Characterizing Organ Donation Awareness from Social Media

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Presentation@2017 IEEE 33rd International Conference on Data Engineering (ICDE), April 22nd, 2017

Agenda

1) Transplant of Human Organs;

2) Related Works

   I. Organ Transplantation

   II. Organ Donation

3) Social Media and Organ Donation

   I. Awareness Signature

   II. Geographical Variations

   III. Organ-Aware Users

4) Limitations and Future Works

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Organ Transplantation

SUCCESSFUL HOMOTRANSPLANTATION OF THE HUMAN KIDNEY BETWEEN IDENTICAL TWINS

John P. Merrill, M.D., Joseph E. Murray, M.D., J. Hartwell Harrison, M.D.
and
Warren R. Guild, M.D., Boston

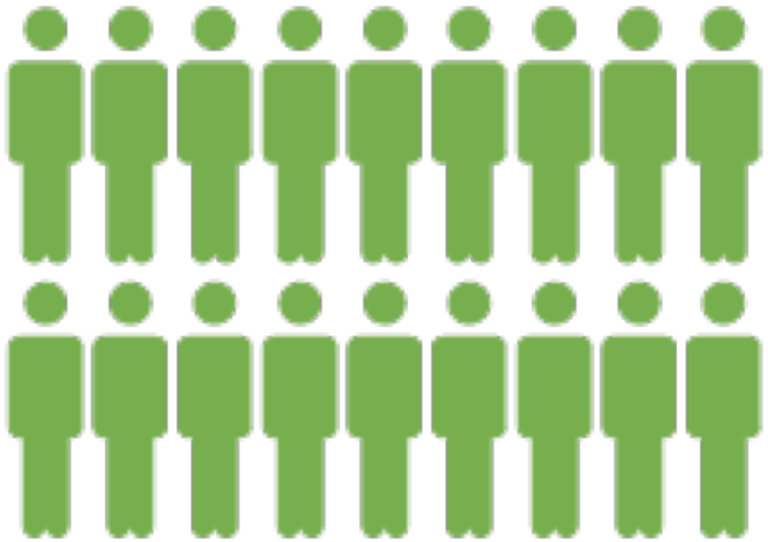
This report documents the successful transplantation of a human kidney from one identical twin to another. The function of the homograft remains excellent 12

• ***A patient whose illness had begun with edema and hypertension was found to have suffered extreme atrophy of both kidneys. Because of the***

Organ Shortage Crisis

Organ Shortage Crisis

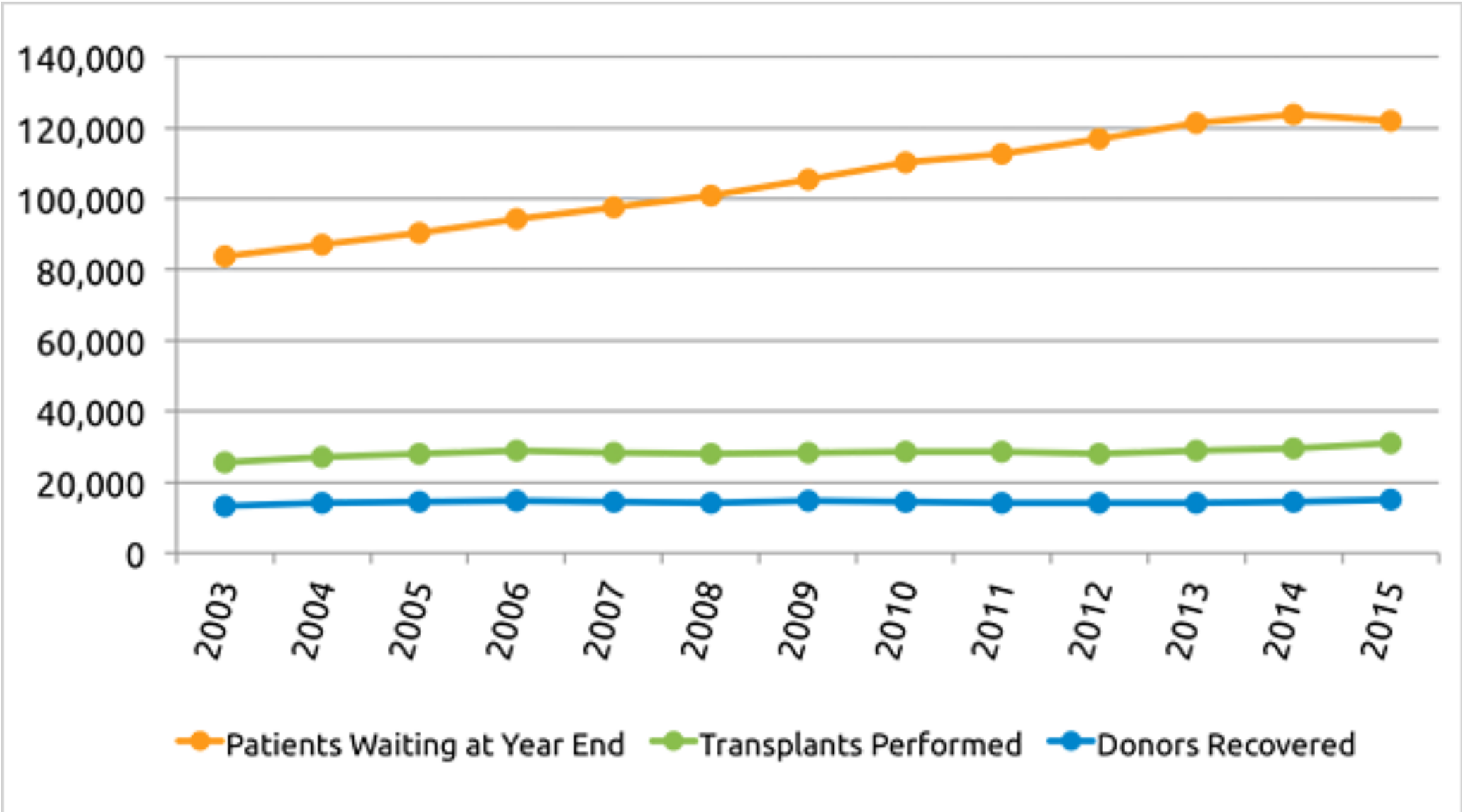
Every **ten minutes**, someone is added to the national transplant waiting list [1].



