NewMind Inaugural Launch Event

Monday 16th June – Tuesday 17th June 2014

Output from Table 1

Workshop 1: Intervention Scenarios for Developmental Disorders

Adult mental health issues can be seen in childhood, and therefore we need to consider: Prevention, Wellbeing & Diagnosis and treatment.

Initial Discussion:

The group discussed the issue that parents and children do not know "what is normal" and because of this they do not know whether the condition is severe enough to seek help or who to approach for help. The group concluded that social services need a strong presence and that perhaps a bench mark should be introduced so that symptoms too can be operationalised in a 'normal' context. There should also be a focus on pre-school diagnosis as well as making teachers more empowered – could include as part of their teacher training.

5% of children have ADHD and are given stimulate drugs, but is there an alternative to this?

It is important to ensure that observations take place in a realistic environment rather than a lab, as well as in a non-invasive way, in order to detect when participants attention drops and what changed in the environment which may have caused it.

Initial Ideas

- Apps and gaming solutions to measure performance and outcome, to provide objective measurement of their symptoms
- Could look at data analysis of Big White Walls website, tracking participant's activity and what they are viewing on the website.
- Could also develop an app to provide feedback which has a closed loop system.
- Have a mechanism to act as an identifier for social pointers, for example the user receives an indicator regarding speech volume, gaze.
- Look further into the similarities between ADHD and Dementia patients.
- Find a way to work towards every child's needs rather than classifying some as ADHD, could be considered "overactive".
- Use technologies such as Google Glass or Kindle to self-monitor and collect information to analyse about patients' everyday lifestyle.
- Start analysing our online data such as social online data, what we are doing, buying, googles etc. or use public data, and consider what this could show about us in 20 years' time as well as the patterns that can be detected.
- Create a baby bracelet to monitor every child's interaction from birth.
- Relating to Treatment and Intervention could use electrode technology as a support for cognitive enhancement in ADHD and as a way to measure ADHD lapses as well as provide a

closed loop scenario through personalise feedback ie you can choose who receives the feedback: child, parents, teachers, clinicians, (similar to using for seizure prediction for epilepsy sufferers).

Ideas Taken Forward:

1) An architecture for games for adolescents for objective measurement of symptoms and outcomes. Need to consider the engagement and psychological requirement.

2) Baby Bracelet to monitor every child from birth in their daily lives providing flexible monitoring of everyday lifestyle and behaviour for example how the child plats, detects abuse, detecting unmanageable arousal in ADHD and provide feedback. Can also analyse the data collected at a later stage.

Important to consider the ethics of such technologies in terms of social acceptability and clinical resistance against the benefits of the technologies.

Workshop 2: Intervention Scenarios for Mood & Affective Disorders

As a starting point, the group recognised that we need to understand and treat mood and affective disorders more effectively such as through the use of e-therapists. There is a need to consider self-management, motivation and the use of social media as a sponsor source. It is also important to integrate care for those who suffer from mood and affective disorders as well as other long term conditions.

Initial Ideas

- A way to integrate services for both mood and affective disorders and other complex issue such as co-morbidity and diabetes – more holistic services, have one interface for patients to interact with.
- To look at ways to detect early warning signs and promote self-awareness of depression so that people can manage their mood themselves.
- A digital personal assistant to monitor mood changes, for example through use of language/facial expression and offer advice and feedback using gentle prompts/reminders.
- Using non-pharmaceutical methods such as CCBT and other technological interventions.
- Improving social support either collaboratively through online forums, or providing motivational quotes/ phrases through an app to the patient.
- Use of sensors as a non-verbal or visual intervention.
- Using TCS / TDCS, although at the moment quite expensive to use.
- A way to track mood changes that will trigger an intervention when a change is detected, could include referring gback to psychiatrist.
- A personalised app to aid in goal setting for the individual / creating a personal tool kit to encourage self-worth therapy. Could also use avatars.
- Increasing wellbeing through medication adherence which also closes the loop and reports back to clinicians, providing feedback to the patient. (Clintouch and Careloop mentioned).

Ideas Taken Forward

1) Create a platform for advance research on linking between data sets from long-term conditions and mood disorder - compare longitudinally/horizontally to detect any trends between LTC's and Mood disorders.
2) A digital personal assistant to monitor mood changes, for example through use of language/facial expression and offer advice and feedback using gentle prompts/reminders.

