta-analyses show post-traumatic stress disorder (PTSD) affects 4% of women after birth and up to 18% of women in high risk groups. Rectification of this situation is essential. In 2016, 5.11 million babies were born in Europe, indicating that up to 1.5 million women may have had **sub-optimal birth experiences** and over 200,000 may have **developed PTSD** as a result. Developmental research has firmly established that the quality of infant-parent relationships is a critical factor in early and later childhood development, consequently, a **family-centred approach to any investigation of birth-related trauma is critical, as trauma can be transmitted within the family system.** Given the enormous economic burden it places on women, health systems, and particularly children, relatively small improvements in services to prevent, detect and treat this problem can benefit society significantly. **The main aim of this Action is two-fold**. The Action will establish an international multidisciplinary network of researchers, clinicians, NGOs and SMEs to 1) consolidate and disseminate current evidence and coordinate a joint effort to seek ways to prevent, minimise and resolve birth-related trauma, and to optimise emotional and psychological outcomes for parents and families and 2) accelerate the translation of that knowledge into best practices that can be shared across Europe to reduce the societal and economic burden arising from birth-related negative/traumatic experiences.

Areas of Expertise Relevant for the Action	Keywords
● Health Sciences: Health services, health care research	● perinatal mental health ● birth-related trauma ● family systems ● health economics ● PTSD

Specific Objectives

To achieve the main objective described in this MoU, the following specific objectives shall be accomplished:

Research Coordination

● 1) to develop a common understanding/definition of birth-related trauma and PTSD to inform guidelines and guide the development of future standards for maternity care
● 2) to understand the factors that make women vulnerable to perinatal mental health disorders, particularly birth-related PTSD
● 3) further develop/consolidate mechanisms/tools for assessment and screening
● 4) coordinate current efforts to develop an understanding of the relationship between traumatic stress in maternity staff and traumatic birth
● 5) advance our understanding of the economic impact of traumatic birth and inform the development of sustainable, cost-effective services for prevention, diagnosis and treatment
● 6) increasing consolidation and dissemination of results to the research community, general public and policymakers.

Capacity Building

● 1) building and unifying an international, multidisciplinary network of researchers and clinicians around maternity care, perinatal mental health and early childhood development using biomedical, epigenetic, socio-cultural, health-organisational, economic, and neuro-psycho-social approaches to tackle birth-related trauma and the emotional and psychological sequelae for women, infants and families

● 2) facilitating access to a global network of researchers, clinicians and advocacy groups in the field
● 3) providing targeted know-how for the next generation of researchers and clinicians in the field through access to the network
● 4) increasing consolidation and dissemination to maximise translation of research into practice, to bridge current theory-practice gaps bringing
evidence to knowledge end users

TECHNICAL ANNEX

1 S&T EXCELLENCE

1.1 SOUNDNESS OF THE CHALLENGE

1.1.1 DESCRIPTION OF THE STATE-OF-THE-ART

Opportunities to make improvements in women and family centred care can be achieved by advancing scientific knowledge in the area of birth-related trauma. Unlike other sources of trauma, **perinatal or birth-related trauma** is relatively unrecognised. Evidence suggests up to 30% of women describe their birth experience as traumatic and experience mental symptoms of intrusion, avoidance or hyper-arousal. Meta-analyses show post-traumatic stress disorder (PTSD) affects 4% of women after birth and up to 18% of women in high risk groups, such as those who have severe pregnancy complications. Rectification of this situation is essential as in 2016, 5.11 million babies were born in Europe, indicating that up to 1.5 million women may have had **sub-optimal birth experiences** and over 200,000 may have **developed PTSD** as a result.

To date, our understanding of the causes of birth-related trauma has been informed by knowledge on peripartum PTSD, pregnancy loss, stillbirth, obstetric interventions (and obstetric violence). However, there is still insufficient evidence to predict which women will develop PTSD, and limited understanding of the factors associated with resilience and vulnerability in the face of peripartum trauma. Research has focused on obstetric complications and intervention as objective indices of traumatic birth, such as caesarean sections. However, although caesarean births are associated with PTSD, the evidence is not consistent. Many women develop PTSD after normal vaginal births. Interest is shifting towards the traumagenic role of the **birth environment,** as the **setting** (home vs hospital) and the **cultural and organisational** (systems and structures) factors that shape the **context of birth** (models of care) are likely to influence the quality and nature of interactions between care providers, women and their families. Recent research has identified that shortcomings in patient-provider interactions are among the **most frequently reported causes of trauma** whilst, conversely, good communication has the **potential to positively impact on outcomes.** For example, a recent survey of over 2000 women found that traumatic birth experiences could have been reduced/prevented by better communication and support from caregiving professionals.

Unlike trauma at other times, trauma and PTSD in the perinatal period are particularly important because of its potential impact on women and their children. Infants of women who are anxious in pregnancy are more likely to show fearful or anxious behaviour and there is increasing evidence of long-term impacts on the child. Epidemiological studies show perinatal PTSD is associated with poor and potentially enduring outcomes such as preterm birth, reduced breastfeeding and poor child development. Research in epigenetics, biomedicine and neuro-endocrinology helps explain possible mechanisms through which infants are affected. Variations in exposure and responses to stress have been shown to influence patterns of maternal and fetal behaviour. Consequently, the **role of epigenetics, biomedicine, neuro-endocrinology, neuro-psychology and psychological processes**, related to secondary traumatisation, compassion fatigue and (psychological) **intergenerational transmission of trauma** are important to the development of evidence-based interventions to maximise the quality of the lives of families affected. As the fields of epigenetics and biomedicine rapidly evolve, new understandings are emerging that suggests passing on trauma is not inevitable and that **the intergenerational cycle of transfer can be broken through timely interventions.** Adverse psychological outcomes after birth-related trauma can affect infant-mother attachment, which is linked to poor mental health for the children later in life. Strong evidence exists of the long-term impact and cost of postnatal depression, another

important and frequent outcome of birth-related trauma, indicating that moderate to severe depression, at both 2 and 8 months postpartum, was associated with an almost five-fold increase in behavioural problems in the child aged 3.5 years.

Evidence on **prevention and treatment of birth-related trauma** is sparse. There are a few studies of primary prevention through antenatal stress management or counselling, with inconsistent results. Little research has looked at the **birth environment** and how this can be altered to potentially mitigate against negative and traumatic birth-related experiences. The impact of **traumatic stress on maternity staff** and its link with traumatic birth must also be considered as a potential modifiable risk factor. When considering the potential psychological consequences of perinatal trauma, it is important to take a **family-centred approach, as trauma can be transmitted within the family system.** Knowledge of the relationship between these factors is critical if the nature of the birth-related experience is to be altered from negative to positive. Research on treatment is also limited. As interest amongst clinicians and researchers in birth-related trauma increases, the importance of screening women and referral for treatment at the earliest opportunity is being more widely recognised. However, there is no research on screening for birth trauma, and very few studies of the effectiveness of key treatment/therapeutic models for this population. Reviews of the available research find no evidence that midwife-led debriefing improves or worsens psychological outcomes, with some evidence that trauma-focused psychological therapy leads to reduced PTSD symptoms. However, these reviews identify limitations with the existing research, such as the lack of high quality or robust evidence.