On average, 22 people die each day while waiting for a transplant [1].

OPTN Web Site. http://optn.transplant.hrsa.gov

Organ Shortage Crisis



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Previous Works

EXPERT REVIEW OF GASTROENTEROLOGY & HEPATOLOGY, 2016
http://dx.doi.org/10.1586/17474124.2016.1149061

Taylor & Francis
Taylor & Francis Group

REVIEW

Extended criteria donors in liver transplantation Part I: reviewing the impact of determining factors

Balázs Nemes[a], György Gámán[b], Wojciech G. Polak[c], Fanni Gelley[d], Takanobu Hara[e], Shinichiro Ono[e], Zhassulan Baimakhanov[e], Laszlo Piros[b] and Susumu Eguchi[e]

[a]Department of Organ Transplantation, Faculty of Medicine, Institute of Surgery, University of Debrecen, Debrecen, Hungary; [b]Clinic of Transplantation and Surgery, Semmelweis University, Budapest, Hungary; [c]Department of Surgery, Division of Hepatopancreatobiliary and Transplant Surgery, Erasmus MC, University Medical Center Rotterdam, Rotterdam, The Netherlands; [d]Department of Internal medicine and Gastroenterology, Polyclinic of Hospitallers Brothers of St. John of God, Budapest, Hungary; [e]Department of Surgery, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki, Japan

ABSTRACT

ARTICLE HISTORY

Previous Works

Soc. Netw. Anal. Min. (2013) 3:457–473
DOI 10.1007/s13278-012-0089-1

ORIGINAL ARTICLE

Understanding organ transplantation in the USA using geographical social networks

Srividhya Venugopal · Evan Stoner · Martin Cadeiras · Ronaldo Menezes

Previous Works

American Journal of Transplantation 2015; 15: 541–546
Wiley Periodicals Inc.

doi: 10.1111/ajt.12981

Brief Communication

The Impact of Proposed Changes in Liver Allocation Policy on Cold Ischemia Times and Organ Transportation Costs

D. A. DuBay[1,*], P. A. MacLennan[1], R. D. Reed[1], M. Fouad[2], M. Martin[2], C. B. Meeks[3], G. Taylor[3], M. L. Kilgore[4], M. Tankersley[5], S. H. Gray[1], J. A. White[1], D. E. Eckhoff[1] and J. E. Locke[1]

[1]*Department of Surgery-Transplantation, University of*

Abbreviations: ANOVA, analysis of variance; BMI, body mass index; DRI, donor risk index; HCC, hepatocellular carcinoma; LSAM, liver simulation allocation model; MELD, Model for End-Stage Liver Disease; OPO, organ procurement organization; UAB, University of Alabama Birmingham; UNOS, United Network for Organ Sharing

Previous Works

ORIGINAL CONTRIBUTION

Factors Influencing Families' Consent for Donation of Solid Organs for Transplantation

Laura A. Siminoff, PhD
Nahida Gordon, PhD
Joan Hewlett, PhD
Robert M. Arnold, MD

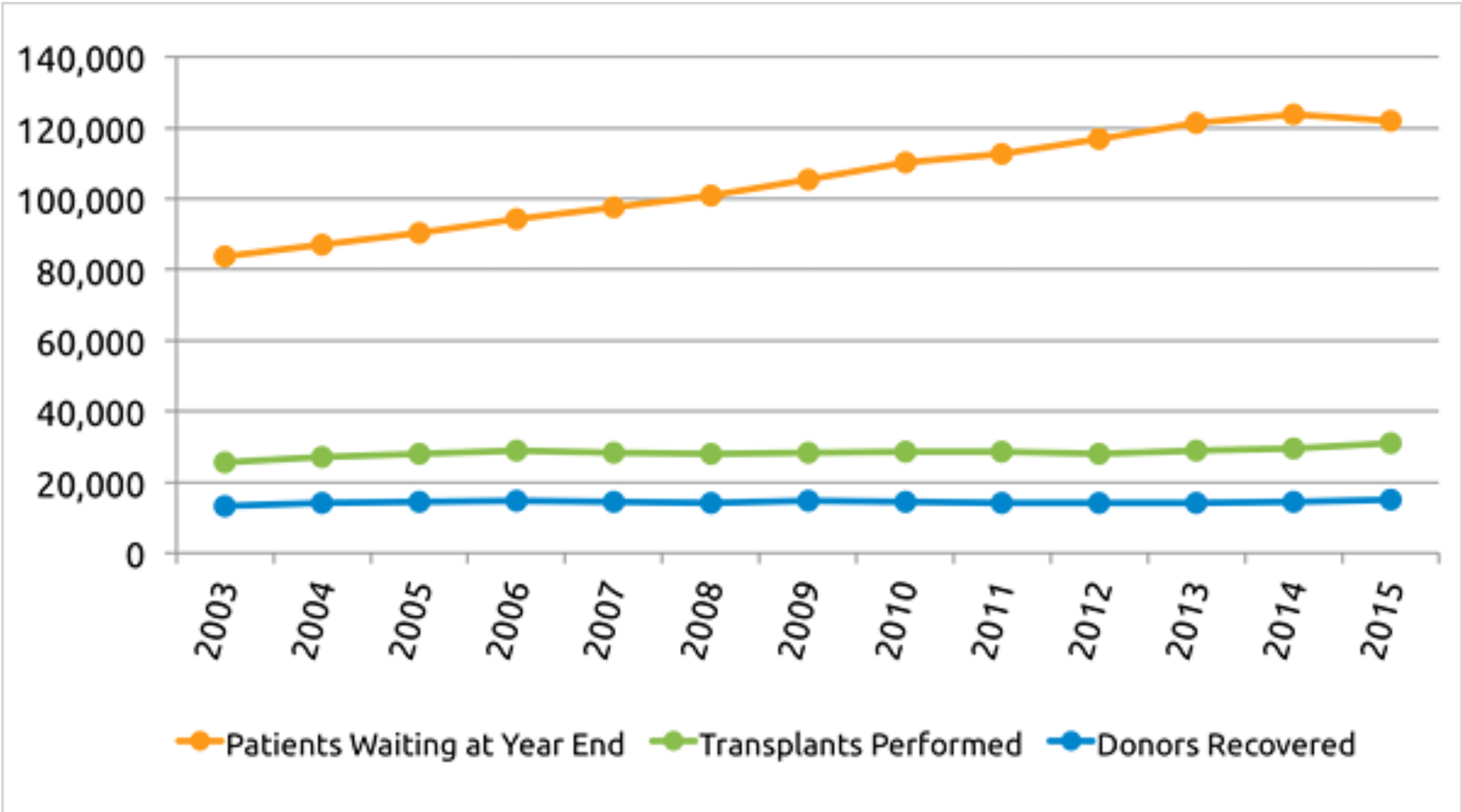
Context Transplantation has become the therapy of choice for patients with organ failure. However, the low rate of consent by families of donor-eligible patients is a major limiting factor in the success of organ transplantation.

