A Novel Methodology for Building Longitudinal, Patient-Centric Real-World Datasets in Hemophilia A

A Pilot Study in the Mild and Moderate Population

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Disclosures

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There are limited real-world data on people with mild or moderate hemophilia A

People with mild and moderate HA account for 40–52% of all PwHA, including nearly all women with HA, and this population is under-represented in scientific literature[1,2,3]

Available claims data from payer databases are confined to billing codes, and lack crucial data on outcomes and disease characterization (e.g., severity, treatment response)[4]

Registry datasets can require resource-intensive data entry and potentially miss key information about care received at outside facilities, at home, or after patients switch providers[5]

HA, hemophilia A; PwHA, people with hemophilia A

1. Di Michele DM, et al. Haemophilia 2014;20:e136–43; 2. Benson G, et al. Blood Transfus 2018;16:535–44;
3. Peyvandi F, et al. Haemophilia 2019;25:755–63; 4. Tyree PT, et al. Am J Med Qual 2006;21:269–75;
5. Gliklich RE, et al. Registries for Evaluating Patient Outcomes: A User's Guide. 3rd edition, 2014.

A patient-centered approach to fill this gap

- The aim of this study was to create a **longitudinal healthcare database** using a **novel, patient-centered approach** to collect RWD from individuals with mild and moderate HA in the United States
  - This online record management platform integrates **medical record data** collected during routine clinical care with **PROs**
  - Data are traced back to original notes from clinicians, fulfilling an important requirement highlighted in the FDA's new draft **guidelines on RWD**[1]

FDA guidelines on real-world data[1]

1. Data sources should appropriately address the **study question** and sufficiently characterize study populations, exposure(s), outcome(s) of interest, and key covariates
2. Definitions for **study design elements** should be developed and validated
3. The **provenance** and **quality** of data should be maintained during accrual, curation and transformation into the final study-specific dataset

Study aim: to assess the feasibility of using the PicnicHealth online record management platform to create a longitudinal healthcare database for individuals with mild and moderate HA

FDA, US Food and Drug Administration; HA, hemophilia A; PRO, patient-reported outcome; RWD, real-world data

1. FDA Draft Guidance For Industry on RWD, 2021. Available at: https://www.fda.gov/regulatory-information/search-fda-guidance-documents/real-world-data-assessing-electronic-health-records-and-medical-claims-data-support-regulatory. Last accessed October 2021.

People with mild or moderate HA were recruited

- Recruitment began in **June 2020** utilizing multiple channels:

Mild or moderate HA was confirmed via physician report within provider notes in combination with baseline FVIII levels (>5–<40% mild, 1–5% moderate)[1]*

*One symptomatic person with HA in the PicnicHealth cohort had FVIII levels >40%; for the purposes of this study, they are included in the mild HA cohort

F, factor; HA, hemophilia A

1. Blanchette VS, et al. J Thromb Haemost 2014;12:1935–9.

PwHA were enrolled via the PicnicHealth online record management platform

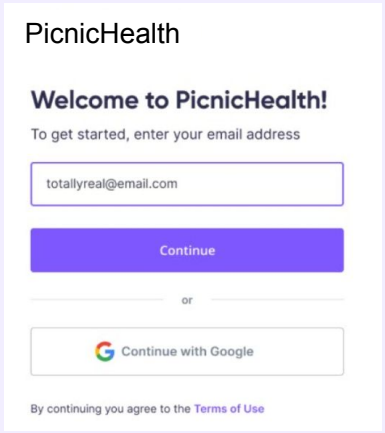
PicnicHealth supports recruitment through patient advocacy groups and marketing

PwHA learn about study through email, web, and social media

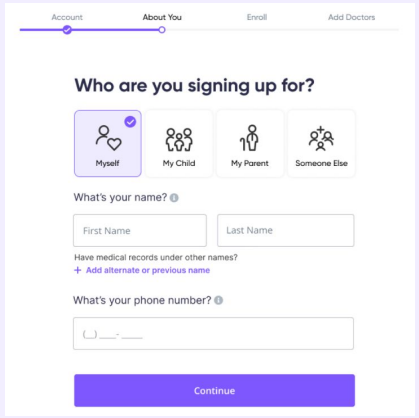
PwHA click on link to co-branded* landing page about the study

PwHA create PicnicHealth account and verify identity

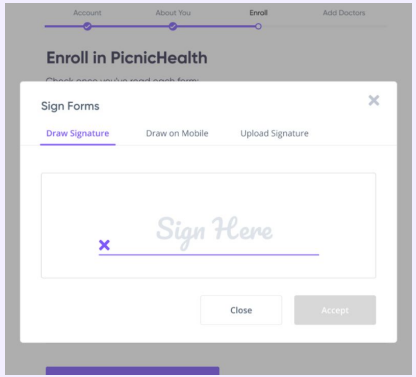
PwHA sign IRB study consent and record release authorizations



