Dutch participation in the European 1+ Million Genomes Initiative

Supported by:

Gert-Jan van Ommen, Utrecht, June 20, 2019
The European 1+MG initiative
Declaration for delivering cross-border access to genomic database

1 million genomes accessible in the EU by 2022

Linking access to existing and future genomic database across the EU

Providing a sufficient scale for new clinically impactful associations in research
Declaration on linking genomic databases across borders:

"Towards access to 1 million Genomes in the EU by 2022"

- Signed on 10 April 2018 during Digital Day 2018
- Access to be provided in a federated network of genomic datasets at national / regional level
- Member States driven initiative supported by the European Commission
  - DGs-RESEARCH, CONNECT & SANTE
Timeline NL

- April 2018. First contact from VWS “worth signing by NL?”. Answer YES! Rapid action
- Collated mails sent to VWS but NL was not yet amongst first 15 signatories: Croatia, Cyprus, the Czech Republic, Estonia, Finland, Greece, Italy, Lithuania, Luxembourg, Malta, Portugal, Slovenia, Spain, Sweden and the UK
- Message from VWS: “if ‘the field: had strong support, NL would sign”.
- Mail of June 4 to large constituency of societies, centers, pat assoc, industry led to widespread, unanimous (and almost overnight) support
- NL signed in September 2018
- Now 21 signatories.
- First 1MG meeting September 2018 in Brx
- Now (5-6 June 2019) 5 meetings of ‘1+MG’ and operational working group structure
- National ‘Mirror Groups’
European Working groups

1. Scope, stakeholders and governance
2. Ethical, Legal, and Societal Issues (ELSI)
3. Common standards for capturing clinical and phenotypic data requirements
4. Good sequencing practice / development of standards for clinical interpretation
5. Interoperability, transfer between countries, local/federated system incl. systems development and deployment and data access governance
6. Health economics and outcome research
7. Involvement of the private sector (incentives, IP, contribution and access)
8. Usecase 1: Rare Diseases
9. Usecase 2: Cancer
10. Usecase 3: Common and complex diseases; incl. personalised prevention/population based sequencing & pharmacogenomics
Scope 1+MG initiative

• Towards **Personalized Medicine & Health including prevention**
  - Member states want to **link health care and research**

• **Clinical data as the basis, incl. phentotypic/environmental data**
  - Priority disease areas: cancer, rare diseases, common and complex diseases

• **Goal: 1M WGS across Europe by 2022**
  - First stage: national reference collections with strong imputation power
  - Connecting **WES collections** as intermediate goal

• **Data ’federation’:** from data sharing to making local data accessible through national nodes
  - Strong ELSI/IT component: arrange (dynamic) consent & secondary use
  - **FAIR Data & Personal Health Train** approach (pioneered in Health-RI)

• **Build on existing infrastructures (e.g. BBMRI, ELIXIR, GA4GH, ICGC, IMI, EFPIA),** and other genomics and data sharing efforts in RD, cancer and common complex disease fields
Generic goals

- Build a common vision and purpose to leverage and maximally utilise existing resources and accelerate related initiatives at a Member State and European level,
- Support the development of new infrastructure where required
- Develop a federated ‘knowledgebase’ of genomic and health information
- Surround this with platforms and networks for clinical discussion and training, collaborative research and innovation and enterprise
- Establish a cross-border network of expertise
- Create a platform for participant engagement to educate and involve citizens and patients in the use of their genomic and health data
Short term aims to define and suggest way forward on

• **Build national node structure** to work on commitment from MS and liaise with the Commission to line up towards a collective roadmap

• **Ethical and legal framework** – suggest a cooperation model with ongoing initiatives, identification of obstacles and suggestion for a way forward to address them

• **Federated secure privacy respecting technical and procedural framework for cross-borderer access** to genomic, phenotypic and health data

• **FAIR data governance and access** –

• **Need for good data** – setting the threshold for counting towards 1+ MG
  • Guidelines on Good Genomics Practice
  • Guidelines on a minimum and preferred (more detailed) data set for diagnosis
Some plans tabled:

- Identify best practices/share success stories
- Connect to international activities to share RD WES / phenotypes
  - GA4GH Beacons
  - MatchMaker Central
  - Phenotype (‘gestalt’) comparison AI
- Pilot projects building on on-going initiatives: “synthetic cohorts” to start test-driving
- Precision prevention (Estonia, Metspalu – WP10)
  - Generate 10 K (or more) WGS per country to develop specific Polygenic Risk Scores (PRS) {1000’s of variants} for common complex disease, cancers and pharmacogenetic risks by ‘imputation’
  - Then generate cheap (50€) prognostic array panels for wide application in preventive health care