Perinatal mental health problems have **severe economic consequences**, most of which are associated with intergenerational spillover effects on child health and development. The lifetime economic cost of untreated perinatal mental health problems in England and Wales is estimated at over €9 billion for each annual cohort of births, 72% of which relates to its adverse impact on children. Therefore, it is imperative that the **economic benefits of improved prevention and treatment** are understood and quantified, in order to prioritise and **inform health policymaking** to tackle this problem**.**

1.1.2 DESCRIPTION OF THE CHALLENGE (MAIN AIM)

The WHO intrapartum guideline for a positive birth experience has emphasised **the importance of maternal emotional and psychological wellbeing during childbirth**, as well as the need for safe births. There is evidence that approximately **30% or 1.5 million** women across Europe **experience childbirth as negative or traumatic**. A recent systematic review confirmed that pregnant women with poor health or complications in pregnancy, and a history of depression or posttraumatic disorder are more vulnerable to posttraumatic stress from the birth. However, in the absence of significant obstetric/neonatal complications, it is unclear who is most vulnerable to negative/traumatic birth-related experience. Consequently, the prevalence of PTSD symptoms related to negative/traumatic birth experiences is likely to be underestimated and ill-understood. One overarching theme amongst the narratives of women affected is that **birth-related trauma is a hidden issue.** Yet it has a significant impact on women as evidenced by these accounts: *"I would have done anything to have this baby and did everything, even stuff I didn't want to. All I get told when dealing with the residual emotional effects is, you should be happy with the outcome"…."To have general anesthesia when I had a caesarean section was horrible. You sleep during labour and miss the experience of becoming a mother."*

Recent research has highlighted the importance of the **birth environment,** and studies looking at why women experience birth as traumatic have found that patient-provider interactions may also play a role, and communications about interventions may be more important than the interventions themselves. This is important because the birth environment and the interactions therein are **modifiable** to improve women's experience. Therefore, if the effect of interactions with the maternity team is better understood, and communication between women and caregivers can be influenced positively, there is a real opportunity to **prevent/reduce negative and traumatic birth-related experiences**, **optimising outcomes for women, infants and families**. More recently, the impact of shortcomings in patient-provider interactions is being reported as a source or stress/distress to clinicians. The impact of **traumatic stress on maternity staff** and its link with women's negative/traumatic experience of birth must be considered, as it also has the potential to be mitigated. Childbirth does not occur in a vacuum, and the experience is highly influenced by social norms and culture, whilst simultaneously situated within local organisational systems and structures. Therefore, a multidisciplinary, international, cross-cultural approach to exploring the birth environment is key. Researchers and clinicians from a range of approaches need to work jointly if scientific knowledge and best practices are to be leveraged to best effect, and optimal ways to provide equitable models of service provision that empower women and their families are to be developed. Significant potential to reduce/prevent negative/traumatic birth experiences lies in improving communication and collaboration more generally in the birth environment.

Therefore, consideration should be given to the potential of education and training for care providers as they interact with women and their partners in pregnancy, labour and postpartum in the development of an integrated care model to prevent and reduce the number of women who experience birth as negative/traumatic. In seeking to deepen our understanding of the role of the birth environment on negative and traumatic experiences, **respect, communication, empathy and empowerment** within the relationship between women, partners and care providers will be examined to provide technical guidance for policy makers on how to improve **women- and family-centred care** to prevent/minimise negative/traumatic birth experiences. Consequently including **women as stakeholders** in this Action ensures a bottom up approach to service improvement through the very coalitions among parents, professionals, researchers, educators, NGOs, SMEs and managers that this network seeks to foster.

It is important when considering the potential psychological consequences of a negative/traumatic birth-related event to take a **family-centred approach, as trauma can be transmitted within the family system.** Developmental research has firmly established that the quality of infant-parent relationships is a critical factor in early and later childhood development. While much research has been undertaken in 'classical' areas of trauma, such as child abuse and war, a gap exists regarding the potential impact of traumatic childbirth. Further research is required to explore the links between negative/traumatic birth related experiences and future pregnancy decisions, not necessarily from a population growth perspective, but perhaps more importantly from the emotional costs arising from delaying plans to have additional children or having fewer children than desired. Research is also necessary to recognise at what time women are most strongly affected by the negative/traumatic experience, and which aspects of the woman's life history and/or situational factors that affect outcomes, short and long-term. The extent to which women are affected by previous traumatic experiences appears to vary from individual to individual. This recognition of individual differences in the response to trauma has influenced the search for explanations in genetics. New understandings from **epigenetics and neuroendocrinology suggest the intergenerational transmission of trauma** is not inevitable. The societal benefits of even relatively small improvements in services to prevent, detect and treat this problem are significant given the enormous economic burden it places on women, health systems, and particularly children, as a result of the impact it has on their long term emotional, cognitive and physical development. Therefore the **impact of improvements in prevention on the reduction of healthcare costs** must be considered in the context of optimising health outcomes following childbirth, to demonstrate the significant societal benefits of lessening the burden of maternal and child health complications in the short and longer term. The COST framework is well suited to widening common understanding of the subject and steering towards a more consistent, integrated evidence-based model of service delivery across maternity, childhood and mental health services. This is especially important with the **increasing cross-border mobility of families** if those affected are to avail of an equitable model of service provision across Europe. **The main aim of this Action is two-fold**. The Action will establish an international multidisciplinary network of researchers, clinicians, stakeholders, Non-Governmental Organisations (NGOs) and Small and Medium Enterprises (SMEs) to achieve impact through: 1) consolidating and disseminating current evidence and coordinate a joint effort to seek ways to prevent, minimise and resolve birth-related trauma, and to optimise emotional and psychological outcomes for parents and families and 2) forming coalitions to accelerate the translation of that knowledge into best practices that can be shared across Europe to reduce the societal and economic burden arising from birth-related negative/traumatic experiences.

1.2 PROGRESS BEYOND THE STATE-OF-THE-ART

1.2.1 APPROACH TO THE CHALLENGE AND PROGRESS BEYOND THE STATE-OF-THE-ART

In high and middle income countries as many as 1:4 women give birth by caesarean section, whilst rates of induction/augmentation of labour are rising steeply. Policymakers and stakeholders are becoming increasingly concerned about the **clinical, economic and psychosocial effects** of these interventions in birth. **Improvements in care, leading to reduced incidence of traumatic birth (associated with interventions, interactions and context) can be achieved by the creation of a European network, bringing together experts currently working at a distance from each other.** Improvements in outcomes following negative/traumatic birth-related experiences and emotional and psychological outcomes for women, infants and families depend on a number of factors, not least the efforts of multidisciplinary teams consolidating expertise and resources to make significant contributions, not possible to the same extent when working in smaller teams. **Advances can be made in the conceptualisation of negative birth experiences not only to develop a standardised tool to assess the birth experience, but to find ways to prevent/minimise negative experiences, and**

