

# Defining the demographics of the Genotyping Laboratory. Results from the FARG 2008 Survey.



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## INTRODUCTION

Many laboratories, both core and non-core based, are actively performing "genotyping". However, differing laboratories are performing genotyping and using genotyping technologies for drastically different reasons based on the research aims. This makes the implementation and measurement of the genotyping technologies' performance different. To this end, members of the Fragment Analysis Research Group (FARG) conducted a survey to capture the differing types of genotyping technologies routinely implemented in laboratories, the research aims of said technologies and importantly the demographics of such laboratories performing "genotyping." The survey was made available to wide community of genotypers, with focus on the demographics of the genotyping laboratories that responded to the survey. Important differences in these demographics, such as the physical size and methods of funding from each laboratory, helps shape these demographics and help define genotyping and the scope of work.

## METHODS & STUDY DESIGN

Members of the Fragment Analysis Research Group (FARG) collaboratively designed and released a survey on [www.SurveyMonkey.com](http://www.SurveyMonkey.com). The Survey was divided into two major parts 1) Demographics and background and 2) Research aims and technologies/methodologies used to achieve such aims. Participants from many sources were invited to take the survey with the intent to attract a broad sampling of both the core and non-core laboratories that are performing genotyping.

## RESULTS

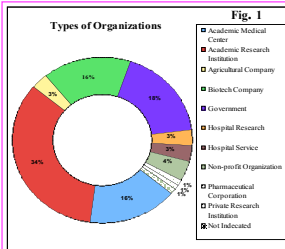


Fig 1. Of the 69 responses received, there were four types of organizations that made up the majority of the survey responses.

•39% came from Academic Research Institutes  
 •18% from Government Labs  
 •16% from both Biotech Company's and Academic Medical Centers.

The remaining responses came from organizations representing less than 4% of the total responding.

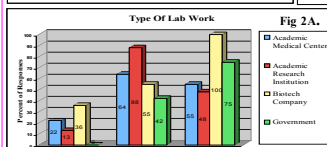


Fig 2A.

Fig 2A and B. The four laboratory types that make up the majority of the survey responses are shown with the different basic type of work they are conducting, and based on their CLIA certification status. Most of the survey respondents are conducting research or acting as a Core Facility, and most of these lab are not CLIA certified. The survey labs that are conducting clinical work are or are in the process of getting CLIA certification.

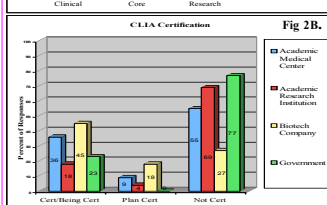
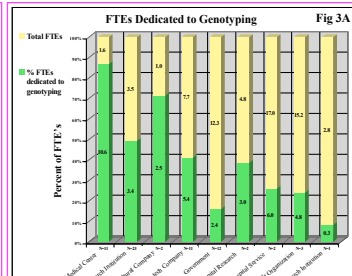


Fig 2B.

## RESULTS (Cont.)



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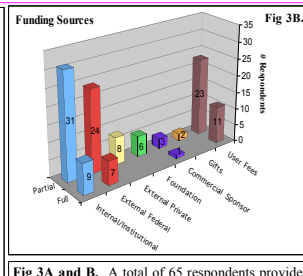


Fig 3A and B. A total of 65 respondents provided funding source information. A majority of respondents (43%) report a single funding source. The funding source reported was approximately equal between user fees, external federal and internal/institutional. Laboratories in academic research institutions were the majority of respondents reporting more than two funding sources. Data shows percentage of full time employees (FTEs) among the respondent institutions whose responsibilities are dedicated to genotyping.

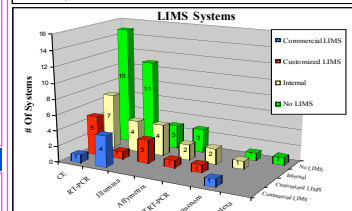


Fig 4. The genotyping platforms reported were placed into 7 groups and then linked to the type of LIMS used. Older technologies such as Capillary Electrophoresis (CE) and RT-PCR (such as Taqman) gave the most responses, with all types of LIMS represented. Newer, more high throughput technologies such as Illumina, Affymetrix and Biotrove/Fluidigm all have either a customized or an internally developed LIMS. The single Solexa respondent had no LIMS which might be attributed to the newness of the technology.