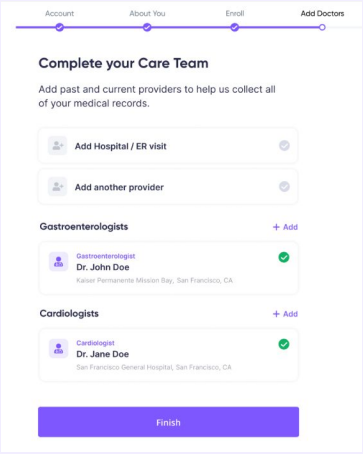
Create account



Enter personal information



E-sign:
- Record release authorization
- IRB approved consent

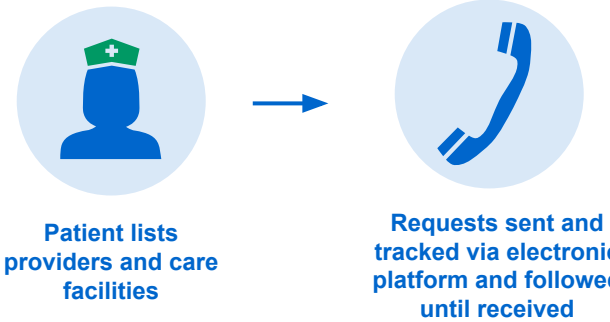


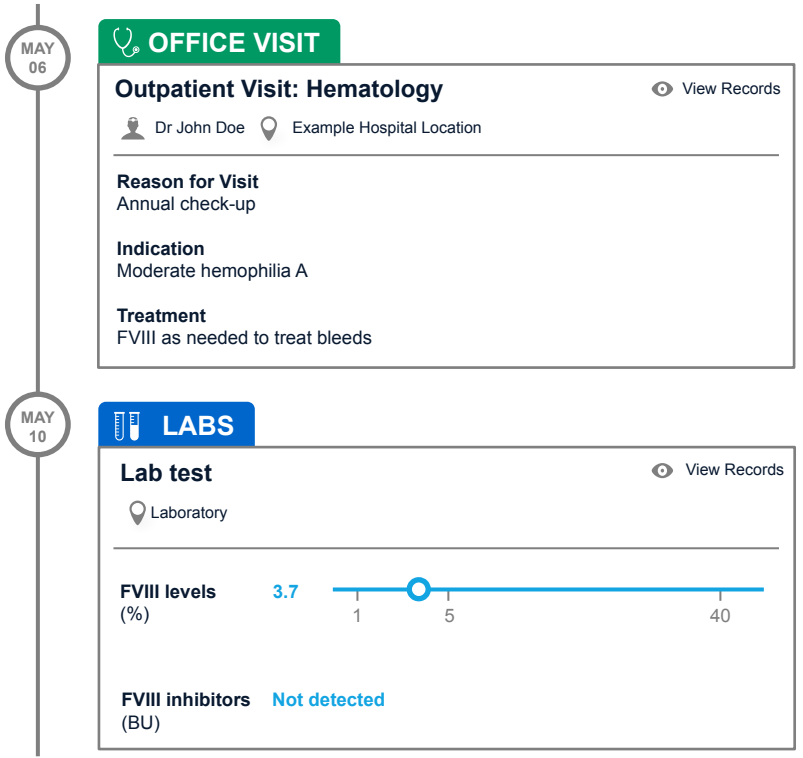
List providers

*Study conducted as part of a strategic partnership with F. Hoffmann-La Roche, Ltd.
IRB, Institutional Review Board; PwHA, people with hemophilia A

Technology-enabled record collection and tracking

- Records were gathered from **all providers**, across any facility, retrospectively as records were available
  - All records obtained were made available to the participants via a **medical timeline**





BU, Bethesda Unit; F, factor

Machine learning was used to aid data structure

- Records were translated to text via optical character recognition with human review
- Data elements from structured text (e.g. medication lists) as well as disease-specific elements from narrative text were captured using natural language processing and **supervised machine learning**
  - Machine learning improves the identification and extraction process from free text
  - **Every data point can be traced back to the original medical record** through detailed metadata containing date, time, provider name, visit type, document type, etc.

Data elements from structured text and disease-specific elements from narrative text were captured from patients' electronic health records and linked to self-reported data