Workshop 3: Intervention Scenarios for Dementia

The group discussed how it is important for elderly people to feel supported and not feel like a burden on their family, friends or care workers and therefore technologies that offer even the smallest of independence with a daily task should be seriously considered, as well as technologies such as telecare, to reduce the burden on health and social care workers. The groups ideas formed into 4 main areas; reminders, monitoring, reassurance and social inclusion.

Initial Ideas

Reminders

- Mobile phone app that allows you to check if important tasks have already been completed, for example locking the front door, and if such a task has been forgotten the app can lock the door for you.

Reassurance

- A "who's who" camera or google glass system to provide a quick reminder of visitors to the patient's home, providing a biography, photo & role description of the visitor to the patient. This would help patients with recognition and put them at ease with regards to who they are letting in their home.
- Using old technology to hide the new technology, as well as using technology that patients can learn to use each time and therefore do not have to remember how to use.

Monitoring

- Monitor an individual (movement, facial expression etc.) to identify when the patient is doing well or not, by finding correlations with environment/ circumstance which lead to poorer performance. Using a GPS enabled device that conducts continuous ambient monitoring and can identify patterns and then raise an alert when the person digresses from their normal pattern.
- Using sensor technology on appliances such as kettles, ovens and fridges – 'smart appliances' to monitor the daily use by the patient and alerts a carer when no interaction has been made.
- Biofeedback system to manage comorbidities for example chips embedded in medicines to monitor medication adherence, or the use of implants to conduct an analysis of patients sweat, blood, urine ect and feedback results to the clinician.
- Integration of objective monitoring/ diagnosis with subjective conversation and tailored services.

- A way to avoid having to attend doctor's appointments- use of technology for in-home assessments, provide an infrastructure to connect people with carers within their home.
- Personalised toolkit to support symptoms, e.g. praxis, apathy, memory etc.
- People's speech/ behaviour etc monitored automatically to identify dementia.
- Cognitive improvement therapies and TCS therapies to monitor a patient's mental activeness.

Social Inclusion

- Care homes to be designed like homes in the 1950's, 60's, 70's as appropriate where residents can reminisce with old films and photographs.
- Setting up a virtual reality in which the patient can return to a past environment that they recognise, where they can interact with people that they knew.
- Making sure that the dementia sufferers know that they are supported, a simple device where they can ask for company and to be listened to.
- A virtual reality to create trips to galleries, museums or attractions.
- Providing live streaming of family events or holidays into a person's home so that those unable to travel can still share in important events like weddings.
- Having peer support groups for patients to attend or programmes where patients can interact with young people / children to teach their skills to.

Ideas Taken Forward

1) Social Inclusion: Developing technological solutions for all dementia patients to stay socially active within their society.
2) Reminder & Reassurance: An AI based personal assistant that can be trained by the patient, before the patient deteriorates, to look after a patient in the way that they want. The PA would be able to make an informed decision influenced by how the patient would have acted in various situations and be able to prompt the person as they begin to decline with dementia.
3) Monitoring: Continuous, longitudinal monitoring of patients, including the use of implants as biomarkers, monitoring activity via GPS and medication adherence, which will alert carers when the patient veers away from their norm.

Workshop 4: Intervention Scenarios for Serious Mental Illness

The group considered the need to focus on more preventative and intervening approaches that can be applied before the regular symptoms of serious mental illness occur. It was discussed that the key to success is to manage multi-agency complex cases within a single portal, taking data from all agencies for example cloud database management. It was also recognised that functional outcomes are most important and that self-management should be encouraged.

Initial Ideas

- Taking established apps, such as Touchnow and developing further as an app for people at high risk of developing schizophrenia rather than for those already suffering from the illness.