ultimately optimise outcomes.This is the first time that there has been such a wide range of nationalities and disciplines working together, allowing for factors in birth environment in combination with perinatal mental health outcomes to be explored from a cross-cultural perspective and in context. Collaboration facilitates access to large samples for empirical work, and offers the opportunity for members to pool data from several studies to gain a greater understanding of birth-related trauma and perinatal PTSD. Many of the members are Principal Investigators (PIs) working on empirical studies, and collaboration affords new ways of combining datasets to extend scientific knowledge of birth-related trauma and PTSD symptoms in pregnancy and after birth. Advancing the understanding of the relationship with negative/traumatic experiences of birth and the contextual factors at play is critical to the prevention and reduction of birth-related trauma. This COST Action will accelerate convergence on the question of how traumatic birth experiences and PTSD following birth can be addressed by focusing on the **patient-provider interactions (from both perspectives),** and in doing so the relationship between traumatic stress and its impact on how clinicians' practice will be explored. It is also important to link researchers and clinicians from maternity care and early childhood within the network. Although the consequences of birth last longer than six weeks after the event, the maternity services, in general, **do not follow-up on birth outcomes**, and specifically maternal health and wellbeing after this point in time. Our synthesis of data from comparable national datasets will support the development of conceptual categories that may lead to the systematisation of patterns and mechanisms in traumatic birth experiences and perinatal PTSD. New and emerging research in the areas of **epigenetics, biomedicine and neuro-endocrinology** hold great promise in the development of our understanding of the complexity of traumatic birth experiences and PTSD and the multiplicity of factors at play. Epigenetic or environmental inheritance of trauma from mother to fetus/child throughout their lifetime and even across generations is a burgeoning research area. Evidence exists that maternal depression is associated with epigenetic changes that have life-long consequences in the offspring. *Identifying women at high risk for transgenerational transmission trauma in antenatal care offers a unique opportunity to break intergenerational patterns by offering targeted interventions.* Epigenetics adds a new and more comprehensive psychobiological dimension to the explanation of intergenerational transmission of **trauma.** Specifically, *epigenetics* may explain why latent transmission becomes manifest under stress. Evidence is emerging that some intrapartum and neonatal interventions may affect the neonatal immune reponses long-term, and perhaps intergenerationally. There are two main theories of debate in this area. The hygiene hypothesis is concerned with the effect of gut microbiome colonisation secondary to mode of birth and the effects of intrapartum interventions on the immune response and consequent health outcomes. The EPIIC (Epigenetic Impact of Childbirth) hypothesis is concerned with the effects of eustress and dys-tress on the epigenome secondary to mode of birth and intrapartum interventions. The outputs from this Action will contribute to developing the knowledge base about the epigenetic effects of the perinatal period on health outcomes.

A coordinated research effort to explore further the current and emerging findings relating to childbirth and atopic/autoimmune disease has the potential to maximise the understanding of the longer-term impact of childbirth practices. A recent Lancet Series has highlighted the need for balance between excessive levels of intervention (and associated morbidity) and the lack of appropriate intervention when it is needed. Birth involves a series of complex biological events which can be interrupted by intervening inappropriately and by failing to intervene when necessary. However, negative birth experiences are also associated with fear, pain, loss of control, discrepancies between expectations and experience, caregiver interactions and emotional support, to name but a few. Deepening our understanding of the role of epigenetics, biomedicine, neuro-endocrinology, neuro-psychology and behaviours in both the transmission of trauma and the development of resilience are central for evidence-based interventions to maximise the quality of the lives of families affected. The network will bring together researchers and clinicians from maternity care, the major branches of psychology, analytical biochemical chemistry and those working in the field of parenting and attachment to further explore the issue of transmission of stress and trauma in-utero and during the first year of life. Through the synthesis of available data, the Action will develop new knowledge on the prevalence of PTSD in pregnancy and postpartum and the impact on women, infants and families. The network will facilitate and accelerate advances to work already underway on the issue of negative/traumatic birth experiences and explore further the relationship between birth-related experiences and future pregnancies. The existence of traumatic stress and perinatal PTSD is beginning to receive acknowledgement; however, the Action is a long way from establishing a standard of care that is evidence-based, individualised and supportive. This Action will enable the study of negative/traumatic experiences of birth and perinatal PTSD mechanisms across cultures with a focus on the organisational and contextual factors that influence service delivery and in ways that impact on birth experiences, positively and negatively. Finally, the Action will focus on **developing sustainable health services**, by

exploring the impact of traumatic birth on healthcare costs and resource use, distributional health effects, and women's economic wellbeing, to help prioritise and inform policymaking.

1.2.2 OBJECTIVES

1.2.2.1 Research Coordination Objectives

This Action's network will consolidate, generate and disseminate evidence to optimise emotional and psychological outcomes after childbirth and maximise the translation of evidence to practice across Europe and beyond. This Action includes the following specific objectives: **1)** to develop a **common understanding/definition of birth-related trauma and PTSD** to inform guidelines and guide the development of future standards for maternity care, **2)** to understand the **factors that make women vulnerable to perinatal mental health disorders, particularly birth-related PTSD, 3) further develop/consolidate mechanisms/tools for assessment and screening, 4)** building and unifying an international, multidisciplinary network of researchers and clinicians around maternity care, perinatal mental health and early childhood development using biomedical, epigenetic, socio-cultural, health-organisational, economic, and neuro-psycho-social **approaches to tackle birth-related trauma** and the emotional and psychological sequelae for women, infants and families, **5)** coordinate current efforts to develop an understanding of the relationship between **traumatic stress in maternity staff and traumatic birth which cannot be achieved without international collaboration, 6)** advance our **understanding of the economic impact** of traumatic birth and inform the **development of sustainable, cost-effective services** for prevention, diagnosis and treatment**,** and **7)** increasing **consolidation and dissemination of results** to the research community, general public and policymakers.

1.2.2.2 Capacity-building Objectives

This Action will bring a cross-cultural context to understanding the practices that work best in particular populations and contexts to reduce birth trauma and optimise wellbeing after birth for current and future generations. Consolidation of a multidisciplinary network of researchers, clinicians, stakeholders (women/citizen/client/patient), NGOs and SMEs actively involved in the fields of birth-related trauma, perinatal mental health and PTSD and early childhood will facilitate the sharing of knowledge and best practices through workshops, conferences, Training Schools, linking with service users, publications and contributing to international guidelines and frameworks for care. This COST Action has several overarching objectives, This Action includes the following specific objectives to support the infrastructure and research: **1) building and unifying an international, multidisciplinary network of researchers and clinicians around maternity care, perinatal mental health and early childhood development** using biomedical, epigenetic, socio-cultural, health-organisational, economic, and neuro-psycho-social approaches to tackle birth-related trauma and the emotional and psychological sequelae for women, infants and families, **2) involving Early Career Investigators** (ECIs) for mentorship to build their research capacity and visibility and facilitate leadership development (ensuring the sustainability of the community into the future including connecting with women who have experienced birth-related trauma), **3) providing targeted know-how** in Training Schools (TSs) for the next generation of researchers and clinicians in the field through access to the network, **4)** facilitating **access to a global network** of researchers, clinicians and advocacy groups in the field, **5) promoting knowledge and exchange**, sharing resources and offering mentorship through providing Short Term Scientific Missions (STSMs) for students, researchers and experts in the field; and **6)** increasing **consolidation and dissemination** to maximise translation of research into practice, to bridge current theory-practice gaps bringing current to knowledge end users.

2 NETWORKING EXCELLENCE

2.1 ADDED VALUE OF NETWORKING IN S&T EXCELLENCE

2.1.1 ADDED VALUE IN RELATION TO EXISTING EFFORTS AT EUROPEAN AND/OR INTERNATIONAL LEVEL

The purpose of this Network is to create synergy between biomedical, epigenetic, socio-cultural, health-organisational, economic, and neuro-psycho-social approaches to tackle negative/traumatic experiences of birth and the emotional and psychological sequelae. The objectives outlined in this

Action, both research and capacity building, are only feasible through the funded collaboration of a broad, multidisciplinary, international group, which currently does not exist in Europe or worldwide. To date, the absence of a network has led to a state where knowledge is fragmented and scattered across disciplines, teams and countries. This lack of synergy has hindered progression in the field. The unique value of this Network is the potential to meet face-to-face so that experts and end users can collaborate on agreed objectives together through a coordinated collection and comparison of data and practices, standardisation of definitions, exchange of knowledge and practices, improving the implementation of what is known. The objectives will be achieved through a more coordinated approach to combining and analysing data and practices, standardisation of definitions, exchange of knowledge and practices, improving the implementation of what is known and bridging knowledge gaps. This Action will build on the work of two previous COST Actions in Birth, one to complete in November 2018.

