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RHD GENOTYPING OF DISCREPANT OR WEAK D SAMPLES: OVER A YEAR'S EXPERIENCE

S. Vege, C. Lomas-Francis, K. Hue-Roye, J. Aeschlimann, R.W. Velliquette, and C.M. Westhoff
Immunohematology and Genomics Laboratory, New York Blood Center

INTRODUCTION

RHD genotyping has been recommended to guide transfusion of RhD-negative RBCs and administration of Rh immunoglobulin (RhIG) to patients with discordant or weaker than expected D typing, particularly for females of child bearing age and OB patients (Sandler *et al*. 2015, *Transfusion* 55: 680-9).

The recommendation is based on observational evidence, primarily from Europe (Flegel 2006, *Curr Opin Hematol* 13:476-83), that individuals with weak D types 1, 2, and 3 are not at risk for clinically significant anti-D.

The implications for RhD-negative blood supplies and the impact of this approach for RhIG supplies when applied across the diverse U.S. population are not yet clear.

Here we report 15 months experience with *RHD* genotyping on 352 samples referred with discrepant or weak D typing investigated from January 2016 to April 2017.

MATERIALS AND METHODS

Serology testing

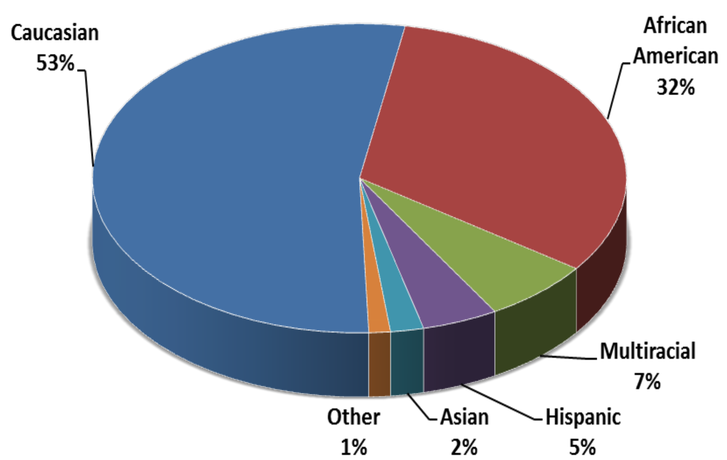
- RBC testing was performed by standard tube agglutination with commercial reagents according to manufacturer's instructions.

DNA-based testing

- Genomic DNA was isolated from WBCs.
- *RHD* and *RHCE* BeadChip prototype assay (BioArray/ Immucor) was performed according to manufacturer's instructions.
- For those samples with no changes detected by *RHD* BeadChip, the coding region of *RHD* was amplified and Sanger sequenced.

Demographics

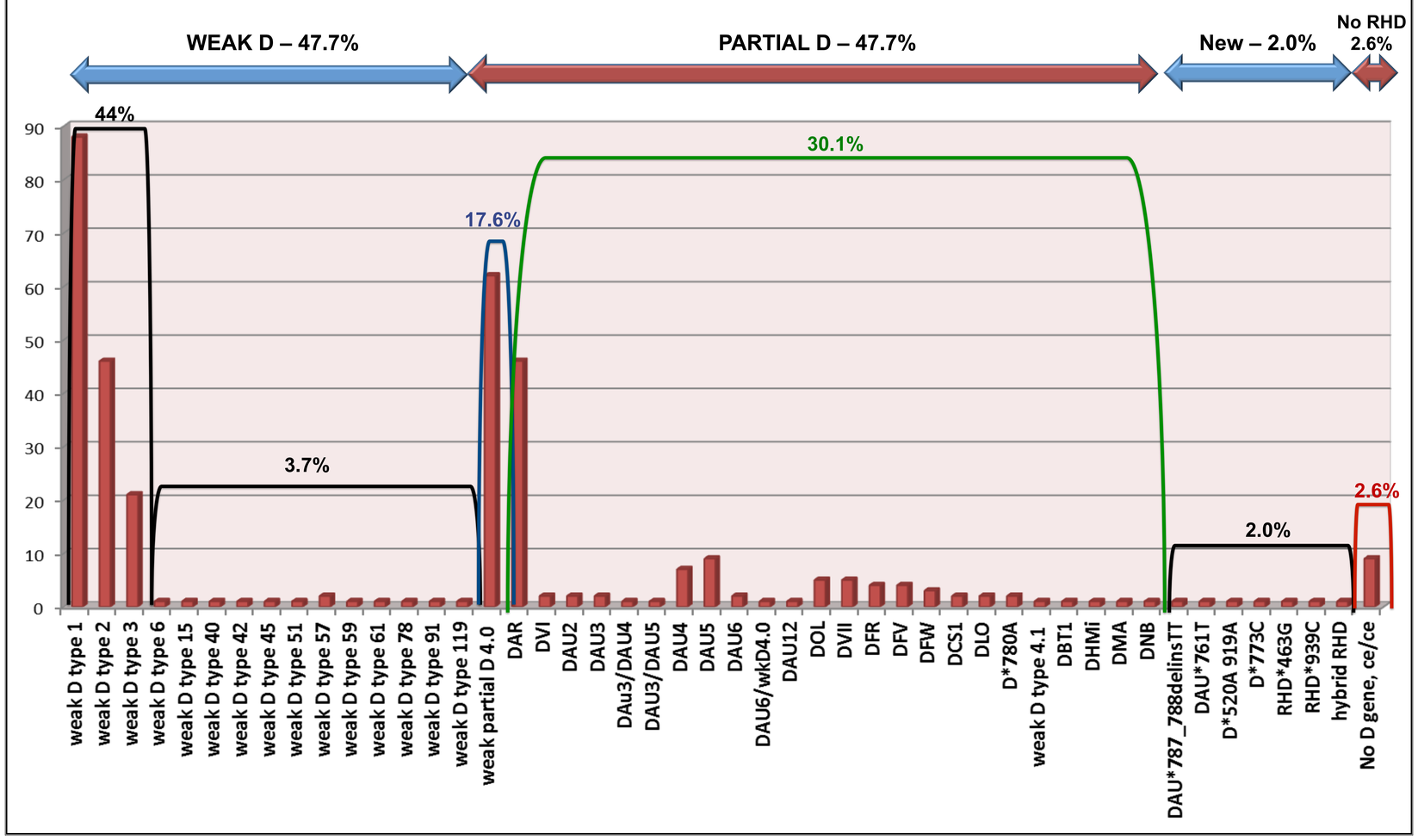
- The patient ethnicity was known for 153 samples:



RESULTS

Table 1: *RHD* genotypes in U.S. associated with weak D serologic phenotypes.

	Weak D alleles				Partial D alleles			New alleles	No RHD
	1	2	3	Others	4.0	DAR	Others		
# samples	88	46	21	13	62	46	60	7	9
Percent	44			3.7	47.7			2	2.6



CONCLUSIONS

- In a multiracial cohort of 352 individuals whose RBCs were weaker than expected with D antisera:
  - **44% were weak D types 1, 2, or 3 and not at risk of clinically significant anti-D**
  - 3.7% were uncommon weak D alleles with unknown risk
  - **30.1% were partial D with risk for allo anti-D**
  - **17.6% were weak partial 4.0 with apparent risk in minorities but not in Europeans**
  - 2% were new RHD alleles with unknown risk
  - **2.6% were D– with false positive D typing and at risk**

These studies are important to gain insight into the prevalence of specific alleles in the U.S. multiethnic population and to continue to evaluate and refine *RHD* genotyping for clinical practice.

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