- A sleep tracker app which can detect when you are in a deep sleep and only wakes you when you're not in deep sleep.
- Monitoring mood and music to build a database of songs that have been matched to evoking certain emotions in people, where patients can choose what music they listen to depending on their state of mind. Can also use music to control auditory hallucinations and understand how this works.
- An app that can scan bar codes of food items whilst at the supermarket which will provide advice on what to buy and eat to keep a healthy diet. Or that can scan a photo of your potential dinner and provide guidance on how to make it healthier.
- A way to monitor if people have smiled at those they have interacted with and how many they interacted with within a day with feedback to therapists to improve their "niceness".
- Mobile TC's to improve e.g. memory function, track personal biorhythms-circadian rhythms and respond to cognitive load and depression.
- Real time Data analytics and Machine learning to detect relapse signals and deliver intervention. Could be dynamic and responsive. Learn behaviour and react to stimuli for example by using an array of sensors to monitor activity/ where people go/ patterns etc.
- Google glasses with camera and voice recording. Personalise for colour aura to show person's state of mind and analyse facial expressions. Record and analyse interactions with others and provide feedback.

Ideas Taken Forward

1) Maintaining wellbeing through virtual communities; an app to get people to perform better in physical activity by using competition, putting them groups versus each other ie Manchester Utd fans vs City fans, vegetarians verses meat eaters etc. Can also include personal goal setting and ways to achieve them, e.g. 90 minutes of activity per week and social networking with peers as a support mechanism.
2) Virtual reality/ avatars/ virtual psychotherapist with good alliance with the patient which create social environments, for example, train travel and provides advice on your reaction in particular circumstances.

Output from Table 2

Workshop 1: Intervention Scenarios for Developmental Disorders

Initial Discussion:

The group discussed a potential system that enabled the early detection of conditions such as ADHD and ASD. Intervention in schools would be more common and early diagnosis would become a reality thanks to interviews/ observation in schools and questionnaires.

Possible outcomes of such a scenario included prevention of unnecessary hospital and prison admissions and reducing the number of students dropping out of school.

The importance of patients understanding their own condition was also discussed, along with the frequent reluctance to engage with professionals/authority and the high rates of ADHD found amongst prisoners.

The difference between medication vs. behavioural treatment was discussed. Is behavioural treatment really long term support if it comes in the form of a 6 week course?

Ideas Taken Forward

Scenario: Integrated socio-health surveillance (interaction with services/ integration of information) Self-care would become more prevalent. Individuals would receive personalised feedback so that they can keep their own conditions in check (as they now have a greater understanding of it.)

Scenario: Multifactorial and temporal mathematical personality models would give a complete picture of the patient/ the patient's movement etc. Data such as patterns of arousal would be used and factor models would depend on: genetics/ environment and individual experience. Thanks to this system, early intervention (along with detection of significant change) would be possible. This would give us an opportunity to understand the effects of environment on the individual.

Scenario: A warning system/ wearable device to help prevent stressful situations for the patient by limiting their sensory experience. This would include an aid for communicating the patient's emotions and understanding the emotional state of others (in real-time.) This system would be configurable/ personalised and would empower the patient by helping them to interact with the world.

Workshop 2: Intervention Scenarios for Mood Disorders

Initial Discussion:

The group discussed the importance of "the customer drives the product." This would mean kitting out the patient's house to suit their needs and to measure relapse effectively. The group discussed the possibility of self-managed care for mood disorder patients: depression sufferers are generally keen to seek help whereas during a "mania" stage a patient is less likely to record their condition/ manage their own care.

The importance of intelligent monitoring was also mentioned, as a single intervention (which is often the case) is not as effective, so we need a more sustained approach.

The group also talked about the potential use of Text Analysis in detecting changes of mood in patients/ contributing to integrated data to build a picture of their overall condition.

Relapse prevention= high numbers of relapse amongst Depression patients and often treatment is often cut short too soon as their symptoms cease but their underlying condition prevails= importance of sustained treatment.

Ideas Taken Forward

Scenario: A "First Aid Kit" would be available to teach people how to deal with people suffering from depression. This would also combat stigma attached to such conditions and would reduce the

amount of barriers that depression patients face. It would also improve mood literacy amongst Mood Disorder patients and would give families/ friends a guide- How to Support a Person Suffering from Depression, e.g., Importance of positive body language.

Scenario: Self-managed care would be prevalent and patients would be given information online/ encouraged to review their own mood patterns in relation to different treatments= what worked for them and what didn't work so well? Self-monitoring for depression/ anxiety and systems such as Mood Gym would be utilised. Patients would be managed in an advisory way and they would be able to detect their own need for an intervention.

Data repositories and multimodal data sets would be used to form a bigger picture of each patient.

Workshop 3: Intervention Scenarios for Dementia

Initial Discussion:

The group discussed how patient's needs change as dementia progresses.