Objective To explore factors associated with the decision to donate among families of potential solid organ donors.

Design and Setting Data collection via chart reviews, telephone interviews with health care practitioners (HCPs) or organ procurement organization (OPO) staff, and

ORGAN TRANSPLANTATION IS one of medicine's success

Organ Shortage Crisis



OPTN Web Site. http://optn.transplant.hrsa.gov

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Previous Works

Clin Transplant 2013: 27: E320–E326 DOI: 10.1111/ctr.12122

Clinical Transplantation

Identifying potential kidney donors using social networking web sites

Chang A, Anderson EE, Turner HT, Shoham D, Hou SH, Grams M. Identifying potential kidney donors using social networking web sites.

Abstract: Social networking sites like Facebook may be a powerful tool

Alexander Chang[a], Emily E. Anderson[b], Hang T. Turner[c], David Shoham[d], Susan H. Hou[e] and Morgan Grams[a]

Previous Works

Social Science & Medicine xxx (2016) 1–9

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Cultural carrying capacity: Organ donation advocacy, discursive framing, and social media engagement

Christopher A. Bail

Department of Sociology, Duke University, USA

Previous Works

American Journal of Transplantation 2013; 13: 2059–2065
Wiley Periodicals Inc.

doi: 10.1111/ajt.12312

Social Media and Organ Donor Registration: The Facebook Effect

A. M. Cameron[1,*], A. B. Massie[1,2], C. E. Alexander[3], B. Stewart[4], R. A. Montgomery[1], N. R. Benavides[5], G. D. Fleming[6] and D. L. Segev[1,2]

Introduction

Currently, the need for organs vastly outpaces the available supply, with over 100 000 Americans waiting on an organ transplant waitlist (1). Further, the waitlist is probably an

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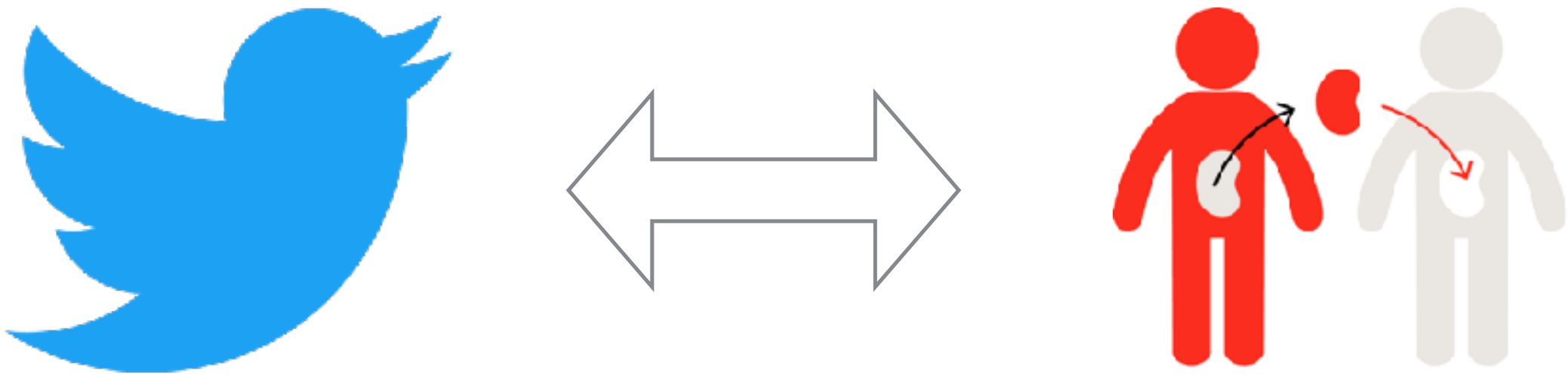
Research Question



What is the extent in which ***online social activities*** *on Twitter is associated with aspects of* ***organ donation****?*

Tweets Advocating Donation

Tweets Communicating Transplant

Diverse Tweets on Organ Donation

Jim Jones @jbubbag · Apr 4

Replying to @Driven2Save

Because I received a **Liver** from a 22 yr old man gone to soon and words will never be enough to express my gratitude to my unknown **donor**.

1 1 8

Charl JFT96 Hennessy @charlhennessy1 · Mar 26

Replying to @charlhennessy1

Even within her own grief, Violet's mum had her kidneys & **pancreas** donated to help other children who desperately need organ **donation** 💖

1 2 7

Ryan J. A. Hoover @RyanJAHoover · 1 Nov 2012

Organ **donation** lecture in nursing class today @RochesterCTC - who knew you could donate part of an **intestine**???