The added value of this COST Action compared with previous efforts or existing efforts is that a community will be built around this emerging topic to develop the science through new and collaborative efforts supported by and coordinated within the network. Working collaboratively within the network will reduce fragmentation, stimulate innovation (jointly witj stakeholders/end users) and accelerate the progress of knowledge development in the field. Increased coordination will strengthen, organise and merge scientific knowledge in this field across Europe and internationally. The Action creates a multidisciplinary research environment, increasing expertise and competitiveness across Europe in this field. Based on the interest in this area, it is clear there is need to build a strong and growing sense of community amongst international researchers, clinicians and end users working in the field of birth-related trauma and perinatal mental health. The COST framework is best suited to widening common understanding of the field and pointing towards a more evidence-based, consistent model of service delivery. This Action will result in consortium building amongst birth cohort PIs to estimate the prevalence of birth-related trauma and PTSD in different countries and understand how the mismatch between expectations of birth and actual birth-related experiences influence reproductive health decisions. This lack of synergy has hindered progression in the field. The unique value of a network such as this is the potential to meet face-to-face so that experts collaborate on agreed objectives, through coordinated collection and comparison of data and practices, standardisation of definitions, exchange of knowledge and practices, improving the implementation of what is known and bridging knowledge gaps. Proposers are working on projects in the areas of **1) assessment and screening** for birth-related PTSD or vulnerability to perinatal mental health disorders, **2) experiences of birth and parent-parent, parent-child relationships and child outcomes**, **3) mechanisms of transmission of intergenerational trauma** related to mental illness, focussing on life history and situational factors such as socioeconomic status, support, maternal sensitivity and interventions to promote mental health, **4) the birth environment** and the impact of the organisation of care on birth-related experiences, **5) the impact of adverse events on practice**, **6)** understanding **traumatic stress** in maternity care staff and **7) focussing on prevention and intervention**. Several longitudinal cohort studies and intervention trials are underway across Europe. This Action has ensured a balance between ECIs and experienced researchers in order to offer mentorship and leadership to a new generation of researchers who will contribute in the long-term to Horizon Future goals. Through this Action, individual researchers and teams can now benefit from a larger, more coordinated approach, facilitating researchers to foster and coordinate their own and jointly developed research programmes into the future, and to contribute to **EU2020** policy goals. The Action members will collaborate on funding proposals and participate in future funding programmes in order to build on the scientific success of the network.

2.2 ADDED VALUE OF NETWORKING IN IMPACT

2.2.1 SECURING THE CRITICAL MASS AND EXPERTISE

Having a critical mass working jointly and in a coordinated fashion allows for more efficient and effective working and the accelerated exploitation of research outcomes as researchers and teams intensify links within the network. Consequently more opportunities to collaborate emerge. With increased output comes increased dissemination and the opportunity to close further the gap between science, policy makers and society. This network has been designed to become an important reference point for research on birth-related trauma. Consequently the Action will become the largest global network in this area. The network is composed of complementary and necessary expertise to address the aims and activities outlined in this Action. **This network** is a multidisciplinary collaboration of researchers, clinicians and SMEs from 24 countries representing COST member states, one cooperating state, ITCs and one IPC (Australia). New members, including those from Near Neighbour Countries (NNCs) and additional ITCs and IPCs, will be invited to join via the Action website and through research

collaborations already established with the proposers across Europe and beyond. Some proposers have contacts in New Zealand, Brazil and Canada specifically, who will be approached initially to join the Action. It is hoped that through snowballing, new members, not yet known to the team, will join the network. The network will facilitate the sharing of information, resources and expertise by increasing the critical mass of researchers, clinicians and SMEs in this area. This network is made up of **experts** from a **wide variety of disciplines** including, midwifery, obstetrics, psychology (various branches i.e. health, medical, prenatal, family studies, neuro, clinical, behavioural), psychiatry, paediatrics, neurology, neurobiology, social work, social policy, analytical chemistry, biochemistry, epidemiology, epigenetics, health economics, media and informatics. The participants have significant research experience in terms of the methodological expertise requires to achieve the aims of the Action but also in terms of project management, research supervision and capacity building, grant applications and dissemination. In addition, the research department structures within the respective institutions will also provide capacity to manage the Action.The Working Groups (WGs) have focussed and overarching aims across health sciences, psychology, clinical medicine, computer and information sciences, health economics, social work and policy, educational sciences and the industrial sector. It is anticipated that the integration of disciplines, knowledge end users, stakeholders and research teams through the network will **lead to the development of collaborative research projects** from maternity care, early childhood development and birth-related trauma which until now have been studied separately.

The network has also been designed with geographical spread in mind to ensure the influence of organisational contexts and cultures on birth-related trauma can be studied across a range of settings. Currently, the network has a strong representation of females in the membership at 84%. This is not unusual in this field and reflects the nature of the professions involved (midwifery, psychology, social sciences). However, the issue of gender balance will remain a standing item on the Management Committee (MC) agenda, to increase the proportion of males participating in this COST Action. The network will also support and mentor ECIs and those from ITCs enabling them to **spread excellence** and address the **issue of perinatal mental health and birth-related trauma, which is of global concern**. Spreading excellence is accelerated within a network, and **building a critical mass** allows for the generation of research questions to **shape research priorities for H2020** into the future. Finally, the development of expertise within the network allows for increased potential for members to access funding through **increasing their visibility**.

2.2.2 INVOLVEMENT OF STAKEHOLDERS

The opportunity to include stakeholders not yet identified is high. Stakeholders are likely to be located in **research-intensive universities and institutes, clinical practice, professional associations,** SMEs in **technology** and **service user organisations** (including pregnant and post partum women). **The inclusion of primary stakeholders is crucial to implementation**. Consequently; **many of the members who have close links with service user organisations at a national level, will begin by inviting new stakeholders to the Action. This Action will also facilitate communication between service users at a European and Worldwide level.** One of the first activities taken will be to develop an Action Website to generate attention towards the Action. The Website will host the aim and objectives of the Action and the members contact details and fields of interest and research profiles. The members will also circulate information on the Action to colleagues and other contacts to publicise as widely as possible. **Many of the members have close links with service user organisations at a national level, and this Action will also facilitate communication between service users at a European and Worldwide level.** The aim is to recruit through snowballing as many researchers, clinicians or other stakeholders as possible. The Website will have an open and closed section. The open section will also serve as a tool for communication and to connect the network more widely. It is anticipated that this will be one mechanism to attract ECIs and PhD students to this field. There will be a private (intranet) section within the Website so WGs can communicate with each other, share advances, explore and seek input on queries, generate discussion and debate etc. The Website will also host the outputs i.e. guidance documents, scientific papers, outputs from conferencs, Training Schools (TS), to share knowledge and advance our understandings. Similarly information on the WGs will also be included on OpenAIRE to maximise visibility and accessibility. These activities will lead to collaboration with other research groups and networks. Finally, throughout the Action, **the integration of relevant service users and groups will be achieved through personal contacts, via the Action website, with the support of our participating NGOs and through standard and innovative social media solutions**. Developing these connections is key to the strategic objective to reach out to relevant politicians/policy makers and affected families. The analytics-based technologies employed by our partner SMEs can be utilised to involve larger numbers of service-users in particular in this Action.

