Summary of Pre-meeting Talks

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Overview:

Speakers provided experiential talks across 4 topics identified as important in pre-meeting survey:

- Clarity of test being performed
- Risk/susceptibility tests vs causal/direct mutation
- Nomenclature
- Genetic test application/advice

Again, great thanks to Danika Bannasch, Jonas Donner, Joanna Ilska, Cathryn Mellersh

General comments on talks:

Cross-over between the topics

Consistent suggestions/ideas across all speakers

Great potential for a solution to address multiple issues

Some ideas already in action, but not across all providers or information sources

Topic: Clarity of test being performed

Comments from pre-workshop survey:

- Clearer definitions of different types of testing
- Consistent explanation on how those results should be used in breeding
- Reducing need for linkage, where specific mutation can be detected?
- Include in GTP reports what type of test is being undertaken (e.g. linkage, direct mutation, etc. And/or on HGTD

Topic: Clarity of test being performed

Precise DNA variant being tested for: gene, position in gene/genome, publication… (if not, why? E.g. denote as research?) (CM)

Details of variants important (ref. ADAMTS17) (CM)

Test names, recording correct mutation associated with correct breed: confusing or not transparent; e.g. LEMP, NCL… breed-specific mutations, or some breeds have more than 1 associated mutation (JI)

Recording test results/information impact: Test results recorded against an individual dog's information, Hereditarily "clear" linkage vs direct mutation important, Data can also be used to track changes in a breed over time, test uptake/usage over time, etc. (JI)

Unexpected breed findings: should be investigated further for relevance (or not) (JD)

Mode of inheritance not understood, linkage vs direct mutations – inaccurately reported by GTPs or not reported by GTPs – **transparency is needed**! (JI)

Make clear **what** is being tested; direct mutation vs linkage; applicable (relevant) breeds; standardized mutation nomenclature (ideally) (JD)

Topic: Tests for risk and susceptibility

Comments from pre-workshop survey:

- Transparency in the usage and efficacy of “risk” tests
- Guidelines on how to report/inform breeders and owners on risk
- Is there a threshold of risk association that should be met before a test is offered commercially? (Validation?)

Topic: Tests for risk and susceptibility

Mode of **Inheritance**; % penetrance or **relative risk** – minimum; Explanation of what is understood about the **pathophysiology**; **List of breeds** where test has been validated and the allele frequency estimated in those breeds (DB)

What needs to be communicated: Test results explained as relevant to the individual dog (owners, also breeders); Test results breeding consequences; Seriousness of disease: pain, suffering, treatment, etc.; Common/uncommon (allele frequency); Impact on genetic diversity to select against; Likely needs to be breed-specific advice in some cases (e.g. not all risk is fully understood by breed/type) (DB)

Risk vs Penetrance vs Expressivity – which Dr Bannasch **defined** well.

Do we understand the relationship between the "risk" and causality/impact on the clinical disease? If so, this needs clear communication, and if not/still in research, this also needs to be shared – with the hope of improved understanding over time? Maybe not all risks found are suitable for DTC testing. (DB)

Topic: Nomenclature standardization across labs.

Comments from pre-workshop survey:

- Identify areas in GT reports that need standard nomenclature; e.g. results, test names, how mutations are reported, test types (e.g. linkage vs. DM vs…)

- Using models in other sciences, could a recommended naming system for new tests be agreed?

Topic: Nomenclature

Across all talks, the importance of language was emphasized

Variants well defined by CM: variant, causal variant, associated variant, linked variant*could these terms/definitions be more consistently applied?*

Risk vs Penetrance vs Expressivity – which DB summarized well.

Kennel Club illustrated serious issues with test name confusion, and impact of language translations/universality across providers for both DTC testing and club/health advisor test data usage

Topic: Genetic test application/advice

Comments from pre-workshop survey:

Concern over lack of communication with clients; How can best be explained how those results should be used in breeding.

What role does IPFD/HGTD play in this? If GTPs want to provide their own bespoke advice, what do they see a collaborative resource helping them with?

Topic: Genetic test application/advice

Simple labels are not sufficient – again, is there a communication for owners/breeders vs recording bodies/breed-wide health (JI)

Whether the DNA test is based on: Causal, linked, or associated variant (and what these terms MEAN) (CM); **DNA test should include specific (not general) details** (CM)

Big Picture should be emphasized in breeding selection criteria; maintain genetic diversity – keep genetic diversity in mind, use healthy carriers, etc.; **Relevance**: what is causal/breed-associated vs what is suspected/likely/under investigation vs what has unknown clinical association; **Expectations**: transparent about what results means (relevance, not a clean bill of health, disease onset or not); Application: **access to genetic counseling and breeding advice** after results (JD)

Do we understand the relationship between the "risk" and causality/impact on the clinical disease? If so, this needs clear communication, and if not/still in research, this also needs to be shared – with the hope of improved understanding over time? Maybe not all risks found are suitable for direct to consumer testing. (DB)

Additional comments

DB's comment that messages need to be different for owners vs breeders seemed really vital. All of our ideas should keep in mind… Who uses genetic tests? And how are genetic test results used?

Details are critical to the consumer in "choosing" a DNA test, but let's be real, this is even more important for advisors and test providers to be explicitly clear in what they are recommending or selling for a breed/type.

WHO	PRIMARY INTERESTS	GT USAGE
Owners	Individual dog health	Health risks, individual traits
“1 litter” Breeders	Individual dog’s health, 1-2 litters maximum, the majority of individual breeders	Health risks, individual traits, maybe breeding?
Breeders	Individual dogs health and risks, linvolved in showing/activities, members of an overseeing body, influencers, vested interest in breed’s continuation	Health risks, individual traits, specific breeding goals, avoiding inherited diseases, promoting desirable traits

Direct to consumer

WHO	PRIMARY INTERESTS	GT USAGE
Canine professionals	health care, re-homing, professional purpose bred breeding plans, e.g military, police, rescue, seeing/hearing/medical support dogs	Diagnostic or risk assessment; meet goals of well-defined and specific breeding strategies, or to assess dogs for a specific purpose
Kennel/Breed clubs	Individual dog's health, 1-2 litters maximum, the majority of individual breeders	Breed conservation, monitoring of breeds, recording of test results, public/publishing of test results, sources of research data, breed-wide interests, long-term breed survival interests, education, etc.
Other non-owner	Housing/re-homing, legal queries	Breed types/mixed-breed ID, dog ID, parentage…

Indirect/non-owners

How IPFD/HGTD might help?

- HGTD could be utilized to provide a centralized repository of breed/type-specific GT information, which clients could be directed to, as well as independently access information.
- A collaborative strategy to move GTPs from linkage to direct mutation (where feasible)
- Non-direct mutation tests best practices could be collaboratively developed, and published/accessible via IPFD
- HGTD participating GTPs to volunteer/sign up to a minimum standard of reporting information on risk tests
- HGTD could publish an equivalency table for international common terms/nomenclature

Additional ideas…

- A report/comment in a peer-reviewed journal on a recommended minimum threshold of risk association before a test should be commercially offered
- GTPs/Researchers could identify and publish in a peer-reviewed journal a recommended test naming system