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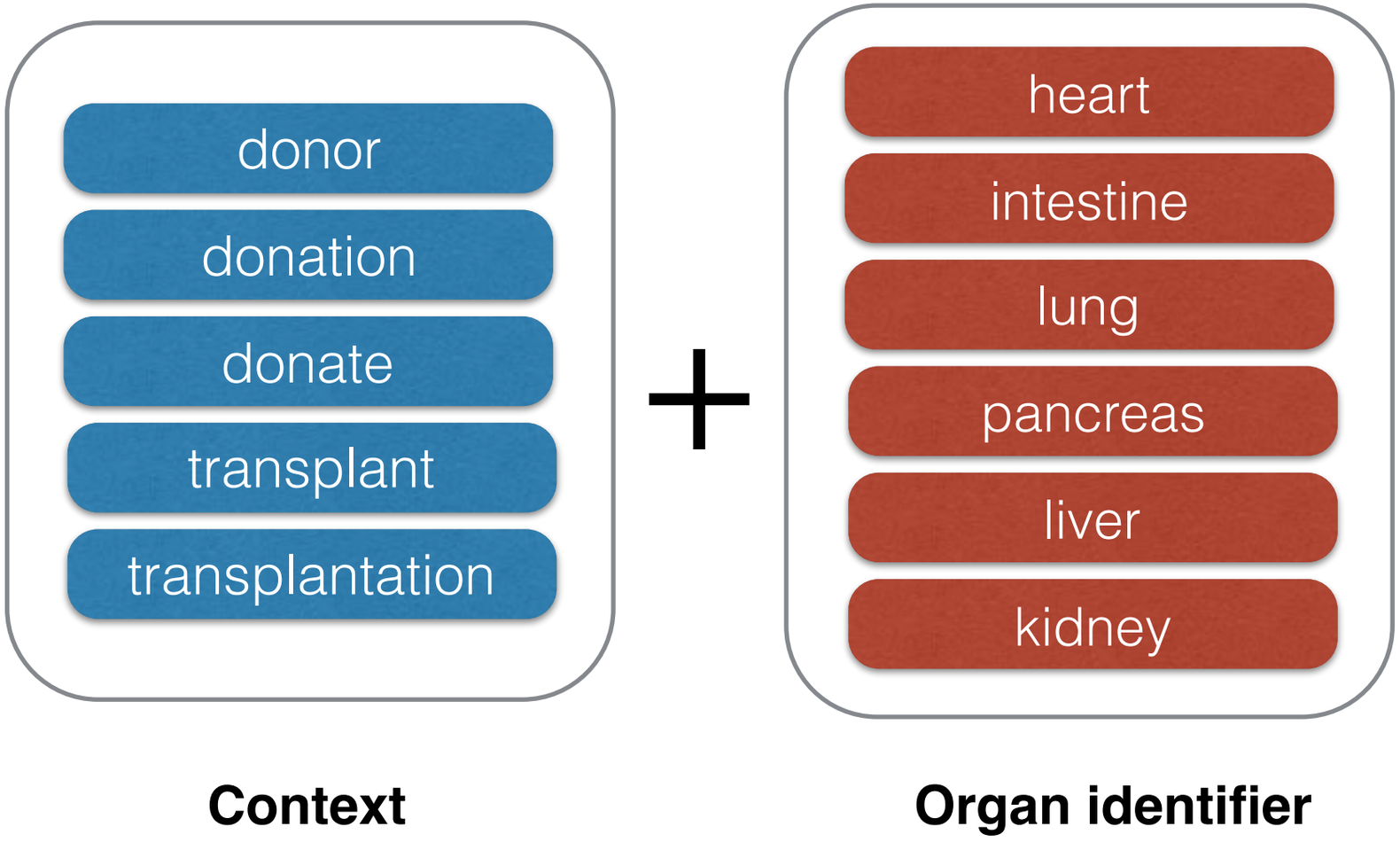
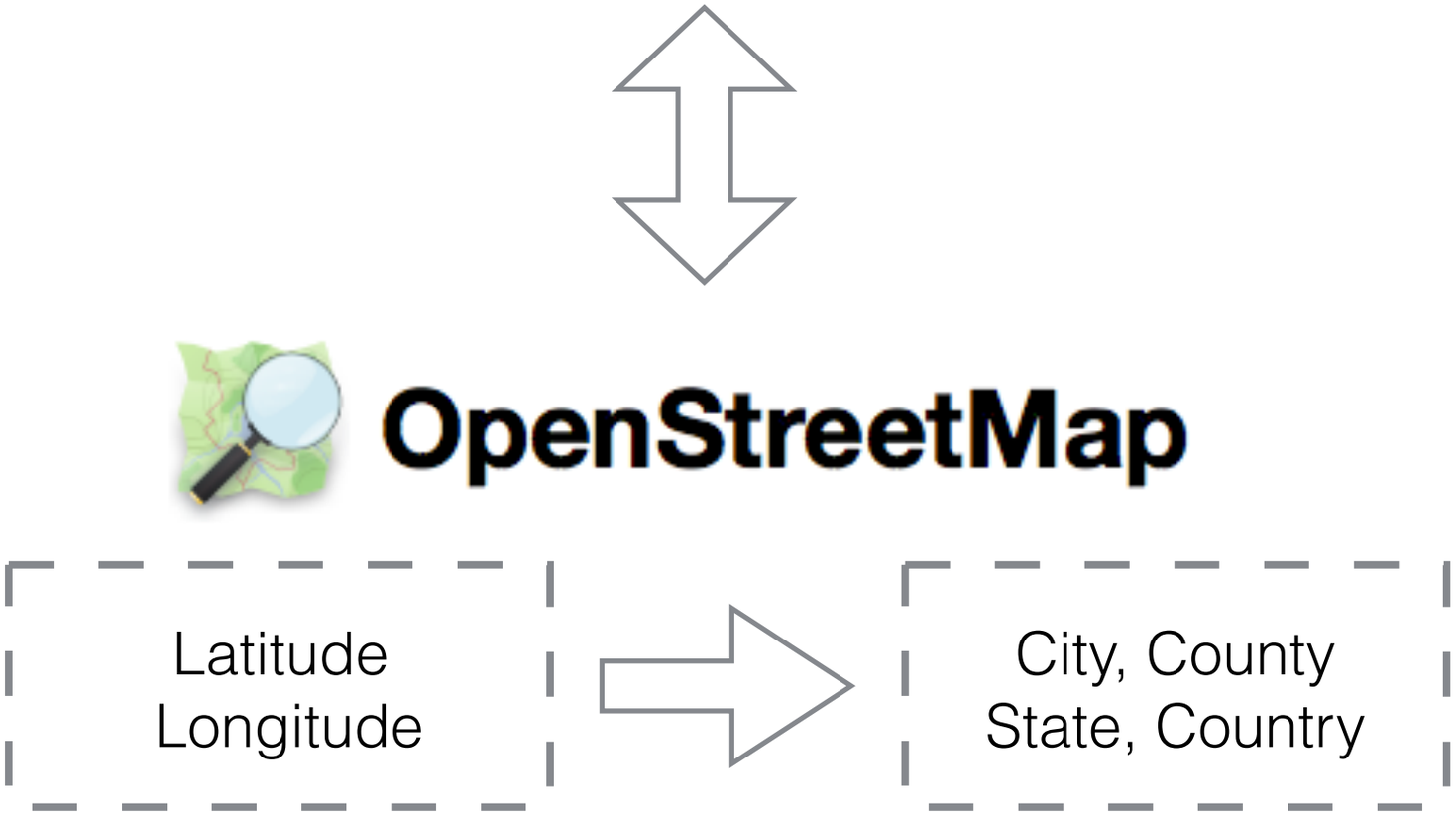
Data