2.2.3 MUTUAL BENEFITS OF THE INVOLVEMENT OF SECONDARY PROPOSERS FROM NEAR NEIGHBOUR OR INTERNATIONAL PARTNER COUNTRIES OR INTERNATIONAL ORGANISATIONS

The advantages to ITCs may be obvious, i.e. counterbalancing the challenges of access to knowledge/expertise, funding and supportive leadership, developing strong research partnerships, involvement in the development of innovative national development strategies and health policies to improve care. Nevertheless, there are also benefits to NNCs and IPCs in participating in COST Actions. The cross cultural understanding of birth that all members will bring to the network will be invaluable in developing our global understanding of the contexts in which birth-related trauma occurs, and the sequelae that follow. There are clear advantages to the integration of research efforts at a **global level to avoid duplication of effort and enhance effectiveness**. Elimination/minimisation of duplication allows research programme leads/funders/policymakers to focus on remaining challenges. Collaboration facilitates the widespread application of evidence to **strengthen national development policies/strategies**, particularly if that evidence has been generated across a range of contexts and cultures. International collaboration and cooperation in research promotes and **enables researchers to become more globally integrated** and to **acquire the necessary leadership skills** (planning, budgeting, grant writing, project management etc.) through mentorship and participation. Collaboration on a wider scale also allows for the synergistic development and potential harmonisation of **research standards** globally, identifying excellence in research.

3 IMPACT

3.1 IMPACT TO SCIENCE, SOCIETY AND COMPETITIVENESS, AND POTENTIAL FOR INNOVATION/BREAK-THROUGHS

3.1.1 SCIENTIFIC, TECHNOLOGICAL, AND/OR SOCIOECONOMIC IMPACTS (INCLUDING POTENTIAL INNOVATIONS AND/OR BREAKTHROUGHS)

A unique advantage of this Action rests in the international team enabling the study of negative/traumatic birth experiences and its sequelae across cultures and contexts. The outputs will highlight the socio-cultural variations in practices and service provision across high and low-income settings across Europe, the impacts of which are currently unknown. Broadening the focus from maternity care to include the impact on the family is critical to developing our understanding of how birth-related experiences influence reproductive decisions, and inform the development of optimal ways to prepare couples for birth. The potential for innovation is high through the production of academic papers, guidelines, white-papers and utilisation of data from comparable datasets for the generation of new findings. Additionally, there is potential to develop data-driven models to predict outcomes by including evidence from epigenetics and biological responses to trauma and stress. These models can be further developed in future studies. By combining knowledge from each of the WGs, decision-analysis models can be developed and used to estimate the incremental costs and benefits of measures to improve outcomes. Technology-based approaches to mood monitoring and symptom management requires further exploration, and the use and impact of virtual reality (VR) technology as a means to improve communication between women and providers should be considered in future research. The creation of the network ameliorates the problems associated with a lack of synergy, leading to slow progress in the field.

In the short-term, this COST Action expects a number of scientific impacts from increased partnering, exchange of resources and the varied disciplinary approaches to tackling birth-related trauma and its emotional and psychological sequelae. The Action will contribute to **knowledge creation** through: **1)** Accelerated development of scientific knowledge through bringing together evidence that is currently disintegrated and dispersed across a wide range of disciplines and countries into an accessible format. **2)** A reduction in the duplication of efforts as systematic reviews can be generated through teamwork and datasets can be pooled to give access to researchers to larger samples, fostering collaborative research, to **transfer of knowledge** through: **3)** Increased partnering allows for researchers from academic institutions, clinical practice and SMEs to increase the visibility of their research to expert audiences. **4)** The consolidation of evidence, development of agreed definitions and conceptualisations, identification of particular characteristics that may respond to particular interventions and improved care generated and tested within new research projects. **5)** Multidisciplinary collaborations also foster innovation that leads to the development of research questions to shape future research projects and

priorities. **6)** These projects benefit significantly from the input from a range of multidisciplinary approaches, as each discipline complements the strengths and limitations of each other and to **career development** by **7)** Supporting the development of ECIs as they work with experienced researchers in the field on the development of new projects, moving the science forward. **8)** The Action will generate new wave of students highly motivated and well trained in the field. **9)** Encourage the participation of males in this female-dominated field. **10)** Widen access for service users to evidence and through collaboration with our technological partner SMEs to lobby politicians/governments/service providers/funders to shape future research and policy. **11)** Potentiate less research-intensive countries through partnering on projects and **12)** given the large number of participants (which will grow further), the members will re-examine and reconsider their existing practices, policies, guidelines based on the outputs from this Action to effect change.

In the long-term, this Action generates a number of impacts for the economy and society. The COST mission aligns with a cradle to grave health policy, and the evidence supports the link between maternal mental health, and a happy and healthy baby and family. **1)** Productivity and development in the field will be achieved through high impact publications. **2)** This Action brings together for the first time multidisciplinary researchers and clinicians from maternity care and early childhood with access to outcome measurements in the first six weeks (recorded in maternity care) with outcomes in the first year of life (recorded in community and early childhood settings). **3)** Production of white-papers/guidance documents for policy makers, to develop systems to increase the availability of equitable maternity care and the prevention of negative/traumatic birth-related experiences and perinatal PTSD through the identification of key components in the birth environment that empower, to mitigate those systems that fail to support women and families adequately. **4)** Recommendations for education and training of healthcare providers in trauma-informed care as a direct approach to prevention will be made. **5)** Consensus document on how maternity and early childhood services can be integrated to reduce levels of fragmentation and develop a more comprehensive approach to supporting women and families following a traumatic experience or the development of PTSD that may become policy in the future. **6)** The economic burden of negative/traumatic birth-related experiences will be explored by examining direct and indirect costs and resource use associated with traumatic birth. The suitability of conventional health economics approaches to conceptualising the intergenerational consequences of trauma will be critically evaluated, and used to inform the development of a robust analytical framework that produces policy-relevant information to drive the development of sustainable services. **7)** The analytics-based technology used by our partner SMEs facilitates the provision of valuable and accurate information to service users, involving larger groups in this Action. Technology to monitor mental health symptoms is acceptable to service users and may in the future become a feasible component of clinical practice, which, in the medium and long term, will impact on the current state of the art and optimise best practice in the field. **8)** Finally, expertise and competitiveness in European researchers are accelerated through increasing the number of high impact publications, theory developments, development and validation of interventions, recommendations and guidelines for best practice to optimise outcomes for women, infants and families.