Table 1

LIMS Type	Developer	Total
Commercial customized	ABI SQL*LIMS	2
	DNAsools	1
	Illumina GoldenGate LIMS	1
	LabVantage Sapphire	1
Commercial customized Total		5
Commercial systems	Biomatrix Sampleware	1
	Center	3
	DNAsools	2
	ThermoNautilus	1
Commercial systems Total		8
Internally developed	Custom un-named	18
	MS Access	1
	Oracle	1
	SQL	1
Internally developed Total		21
Grand Total		34

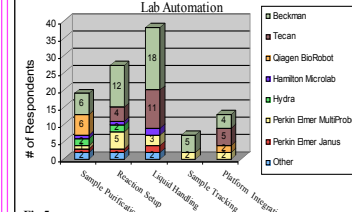


Fig 5. A total of 38 respondents provided laboratory automation information. The majority of respondents report lab automation being used for liquid handling, reaction set-up, and sample purification in relation to genotype sample processing. Beckman instruments were the most versatile being used in all areas of sample processing highlighted in the survey.

Table 1. 34 of the labs surveyed reported using a LIMS system. The majority of the LIMS were Internally developed systems, with 52% of all respondents having a Custom un-named system.

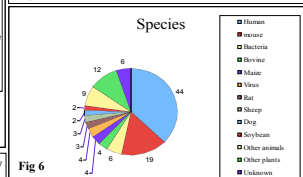


Fig 6. As expected the majority of labs are genotyping human and mouse. However a diverse range of other species are being studied. This list should grow as sequence data for more organisms becomes available.

## RESULTS (Cont.)

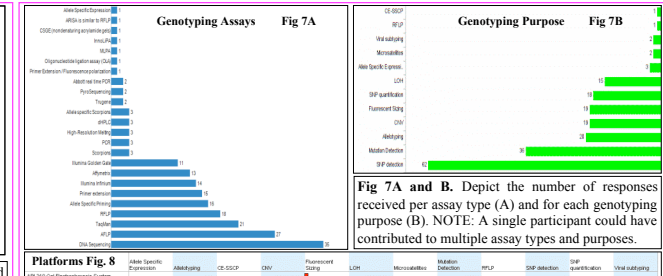


Fig 7A and B. Depict the number of responses received per assay type (A) and for each genotyping purpose (B). NOTE: A single participant could have contributed to multiple assay types and purposes.

Fig 8. Shows the number of responses recorded for each instrument platform based on the purpose of the genotyping assay.

## DISCUSSION

- Ninety-six percent of the survey respondents were from four types of institutions, Academic Medical Centers, Academic Research Institutions, Biotech Company's, and Government.
- The four main types of institutions mostly conduct research and/or act as a core facility. A smaller portion are conducting clinical testing yet almost half (43%) of these labs are or will be CLIA certified in the future.
- Three types of institutions have 50% or more of their full-time employees (FTEs) dedicated to genotyping; Academic Medical Center (87%), Academic Research Institute (71%), Agricultural Company (50%).
- Internal/institutional, external federal and user fees are the predominate funding sources reported by survey participants.
- A majority of respondents (43%) report a single funding source. Organizations relying on more than two funding sources were academic institutions, hospitals, biotech companies, and private research institutions.
- Of the Laboratories reporting the use of a LIMS, the majority were using an internally developed system. LIMS use was more common to labs using higher throughput Genotyping technologies.
- Most respondents use automation for liquid handling, reaction set-up, and sample purification.
- Human and Mouse specimens make up the vast majority of the genotyping studies.
- The many responses received for genotyping assays types, aims and instrumentation indicate a wide diversity of applications for respondents.
- The majority of respondents are participating in SNP genotyping and or Mutation Detection.