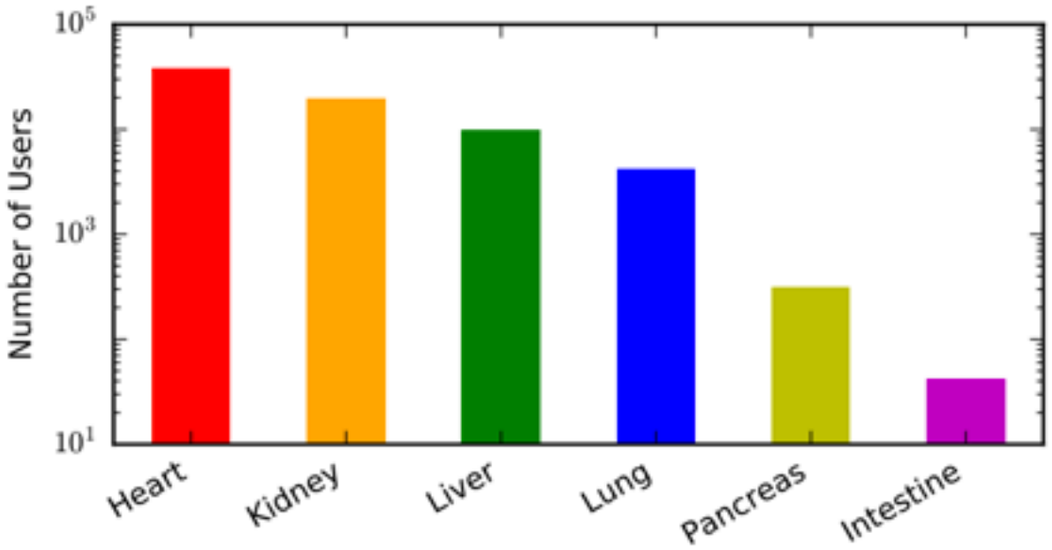
Gauging Indicators of Organ Donation



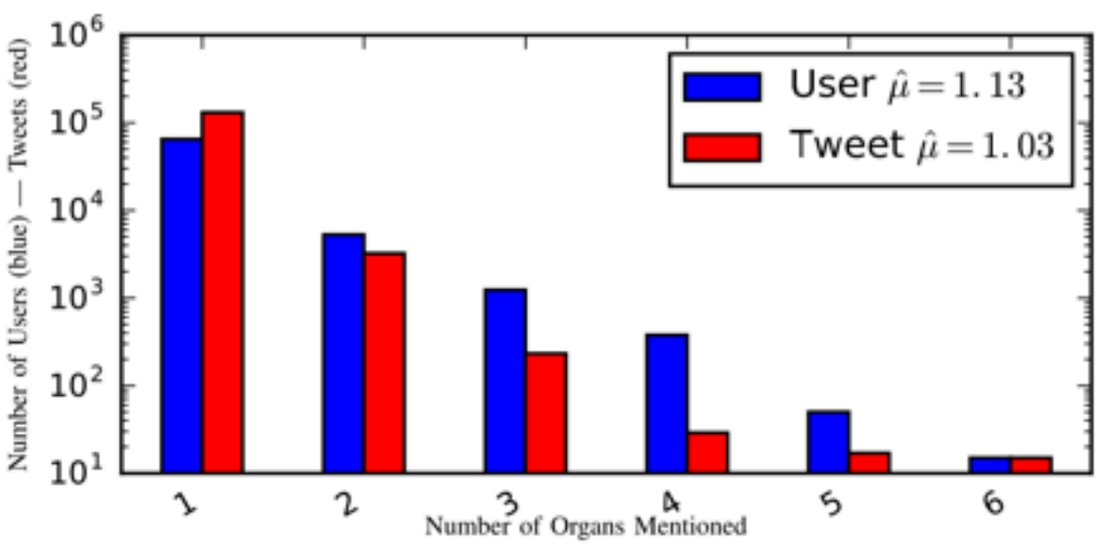
Inferring Locations from Self-Reported Information



Descriptive Statistics



(a) Number of Twitter users per organ



(b) Number of organs mentioned per user (blue) and per tweet (red)

TABLE I. STATISTICS OF THE DATASET USED IN THIS PAPER. THE DATASET CONTAINS COLLECTED TWEETS FROM USERS REGARDING ORGAN DONATION.

Statistic	Value
Start Data Collection	Apr 22th 2015
Finish Data Collection	May 11th 2016
Number of Days	385
Tweets collected	134,986
Number of Users	71,947
Avg. Tweets / Day	350
Avg. Tweets / User	1.88
Organs mentioned / Tweet	1.03
Organs mentioned / User	1.13

*134,986 out of 975,021 tweets could be identified as from USA users.