3.2 MEASURES TO MAXIMISE IMPACT

3.2.1 KNOWLEDGE CREATION, TRANSFER OF KNOWLEDGE AND CAREER DEVELOPMENT

This network will contribute to **knowledge creation** through key putputs such as publications, guidance documents, consensus statements etc. which are easily accessible for all. The network will facilitate the sharing of information, resources and expertise by increasing the critical mass of researchers, clinicians and SMEs in this area. This network is made up of **experts** from a **wide variety of disciplines** including, midwifery, obstetrics, psychology (various branches i.e. health, medical, prenatal, family studies, neuro, clinical, behavioural), psychiatry, paediatrics, neurology, neurobiology, social work, analytical chemistry, biochemistry, epidemiology, epigenetics, health economics, media and informatics. It is anticipated that the integration of disciplines and teams through the network will **lead to the development of collaborative research projects** from maternity care, early childhood development and trauma related to childbirth which until now have been studied separately. Knowledge transfer will occur predominantly through the collaborative efforts of the team and through multidisciplinary working.The network will also support and facilitate career development of ECIs and Network members from ITCs, enabling them to **spread excellence** and address the **issue of perinatal mental health and birth-related trauma, which is of global concern**. Spreading excellence is accelerated within a network, and **building a critical mass** allows for the generation of research questions to **shape research priorities for Horizon**

Future. Finally, the development of expertise within the network allows for increased potential for members to access funding through **increasing their visibility**.

3.2.2 PLAN FOR DISSEMINATION AND/OR EXPLOITATION AND DIALOGUE WITH THE GENERAL PUBLIC OR POLICY

The Action's scientific programme focuses on the application of knowledge and practice synthesis to establish what works, for whom and in what circumstances. **Dissemination activities** are critical to maximise the impact of research on practice. A **Dissemination Coordinator (DCO) will be** responsible for managing communications, organisation of events and the sharing of outputs through activities and venues such as the Action Website, Open Access publications and social media platforms to advertise conferences and highlight key papers/findings making the outputs available to the public. Deliverable1: A **Dissemination Strategy (DS)** will be developed and reviewed annually and will include activities to target a range of audiences such as academia, research, education, clinical practice, service users, policy makers and governmental departments. Through member's local technology transfer offices and our respective universities, the communications/press departments will be utilised to maximise media coverage. Maximum use of member's profiles will be made in research sharing platforms to profile the Action activities and include new participants. Deliverable 2: The Action will have a **dedicated website** as outlined in 2.2.1. The timetable of activities such as WGs, outputs, TSs, Short-Term Scientific Missions (STSMs), opportunities for ECIs, meeting dates and conferences etc. will be hosted here for ease of access. A list and links to publications and full text papers/presentations not subject to copyright restrictions (open access) will be available openly for all. Deliverable 3: Yearly updates and revisions to dissemination plans will be undertaken to ensure **major deliverables** from the WGs such as **systematic reviews, scientific papers, guidance documents/Position Papers, training materials, care pathways** etc. will be freely accessible in line with the main purpose, to exchange, enhance and broaden the understanding of negative/traumatic birth experiences, perinatal mental health and PTSD both peripartum and beyond. The final conference papers/proceedings will be available as open access. A social media strategy will be developed by the Dissemination Committee (DC), coordinated by the DCO with local dissemination partners (to be agreed at the kick-off meeting), with the dissemination plan/strategy for the whole Action developed and agreed by end of Year one. With technological support from our partner SMEs, the Action will be able to use a variety of channels to reach and involve **women and families**. It is important that the Action focuses on how and when to communicate to the users in the planning of strategy focusing on engagement. The Action will utilise a structured combination of Private, Closed and Open social media platforms for clinicians, researchers, and parents. Alongside this Private and Open Twitter handles will be managed in order to achieve appropriate outreach. Managed YouTube and LinkedIn channels will reach out to clinicians, researchers, and parents. Regular video uploads reach out as widely as possible, showing 10 times more shares and views. This is a powerful tool to reach parents and communicate effectively through this COST Action. Participating members have contacts with service user groups nationally which can be utilised to share 'what works' principles as well as webinars, lobbying professionals, NGOs and policy makers with responsibility for setting EU standards.

4 IMPLEMENTATION

4.1 COHERENCE AND EFFECTIVENESS OF THE WORK PLAN

4.1.1 DESCRIPTION OF WORKING GROUPS, TASKS AND ACTIVITIES

The Management Committee (**MC)** will be responsible for the election of Action leadership positions, coordination of the Action, Financial management, reporting and monitoring progress in line with the Memorandum of Understanding (MoU) and specific managerial functions such as creation/dissemination of knowledge, website development and management and Intellectual Property policy. The MC, the committee with decisional power, will be established at a kick-off meeting with the required representatives from participating countries, and will coordinate the scientific and administrative actions. The MC will hold biannual meetings (at least one face-to-face). The first meeting will address the election of representative to key leadership roles, Action Chair (AC) and the Action Vice Chair (AVC) of the network, Grant Holder, each of the Working Group Leaders (WGLs) and WG Vice Leaders (WGVL) plus the STSM, Early Career and Dissemination Coordinators and will reserve up to 50% of these roles for members from NNCs or ITCs. The MC Chair will outline developments up to and including the details of the MoU so that all can contribute effectively to the WGs to achieve the aim of this Action from the get go. During the kick off meeting the MC will elect the following: The Action Chair (AC) and

the Action Vice Chair (AVC), the AC holds responsibility for coordinating all MC activities. The WGLs and Vice Leaders (WGVLs) will coordinate the WG activities and design an individual detailed plan for each WG in collaboration with the MC, including follow up of the allocated budget on an annual basis. Members of the MC must also be a member of at least one WG. The MC will ensure the results achieved during the Action, presented in regular reports to the COST office and annually at the MC face-to-face meeting. At the first MC meeting the following committees will be established: The Training Committee (TC), Dissemination Committee (DC), Website Committee (WC), Coordination Committee (CC) and the Steeriing Committee (SC). **The SC** will be made up of the Action Chair, Action Vice-Chair and five WG Leaders- mandate to be decided at the first MC meeting. The SC will meet face-to-face annually and virtually when necessary and will be responsible for direct and daily business of the Action. The committees will submit annual reports to the MC to monitor and ensure progress in line with the Action objectives. Adjustments will be made contemporaneously as necessary. The MC will be responsible for gender balance in all committees and activities. Consequently, the issue will remain a standing item on the MC agenda, and gender will be considered when inviting new members and allocating places in TS and STSMs. Decisions made at the SC must be approved by the MC.

The Working Groups will be formed and WG Leaders (and Vice-Leaders) will be appointed at the first MC meeting. A detailed Work and Plan for the first Grant Period (GP)and will be developed at the first MC meeting. One day will be dedicated to the process whereby WGLs can put forward their plan, the networking model chosen, current and planned activities, including a discussion on how the relationship of cross-disciplinary ideas to one another and synergies across WGs on particular activities can be achieved. The GP goals for networking activities for the remainder of first GP will be agreed and consolidated further at future meetings in the first GP. A Coordination Committee (CC) will be set up to collate and share outputs across all WGs. The CC will work with the DC on dissemination.

The Training Committee (TC) will oversea a number of activities namely the organisation of the TSs, STSMs (with a dedicated STSM coordinator), and the WG workshops. The organisation of same will be coordinated by the MC and WGLs. The TC will have a dedicated STSM coordinator managing and scheduling the mobillity of ECIs and ensuring they present their research at the TSs and conferences.

The Dissemination Committee (DC) will have within it a Website Committee (WC) to ensure outputs are available as widely as possible. The DC will be responsible for the dissemination of reports and papers generated by the Action to the public, media, research community and policy makers. In designing a strategy (to be reviewed annually) a discrete plan for the use of social media will be developed, coordinated by the dissemination coordinator (DCC) with local dissemination partners. The DC will be centrally involved in ensuring the Action is keeping to schedule, identifying threats, ensuring communication mechanisms are effective. The DC will also have an Early Career Coordinator (ECC) to support WGLs in showcasing outputs from ECIs successes. The DC will also identify (in line with the agreed dissemination plan) opportunities to engage with service users, clinicians, other COST Actions/research groups, policy makers and will have responsibility for dissemination generally. Communication tools include the intranet, Skype, or similar. The DC will oversee IP and GDPR issues in line with COST Implementation rules.

