

Digital Health Readiness as a Determinant of Pharmacologic Dementia Risk Management: Introducing the DRIPP Model

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BACKGROUND

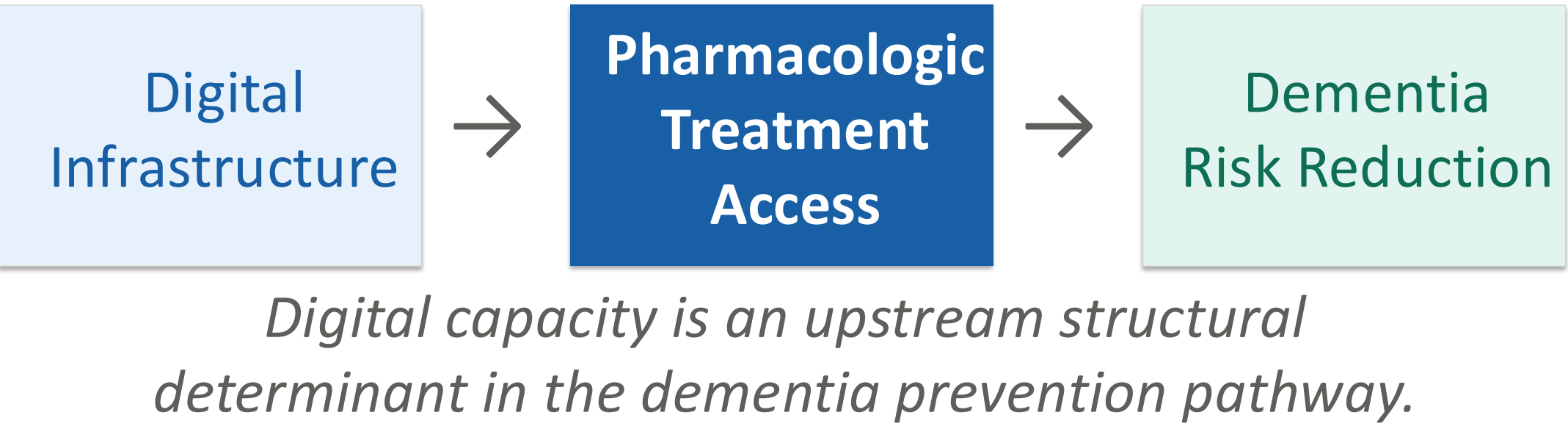
Dementia affects over 55 million people globally, with cases projected to nearly triple by 2050 (WHO, 2023). Approximately 40% of dementia cases are attributable to modifiable risk factors including hypertension and type 2 diabetes (Livingston et al., Lancet 2020).

Hypertension	Type 2 Diabetes
~1.3 Billion affected	~537 Million affected

Pharmacologic management of these cardiometabolic risk factors is a primary prevention pathway for Alzheimer's disease, yet treatment rates vary across geographies and health system capacities (NCD Alliance, 2023).

This poster introduces the Digital Readiness in Pharmacologic Pathways (DRIPP) model to measure the strength of association between digital capacity and pharmacologic performance. HABS-HD represents a U.S. cohort with strong documentation, where diagnosis and medication data were available to measure treatment pathway performance. FemBER represents a Kenya cohort with clinical measurements allowing the classification of screen detected cardiometabolic risk.

CONCEPTUAL FRAMEWORK



DRIPP MODEL — CORE INDICATORS

Digital Readiness Core Indicator (DRCI)

Presence of electronic systems OR adequacy of data captured across four domains: visits, vitals, diagnoses, and medications.

Pharmacologic Pathway Core Indicator (PPCI)

Proportion of diagnosed patients receiving pharmacologic therapy for hypertension and/or diabetes.