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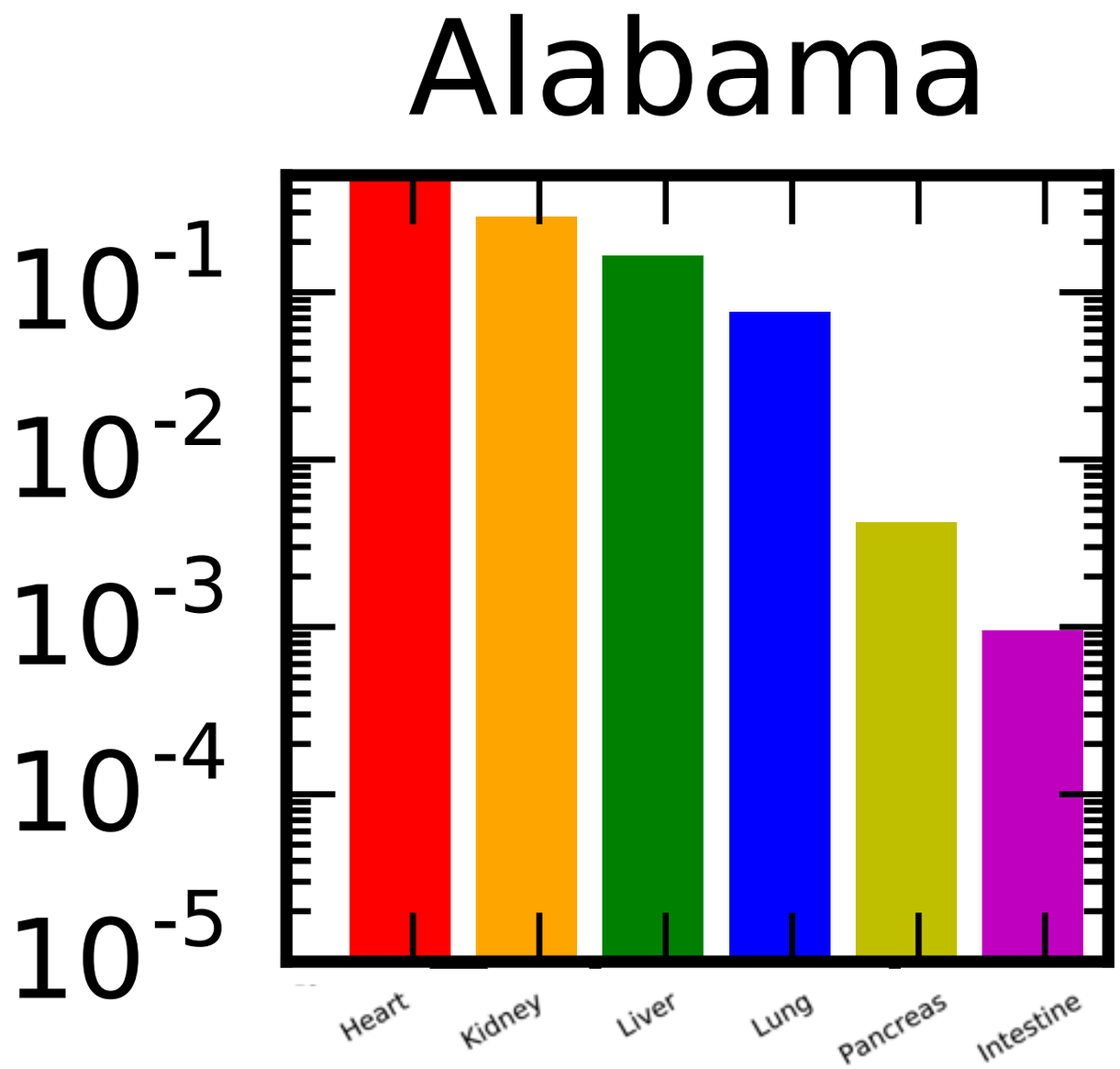