WG1: Optimising the birth environment to reduce/prevent negative/traumatic birth experiences.
WG1 **aims** to conceptualise negative and traumatic birth-related experiences in order to achieve positive experiences of birth.

TASKS/ACTIVITIES:
T1.1 Using a multi-method approach (combining qualitative and quantitative evidence) to gain an in-depth understanding and develop definitions of negative and traumatic birth-related experiences (see Deliverable 1.1)
T1.2 Explore **women's and partners' subjective experiences of childbirth** through secondary data analysis (see Deliverable 1.2), to inform development of a **standardised and validated tool** to measure the perception of birth experiences and its influencing factors (see Deliverable 1.3)
T1.3 Survey women who have experienced a positive or a negative/traumatic birth to **develop a deeper understanding of the role of interpersonal interactions on the birth experience** so effective systems for prevention and intervention can be developed (see Deliverable 1.4). This survey is underway in a number of member countries and will extend to others in the Action over Year 1. Participants research activities such as those described in 1.4 & 2.1 will not be undertaken using COST research funding.

WG2: Understanding how culture, organisational structures and regional differences in service provision influence childbirth experiences. WG2 **aims** to identify key factors to maximise effective translation of research to practice by looking at how the structural and organisational aspects of the environment may influence women and partner's experiences of birth, enabling an understanding of the context and improve prevention.

TASKS/ACTIVITIES:
T2.1 Using a multi-method approach (combining qualitative and quantitative evidence) to gain understanding of the role of care-provider interactions in positive and negative/traumatic birth-related experiences (see Deliverable 2.1).
T2.2 Self-report **survey of clinicians' experiences of interpersonal interactions in the birth environment** to inform our understanding of the now recognised issue of traumatic stress in maternity care staff and how it may impact on their practice (linked with task 1.3 in WG1) (See Deliverable 2.2)
T2.3 Analysis of the review and survey findings combined to identify key factors **that can be ameliorated when shortcomings in communication are present** resulting in negative birth experiences (see Deliverable 2.3).
T2.4 Documentary analysis of national and regional approaches to service provision/models of care in a sample of countries (e.g. with cultural and organisational differences) (see Deliverable 2.4).
T2.5 Focus Group interviews (clinicians and service users)across a sample of countries to identify educational/training needs and develop an appropriate toolkit to ensure care providers are empowered/trained to communicate sensitively (see Deliverable 2.5).
T2.6 Write a position paper/guideline for policymakers for care provider training to promote positive, healthy and respectful practices that empower wellbeing for all concerned (see Deliverable 2.6).

WG3: Short and long-term impacts on women, infants, and family relationships. WG3 **aims** to develop the body of knowledge about predictors, sensitivity, persistence and the burden of illness associated with short and long-term consequences of emotional and psychological outcomes (in particular PTSD) on women, on reproductive health decision-making and on the quality of parent-infant relationships (from the parent's perspective).

TASKS/ACTIVITIES:
T3.1 Prevalence estimate of PTSD (secondary data analysis) as an outcome after birth (PIs in the network will pool data from several studies using a range of tools employed to screen for and assess perinatal PTSD, similar to work on trauma and PTSD in the WHO Mental Health Surveys in other populations) (begin Year 1, complete the analysis and prepare results for high impact publication Year 3) (see Deliverable 3.1).
T3.2 Secondary data analysis from Birth Cohort studies and maternity information systems/reports and survey in T1.3, exploring the link between parents expectations of birth and experiences of birth that are positive and negative/traumatic to deepen our understanding of how a mismatch with expected and actual **birth-related experiences influence reproductive health decisions** (see Deliverable 3.2)
T3.3 Analysis of subgroup fndings from survey in T1.3 to explore with parents the **emotional costs of having less children than desired** (question in survey in T1.3) (see Deliverable 3.3).

WG4: Deepening our understanding of the intergenerational transmission of trauma through biomedical and epigenetic research. WG4 will collaborate with WG3 by using a multidisciplinary range of approaches to deepen our understanding of the effects of trauma exposure in childbirth by integrating individual differences (previous exposure to trauma etc.). WG4 will explore the role of epigenetic alterations and underlying biological and biochemical mechanisms in perinatal mental health and infant development, to underpin screening and develop interventions for those affected. Using data from comparable national datasets (accessible to the PIs), biological factors such as the microbiome, telomere length, cortisol response patterns, vasopressin, role of oxytocin are related to transition to motherhood, perinatal mental health and infant outcomes, attachment and maternal sensitivity.

TASKS/ACTIVITIES:
T4.1 To develop a **statistical model** to predict outcomes across the lifespan by using longitudinal data on community-based samples and those with poor pregnancy outcomes (preterm, stillbirth, intrauterine growth restriction (IUGR)). These datasets will be interrogated for links with the outcomes listed above. The evidence on stress hormones, vasopressin and oxytocin on individual differences as predictors of perinatal mental ill health, in pregnancy/birth and the child's temperament, attachment/empathic responsiveness in mother-infant dyads will be synthesised and compared with the findings from other cohort studies measuring the long term health effects of placental epigenetic signatures resulting from

exposure to a range of stressors in pregnancy, (commence Year 1, complete Year 3, and submit for publication) (see Deliverable 4.1).

T4.2 Secondary data analysis from Birth Cohort studies and maternity information systems/reports to identify effects from stressors in pregnancy to **develop future projects** to explore the potential to develop biologically based outcome indicators, so that future interventions could be examined based on their impact on underlying epigenetic and biological mechanisms, with necessary recognition of appropriate Horizon Future calls (see Deliverables 4.2 and 4.3).

WG5: Health Economic Analysis: WG5 will explore the impact of traumatic birth on healthcare costs and resource use, distributional health effects, and indicators of women's economic wellbeing such as labour force participation and earnings. This will be done through three parallel strands: **1)** Analysis of country-specific data on the **economic burden of trauma in childbirth**, the cost-effectiveness of interventions to identify, prevent and treat trauma, and **socioeconomic disparities** in health outcomes (commence Year 1, complete Year 2, submit for publication Year 3); **2)** Synthesise available evidence on **healthcare utilisation** patterns of affected women**, health-related quality of life,** and **long-term health consequences** for mothers, children and families (commence Year 2, complete Year 3, submit for publication Year 4**); 3)** Critical appraisal of conventional approaches to economic analysis of trauma and PTSD in childbirth, and the development of a robust analytical framework that captures the wide-ranging impact of traumatic birth, to drive evidence-based policymaking (commence Year 3, submit for publication/develop white paper Year 4); **4).** Use this work as the basis for the development of a grant application for an economic analysis alongside a future primary study to support the implementation of safe, effective and sustainable services.

TASKS/ACTIVITIES:
T5.1 Analysis of the **economic burden and distributional health effects** of traumatic birth.
T5.2 Systematic review of the impact of trauma on future reproductive decisions, preferences for obstetric care in subsequent births, and intergenerational effects on children and families (with WG3).
T5.3 Critical appraisal of methods for capturing the clinical and economic consequences of trauma, and development of a **robust analytical framework for conducting economic evaluation** in this area (commence Year 3, submit for publication/develop white paper Year 4.) (see Deliverable 5.3 and 5.4).
T5.4: Protocol for an economic evaluation to run alongside a future clinical study (with WG4).