Working Age dementia was discussed in depth: diagnosis takes longer as dementia is less frequent in working age patients. The consequences of dementia in working age patients is often more severe, e.g., they are physically stronger so if they become agitated it can be dangerous. Dementia also plays a huge role in financial difficulty as younger dementia patients have no pension/ have not paid their mortgage. This is problematic as younger families are still dependent on the working age parent with dementia whereas older patients' children have 'flown the nest' and are more capable of caring for them. The group talked about cognitive aids to extend the working life of dementia patients.

Scenario: Robot aids/ companions. Robots to perform certain tasks, eg, personal hygiene would mean that the patients retained dignity and that carers were freed up to cater to the social needs of the patient. The patient would foster a relationship with the robot carer at an early stage in their dementia so that by the time their condition had progressed, they would be familiar with it and it would not cause alarm. This robot could also monitor the patient and alert human carers when early signs of agitation occur (particularly useful in care home settings.) The robot could also facilitate activities that would otherwise be neglected due to apathetic common in dementia patients, e.g., gardening, going for a walk.

The robot carer could reduce stress for both patient and carer as the early intervention would prevent stressful situations when patient becomes agitated, for example, violence and apathy.

Ideas Taken Forward

Scenario: Adaptive automated service-led intervention model. Early diagnosis would be possible thanks to changes in patient's activity (detected through sensors in home.) For example, change in lexicon indicates onset of dementia. This could involve Planning Aids, to reduce patient's stress and to make daily tasks more straightforward. The topic of change in lexicon monitoring was also relevant to Working Age dementia as it is something that could be monitored by employers (work emails etc.)

The system would adapt as the patient's condition changes and home-monitoring would log how the patient's movements/ activities changed, eg, energy consumption/ 'magic carpet' to track movement.

Workshop 4: Intervention Scenarios for Severe Mental Illness

Initial Discussion:

The group discussed Data logging, and the importance of recognising triggers, for example, positive and negative catalysts that would trigger different effects in patients. Prevention was an area of particular focus, as we discussed the potential to reduce the amount of medication prescribed to patients with Severe Mental illness by adopting technologies capable of detecting a change in the patient's behaviour rather than treating them with drugs.

Overtreatment was highlighted as a problem currently facing mental health patients and this could help resolve this.

The group talked about the importance of sensor technologies, for example, Google glasses to monitor patients' movements.

Ideas Taken Forward

Scenario: The possibility of an 'internalised therapist' was discussed. This mentoring application would prevent agitation as the 'internalised therapist' would be able to step in before the situation got out of hand. It would feature a visual indication that provides real-time feedback for the patient thus reducing ambiguity (as patients often have impaired and peculiar judgement.) The real-time feedback would guide the patient, e.g. "Michael is very busy today and so that is why he is frowning."

Scenario: A Rehearsal Facility would be available to all patients with Severe Mental Illness. This cognitive aid would allow patients to practice conveying the right emotion to those around them and to deal with day-to-day situations more effectively. It would also recognise negative thought patterns and prevent panic, as it would encourage the patient to identify the irrational part of their thought process and to replace it with a more logical, less worrying explanation. The group used the example of a black car. The patient's abuser in the past had driven a black car and every time a black car drove past their house, the patient thought it was their abuser coming to get them. Once anxiety is detected, the system would intervene and encourage the patient to adopt different thought patterns; perhaps the next door neighbour has just bought a black car/ somebody who works down the street drives a back car?

Scenario: The group talked about distorting reality for patients to make daily tasks less stressful. This could be done through contact lenses/ glasses so that the patient experienced a virtual reality adapted to their needs. It would remove stimulus/ negative catalysts and could take patients to their 'happy place.' For example, if a patient liked swimming, the virtual reality would project the image of the swimming pool, the smell of chlorine and the sound of lapping water to prevent them from panicking if negative thought patterns were identified. The example of the black car was also used again, e.g. if the appearance of a black car causes the patient to panic, initially the virtual reality contact lenses could change the colour of the car to red. This would then be used in part of the feed-

back process as it would be explained that they have actually encountered many black cars and nothing terrible happened, thus demonstrating to the patient that it is only a negative catalyst if they maintain a negative thought pattern/ it encourages the patient to adopt a more rational approach.