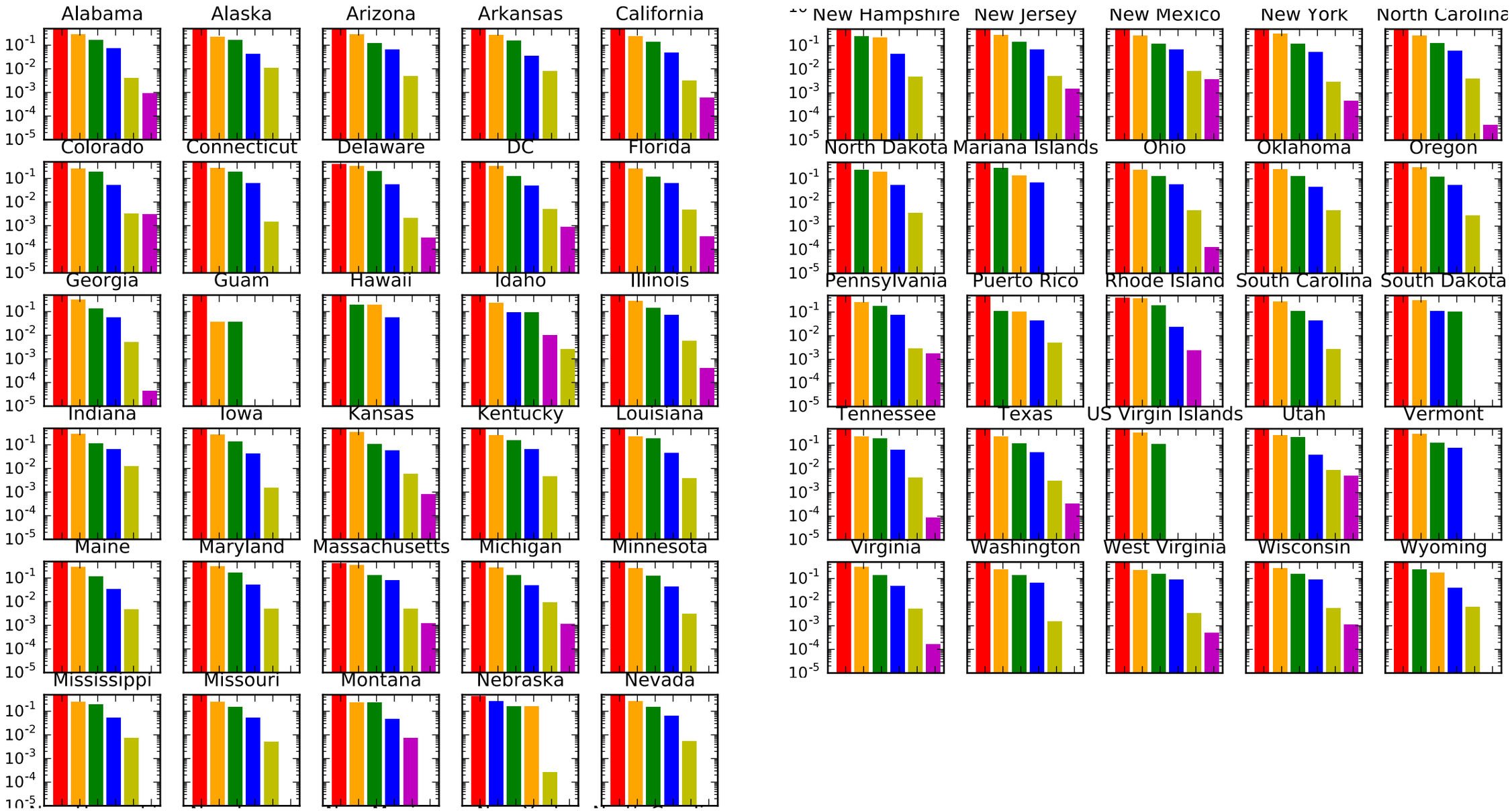
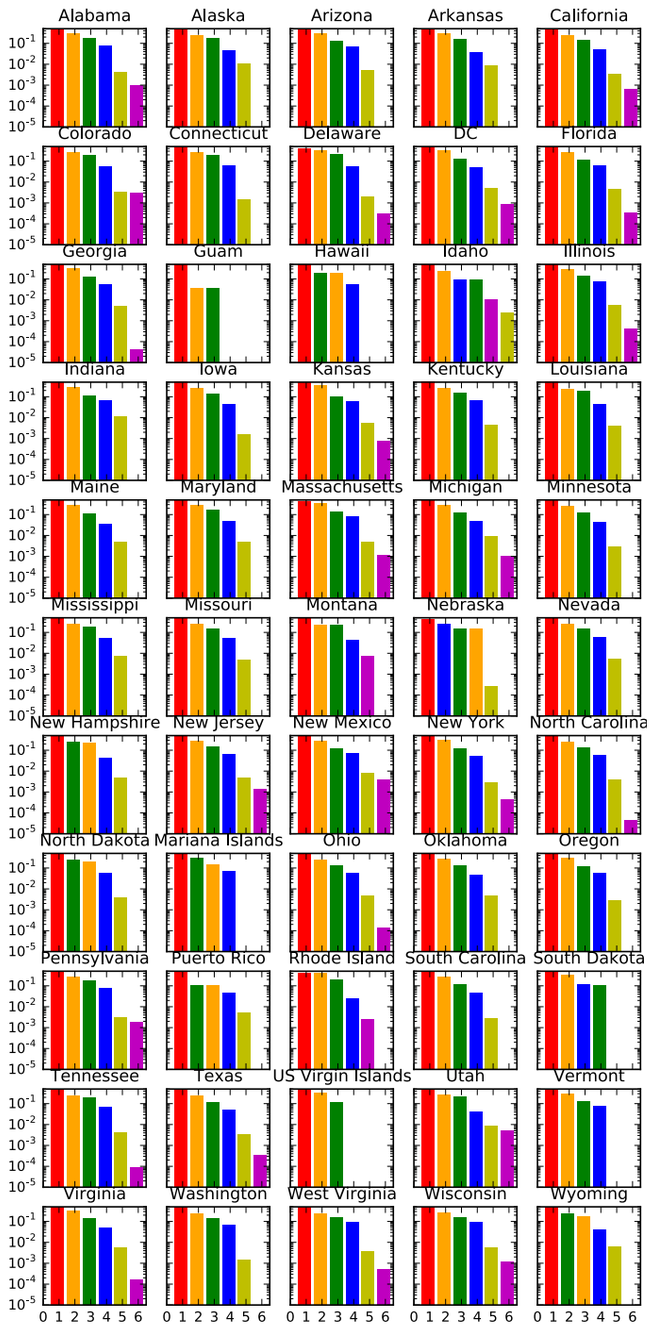
Awareness Signature