Summary: All WGs will collaborate to synthesise findings on ways to improve institutional capacity and training programmes for individualised and supportive care to maximise positive birth experiences and prevent/reduce provider induced birth-related trauma. Each WG will focus on resolving theoretical, conceptual and methodological issues of relevance in translating knowledge to practice. The WGs are structured and separated to address the main aim and serve merely to organise the scientific programme. The synergies between the groups means there is a high level of flexibility to facilitate the inclusion of other disciplines and perspectives not foreseen at the preparation stage of the Action.

4.1.2 DESCRIPTION OF DELIVERABLES AND TIMEFRAME

WG1: Optimising the birth environment to reduce/prevent negative/traumatic birth experiences.
MAJOR DELIVERABALES for WG1- three papers and one validated tool
M1.1: Scoping Review (**Y**ear 2 **Q**uarter 1)
M1.2: Scientific paper on qualitative experiences of birth trauma (Y2 Q4)
M1.3: Standardised and validated tool to measure perception of birth experiences (Y3 Q3)
M1.4: Publication of survey results of women's experiences of interactions with caregivers (Y3 Q4)

WG2: Understanding how culture, organisational structures and regional differences in service provision influence childbirth experiences.
MAJOR DELIVERABLES for WG2- Four papers, education/training toolkit, position paper
M2.1: Scoping Review (**Y**ear 2 **Q**uarter 2)
M2.2: Scientific paper (survey results) on traumatic stress in staff (Y2 Q4)
M2.3: Scientific paper on the factors open to amelioration in care-provider interations (Y3 Q3)
M2.4: Policy analysis (Y3 Q4)
M2.5: Develop and education/training toolkit (Y4 Q2)
M2.6: Position paper/guideline for policy makers (Y4 Q4)
WG3: Short and long-term impacts on women, infants, and family relationships.
MAJOR DELIVERABLES for WG3- Three scientific papers
M3.1: Scientific paper on prevalence estmates (**Y**ear 3 **Q**uarter 2)

M3.2: Scientific paper on expectations and experiences of birth (Y3 Q4)
M3.3: Scientific paper on emotional costs of having less children than desired (Y4 Q1)

WG4: Deepening our understanding of the intergenerational transmission of trauma through biomedical and epigenetic research.
MAJOR DELIVERABLES for WG4- Statistical model, two scientific papers, a grant application
M4.1: Scientific paper on outcomes and biological factors (**Y**ear 3 **Q**uarter 4)
M4.2: Scientific paper on stressors in pregnancy and longterms effects (Y4 Q1)
M4.3: Grant application prepared (Y4 Q3)

WG5: Health Economic Analysis.
MAJOR DELIVERABLES for WG5- Economic analysis framework, 2 scientific papers, one grant application prepared
M5.1: Analysis of the economic burden of perinatal and birth-related trauma (**Y**ear 3 **Q**uarter 1)
M5.2: Theoretical/Position paper on existing methodological approaches, and development of an comprehensive analytical framework for economic evaluations of traumatic birth interventions (Y4 Q2)
M5.3: Grant application for an economic evaluation alongside a follow-on clinical study (Y4 Q3)

The participants have significant research experience, methodological expertise project management, research supervision for capacity building and in writing grants and publications. Research department structures within the respective institutions will provide additional capacity to manage the Action.

Management deliverables and timeframe	**Dissemination deliverables and timeframe**
D1: Dissemination Strategy (including social media) developed end of Year 1 reviewed annually. **D2:** Website (with WG outputs, reports, minutes, TS materials, call for STSMs, gender balance, dissemination activities) **D3:** Monitoring and ensuring WG outputs are on schedule (annually at MC meeting/report). Workshops for WGs Month 6, 12, 18, 24, 30, 36, 42, 48 **D4:** Three Training Schools **D5:** Materials generated from the Training Schools available through the website. **D6**: Two conferences to disseminate and profile the Action further and build on the Network **D7:** Two progress reports and Final Report	**MD1:** Training Schools 1-3: Month 21, 33, 39 **MD2:** STSMs: Month 12, 24, 31, 39 **MD3:** Major deliverables for WGs: Month 12, 24, 36, 48 **MD4**: Conference- disseminate outputs to date, encourage new members to join Month 24 **MD5**: Final conference: Month 45

4.1.3 RISK ANALYSIS AND CONTINGENCY PLANS

Risk assessment	**Solution**
Members do not complete SRs, publications etc. on time	Ensure templates are clear. Agree dates in advance. Have a reminder system so members can seek assistance. Circulate and identify difficulties early
Challenges with data available being too disparate, incomplete in terms of what is captured nationally/locally	Focus on key common or differentiating factors
Difficulties in engagement with clinicians or policymakers (and funding to meet challenges of providing effective care in practice)	Minimise time required for such groups. Ensure the value of the outputs. Continued and sustained lobbying for standards of care with emphasis on the value of a paradigm shift from a curative to a preventative model. Ensuring the economic argument to support effective care is communicated clearly.
Low interaction between participants and WGs	Wide range of participants, many experienced with working within previous Actions. The MC, WGLs and WGVLs will discuss quarterly participation in order to act early, good document and depository database management to ensure effective communication
Low impact of dissemination activities	Collaboration across disciplinary fields should be a mitigating factor, importance of TSs and STSMs for ECIs and PhD student (increasing membership) i.e. in ITCs. Responsibility-Early Career Coordinator.
Low stakeholder communication	COST Website with meeting schedule and outputs, OpenAIRE, use of technology for dissemination, members links with NGOs. STSM & DC

4.1.4 GANTT DIAGRAM

COST Action Devotion Network	Project Year 1				Project Year 2				Project Year 3				Project Year 4			
Calendar Dates	Start date-												End date-			
Quarters	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Milestones (M)																
Management Activities																
Kick off meeting -MC meet and coordination of all WGs	M															
D2 Website and profiling of the Action			M													
Depository database (within the website)				M												
MC/TC/DC//WC/SC/CC meetings		M		M		M		M		M		M		M		M
D3 WG meetings and minutes		M		M		M		M		M		M		M		M
Workshops for WGs		M		M		M		M		M		M		M		M
D4 Training Schools							MD1				MD1		MD1			
Short term scientific missions (four in every 12-month period)				MD2				MD2			MD2		MD2			
D7 Short Progress reports (PR), Final Assessment Report (FR)				PR					PR							FR
Work Groups 1-5 Deliverables and milestones																
WG1: Three scientific papers and one validated tool					M1.1			M1.2			M1.3	M1.4				
WG2: Four scientific papers, Toolkit, Position paper						M2.1		M2.2			M2.3	M2.4		M2.5		M2.6
WG3: Three scientific papers										M3.1		M3.2	M3.3			
WG4: Statistical model, two scientific papers, grant application.												M4.1	M4.2		M4.3	
WG5: Economic analysis framework, two scientific papers, one grant application prepared									M5.1					M5.2	M5.3	
Dissemination																
D1 Dissemination strategy (including social media)				M												
D5 Develop and add Materials from Training Schools							MD1				MD1		MD1			
Major deliverables for WGs				MD3				MD3				MD3				MD3
D6 Conferences								MD4							MD5	