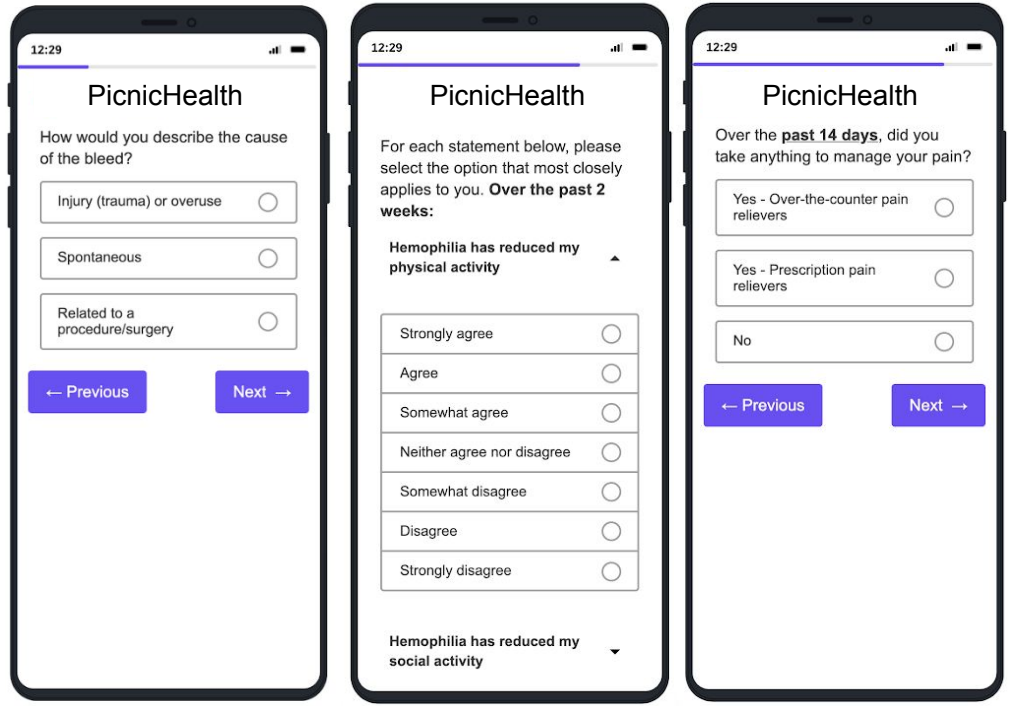
Data elements included clinical visits, disease history and patient-reported outcomes

Data elements captured	
Structured text	
Visits	date, site, provider, specialty
Conditions	assessments, problem lists
Measurements	laboratory results, vital signs
Drugs	medication lists and administrations, vaccines
Procedures	date, type, provider, site
Narrative text (disease-specific)	
Hemophilia history	type, severity, date of diagnosis, inhibitor status, CVAD
Bleed history	date, type, location, laterality, treatment, time interval, rate
Treatments	FVIII and non-factor therapies, regimen (on demand vs prophylaxis), bypassing agents
Joint health	synovitis, arthropathy, arthroplasty, joint replacement, HJHS, Pettersson score
Patient-reported outcomes (prospective data collection)	
Bleed tracking	start date, type, location, laterality, target joints
Bleed treatment	date, type, dose, treatment goal
Pain (1–10)	worst, best, average, target joint, bleed specific

CVAD, central venous access device; HJHS, Hemophilia Joint Health Score

Patient-reported outcomes (PROs) were collected prospectively

- **PROs** were collected **prospectively** via an online questionnaire
  - A subset of 25 PwHA were prompted to enter data every 2 weeks
  - Abstracted electronic health record data were linked to PRO responses in a de-identified dataset
- Information was collected on **bleeds**, **treatment**, **activity**, and **pain**:
  - Date, cause, type, and location of bleed
  - Bleed treatment, including type and specific product
  - Effect of HA on physical and social activity over the past 2 weeks
  - Average pain over the past 2 weeks, and any medication taken to relieve the pain



HA, hemophilia A; PRO, patient-reported outcome; PwHA, people with hemophilia A

Initial results on 104 PwHA have been analyzed

- From June 1, 2020 to June 30, 2021, **104 PwHA** were enrolled (65 [62.5%] mild; 39 [37.5%] moderate)
  - Participants saw providers across 34 states in the US; **22.1% (23/104) were female**, and 20.6% (14/68) of those with known race/ethnicity status were from minority groups
  - Records were gathered from a median of six care sites and 16 providers per participant
- PROs were collected prospectively via a biweekly online questionnaire administered to 25 PwHA
  - As of June 2021, the **average PRO response rate was 90.3%** (150/166 of all requests)

For more detail on the results of this study, please refer to Poster #2017[1]

Download this presentation:
https://bit.ly/31ddQIz

INTERACTIVE

PRO, patient-reported outcome; PwHA, people with hemophilia A
US, United States

1. Witkop M, et al. Poster #2017 presented at ASH 2021

Inter-abstractor agreement was high

- Quality control was assessed via inter-abstractor agreement on outputs with physician review
  - Abstraction quality averaged 95.9% for condition, 99.5% for drug name, and 95.4% for drug start date

Data entities extracted from all clinical records

	Unique entities (n = 15,859)		All entities (n = 90,578)	
	Per patient	Total	Per patient	Total
Drugs	35 (IQR 19–76)	5,485	116 (IQR 63–305)	24,916
Measurements	75 (IQR 51–105)	8,191	317 (IQR 138–607)	47,424
Conditions	13 (IQR 6–30)	2,183	121 (IQR 49–232)	18,238

An entity is any important medical concept extracted from the medical record narrative (e.g. diagnoses, lab tests, medication names, vital signs)

IQR, interquartile range

Conclusions

The patient-centric data collection methods implemented in this study provide a novel approach to build longitudinal real-world datasets, with benefits for patients and physicians

Technology-enabled data abstraction showed consistent high quality; direct engagement with patients complements potential gaps in the clinical record

This approach provides needed data on groups under-represented in RWD and traditional PwHA cohorts, including those with mild and moderate disease and women with HA

HA, hemophilia A; PwHA, people with HA; RWD, real-world data

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Disclosures

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