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Timelines 2019

- Analysis of mapping exercise
- Identify current projects/initiatives/groups relevant for the topic
- Suggest process for how to connect and collaborate with relevant expertise
- Report on national/regional priorities for structural funds

- WGs: Formulate a suggestion for a road map on what need to be addressed and when for ex. road map for setting up interoperability framework and requirements to join
- September meeting 1st draft - roadmap for the initiative
The Dutch perspective
Drive adoption of genomics in Dutch clinical field

• Boost WGS and WES data collection
• Connect NL as very active node in 1+MG European framework
• Drive transnational research and implementation towards personalised medicine and prevention
• Build on existing strengths in the Dutch genomics and clinical fields
• Prepare for further evidence-based precision health
• 1+MG as ‘usecase’ to drive building national Health-RI data infrastructure
Goal MG-NL project, supported by ZonMw

Prepare for the maximal availability and usability of genome data plus linked clinical data in the Netherlands for transnational research in personalized medicine and health

By:

• Benchmarking current availability of genome data in NL in research and care
• Identify best practices in collaboration with FAIRgenomes team
• Secure Dutch participation in EU initiative
• Build Dutch community
• Develop roadmap for NL implementation in research and care
Roadmap MG-NL

- Mobilize national stakeholders
- The Netherlands signs 1MG declaration
- Engage in EU process
- Inventorized Dutch genome data
- Define scope & best practices
- Develop national roadmap
MG-NL Team

• Core Team
  - Marian Beekman (LUMC/BBMRI-NL) **WG10**
  - Jeroen Belien (AmsterdamUMC (VUmc)/FAIRgenomes) **WG3**
  - Daniel Bosch (EMC)
  - Jasper Bovenberg (BBMRI-NL/Health-RI/Legal Pathways) **WG2/WG7**
  - Edwin Cuppen (UMCU/Hartwig Medical Foundation) **WG4/WG9**
  - Ilse Custers (ZonMw) **WG6**
  - Peter-Bram ‘t Hoen (Radboudumc/X-Omics)
  - Daphne de Jong (AmsterdamUMC (VUmc))
  - Roger Lim (VWS)
  - Cor Oosterwijk (VSOP)
  - Gijs Santen (LUMC) **WG8**
  - Marjanka Schmidt (NKI/BBMRI-NL/ELSI service desk) **WG2**
  - Morris Swertz (UMCG/ELIXIR-NL/BBMRI-NL/X-Omics/FAIRgenomes) **WG5**
  - Lisienka Vissers (Radboudumc) **WG8**
  - André Uitterlinden (EMC)

• Project Team
  - Ruben Kok (DTL/Health-RI) **WG1**
  - Gert-Jan van Ommen (LUMC/BBMRI-NL) **WG1**
  - Christine Staiger (DTL/ELIXIR-NL)
  - Rick van Nuland (Health-RI/Lygature)
Inventory of Dutch genome data

- Asked for
  - Available sequencing data and planned sequencing data
  - Accessibility of data
  - Type of data (WGS, WES)
  - Clinical or research data
  - Storage location (local, national, international)
- Across three use cases: cancer, rare diseases and common diseases
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Available data per data type and purpose

Other: mainly panels
Diving into the data

Type of data per Use cases

Purpose and Use cases

WGS, WES or other (specify)

Main purpose of data (res, Clin, Clin/Res)
Accessibility and Findability of data?

- Accessibility for rare diseases: Not indiv, maybe by RD with mutations (large green bar)
WGS data per purpose (wgs & both)
WES data per purpose

Accessible WES data per use case and purpose

Main purpose of data (res, Clin, Clin/Res), Could be made accessible/searchable
1st Conclusions existing data

- Most existing data is clinical data and with limited accessibility
- Most data is WES (clinical) for rare diseases
- Limited WGS data yet, mostly for research in cancer
  - Boost needed to contribute to 1+MG WGS by 2022!

- Parties all choose their own independent procedures and solutions to arrange for citizen/patient consent and for access to their data.
  - Priority topic identified at European level (data governance framework)

- Details of data collections to be further explored
  - To which extent can data be made FAIR? → supporting federated collaborative research
Future plans NL

- Identify best practices
- Develop roadmap for the Netherlands
- Build national coalition to realise 1+MG
- Contribute to international connections to share RD WES
  - GA4GH Beacons
  - MatchMaker Central
  - Phenotype (‘gestalt’ comparison AI)
- Develop scenarios for national action plan (workshops)
  - Contribute to synthetic cohort approach
  - Assess implementation of Common Disease ’Precision prevention’ scenario

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