Mathematical Science in Health Research

Outline

- Initial mapping/directory of existing work
- Ideas for pilot projects

- Healthcare insurance
  - Risk taking/predisposition
  - Anonymization
  - Forecasting
  - working on aging problem, forecasting societal implication (Southampton uni)
- Mobile data
  - Micro-finance
  - Disease monitoring (Brazil – epilepsy/brain)
  - Surveillance/monitoring
  - Sector integration of human and animal health
  - Data collection optimization

- Resource allocation (EWGLA, VEROLOG)
  - Location of facilities, routing, matching
  - Public service providers
  - Optimising interactions given resource limitations
  - Risk maps
- Emergency preparedness e.g. fever study in Nigeria
  - Using algorithm to classify symptoms to improve diagnosis, data mining, deep learning, clustering
- Adaptive control – novel disease outbreak
  - Optimise policy switching, multi-phase
- Disease modelling
  - Water borne (South Africa)
  - Temporal dynamics
  - Model selection
  - Model fitting

- Social determinants – life style complex diseases (AIMS in Ghana)
  - Deep learning – predicting
  - Making AI transparent
- Personalised medicine
  - Statistical models, data mining, linear algebra, numerical analyses
- Drug target network
  - Graph/network theory
- Vaccine design (EBI data dimensionality)
  - Antigen mapping
  - Clustering
  - Supervised/unsupervised

- Record linkage, health data quality, probabilistic models (DFID Tanzania)
- Fraudulent claims, lack of unique IDs
  - Data imputation, algorithm
- Social network – seeding interventions
  - Epidemic spreading models
  - Network development
- Modelling vaccination and cost effectiveness
- Impact assessment
  - ODEs

- Clinical imaging e.g. CAT scans, mobile picture