DRIPP OPERATIONALIZATION

PPCI_i = β_0 + β_1 · DRCI_i

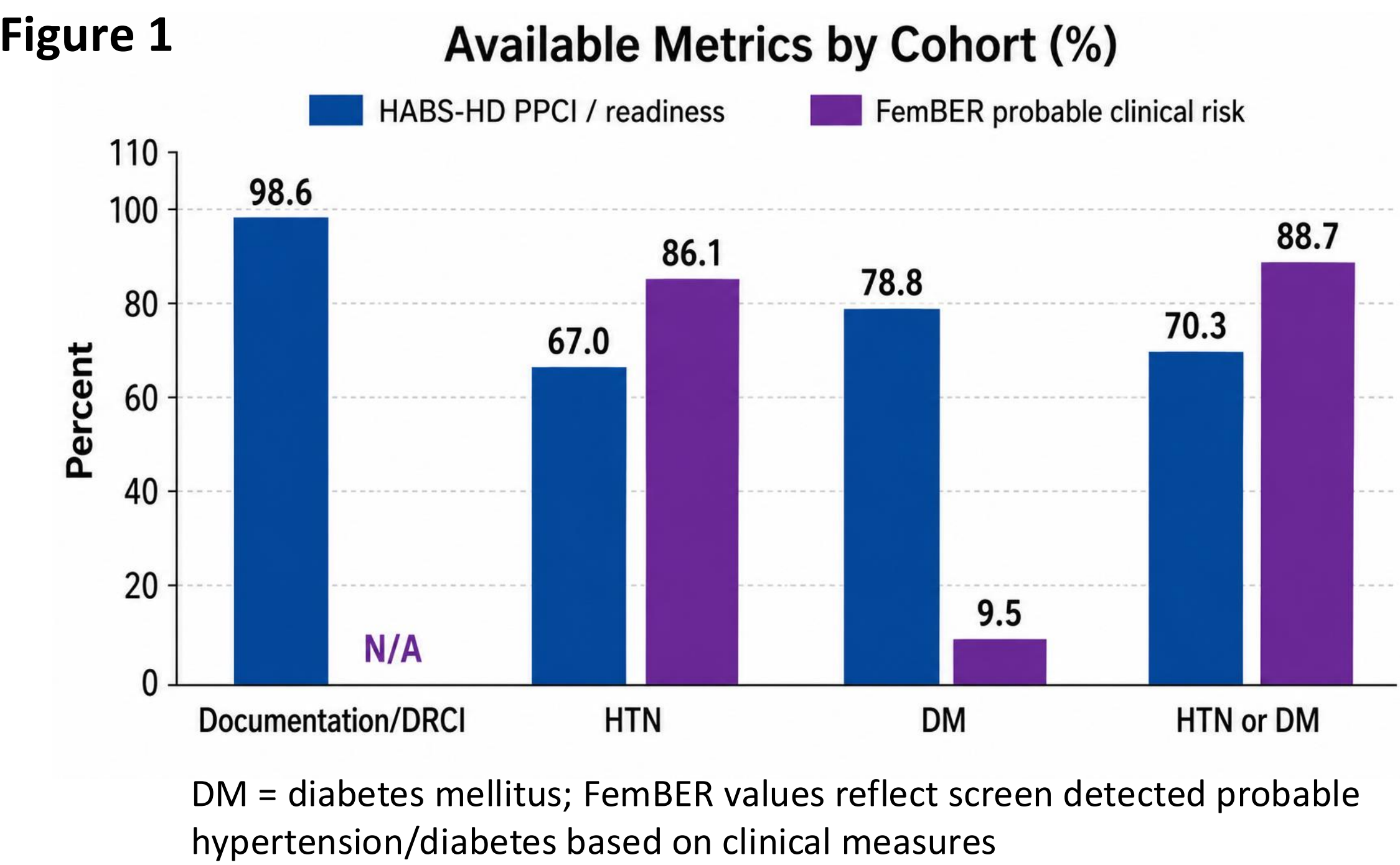
β_1 = strength of association between digital readiness and pharmacologic pathway performance, estimated per cohort i

METHODS

We implemented a two cohort DRIPP proof-of-concept. HABS-HD Release 7 was analyzed at baseline as a high documentation U.S. anchor, with PPCI defined as medication receipt among participants diagnosed with hypertension, diabetes, or either condition. FemBER Kenya lacked comparable diagnosis, medication-use, insurance, and ADI fields; therefore, analyses were adapted to probable cardiometabolic risk using blood pressure (BP), HbA1c, and fasting glucose. MPI measures replaced ADI. Logistic models estimated sociodemographic/clinical associations, reported as odds ratios, 95% confidence intervals, and AUC. Models using systolic BP to predict probable hypertension (HTN) were treated as non-substantive because BP partly defined the outcome.

RESULTS

HABS-HD showed high digital readiness but persistent treatment gaps: HTN PPCI=67.0%, DM PPCI=78.8%, pooled PPCI=70.3% (See Figure 1). Because most HABS-HD records had complete documentation, this cohort was more useful for estimating PPCI treatment performance than for comparing low vs high digital readiness. FemBER could not estimate treatment receipt, but showed high screen-detected cardiometabolic burden: probable HTN=86.1% and probable HTN/DM=88.7%. No FemBER predictors reached p<0.05; however, model AUCs were 0.83 for probable HTN, 0.75 for the sociodemographic probable DM model, 0.82 for the clinical probable DM model, and 0.94 for the combined probable HTN/DM model.



CONCLUSIONS

DRIPP provides an equity framework for assessing whether health systems have the digital capacity needed to successfully manage dementia risk treatment pathways. In this initial implementation, HABS-HD demonstrates how DRIPP can quantify pharmacologic pathway performance when diagnosis and medication data are available: despite high documentation/readiness (DRCI=98.6%), treatment gaps remained for hypertension (HTN PPCI=67.0%), diabetes (DM PPCI=78.8%), and pooled HTN/DM opportunities (70.3%). FemBER demonstrates how the framework can be adapted in settings where treatment data are not yet available, using measured clinical indicators to identify high cardiometabolic risk, including probable HTN=86.1% and probable HTN/DM=88.7%, while also defining the minimum data elements needed for future treatment equity analyses.

Discussion

Limitations included a reduction of scope from a four-country DRCI→PPCI analysis (U.S., Sierra Leone, Nigeria, Kenya). Additionally, FemBER could not estimate PPCI because diagnosis, medication-use, insurance, and ADI variables were unavailable. Cross-country β₁, facility-level adjustment, and stockout sensitivity analyses remain planned rather than completed. This initial implementation of the DRIPP model in US and Kenya will be refined with plans to apply this method to additional countries including Sierra Leone, Ghana, and the UK.

SELECTED REFERENCES

[1] WHO Global Dementia Report, 2023. [2] Livingston et al., Lancet 2020. [3] Blumenthal et al., NEJM 2010. [4] Slight et al., JAMIA 2015. [5] Mehl & Labrique, Nat Med 2014. [6] HABS-HD Protocol, UNTHSC 2020.