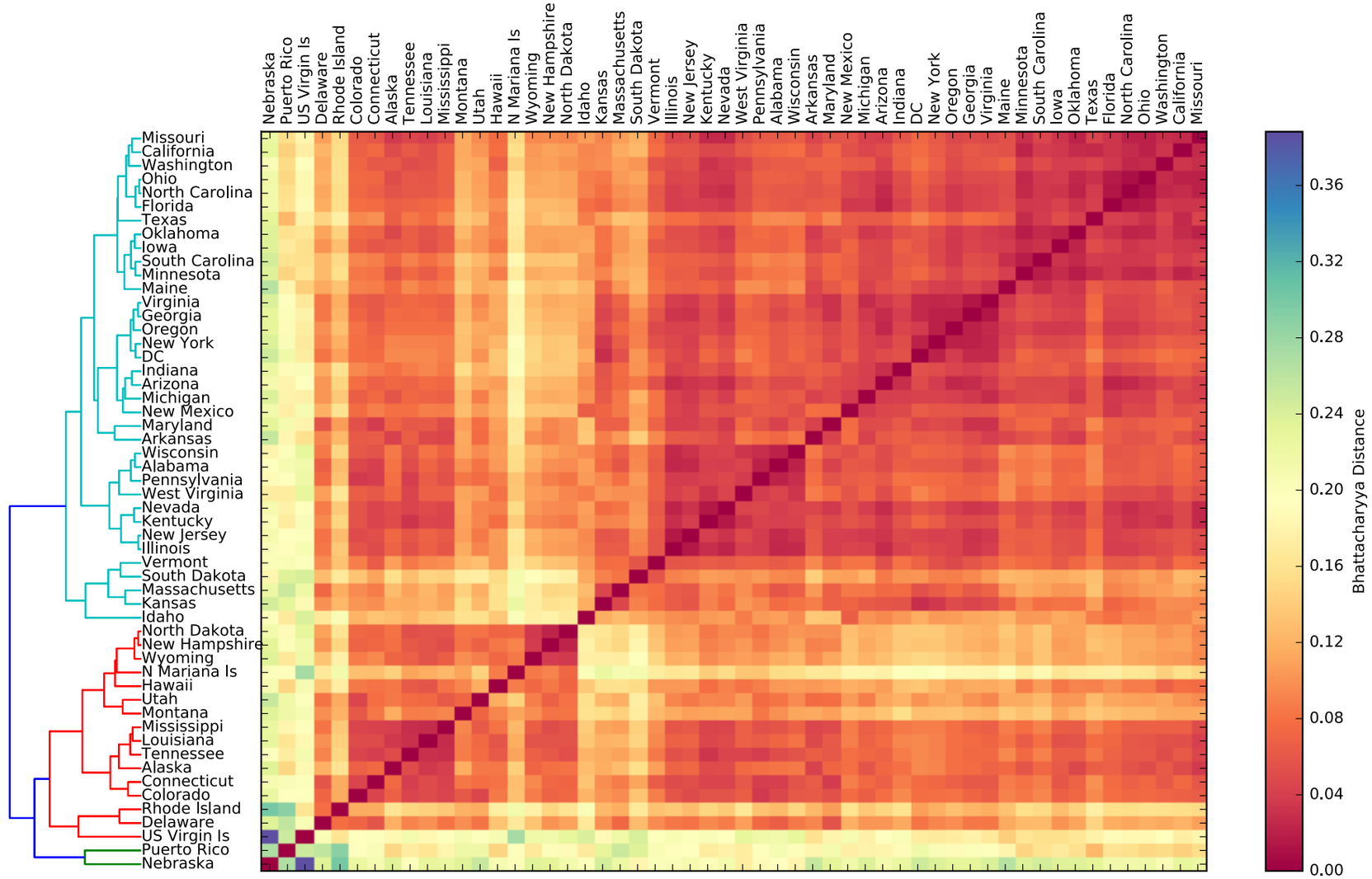


Awareness Signature

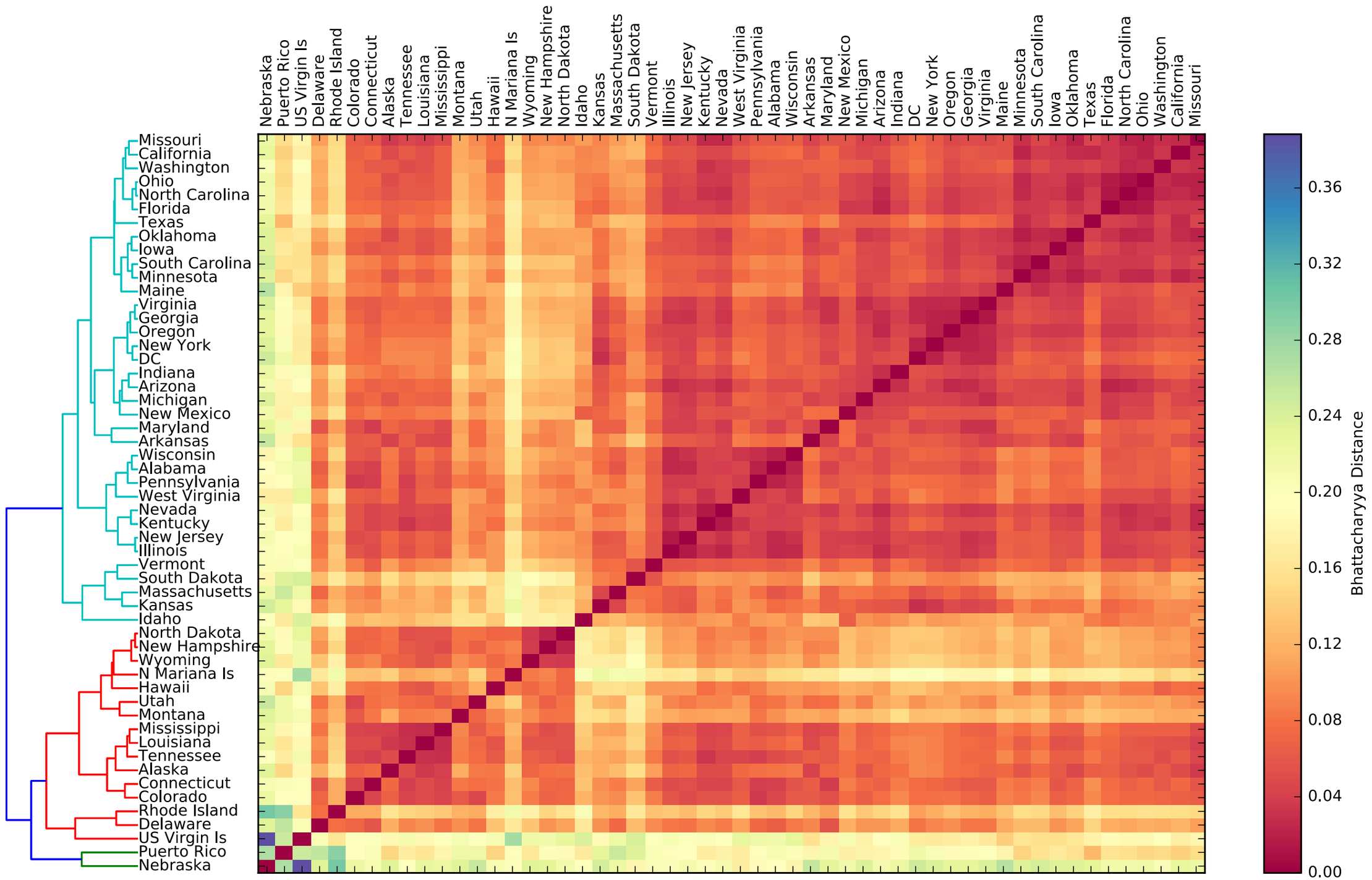


Awareness Signature

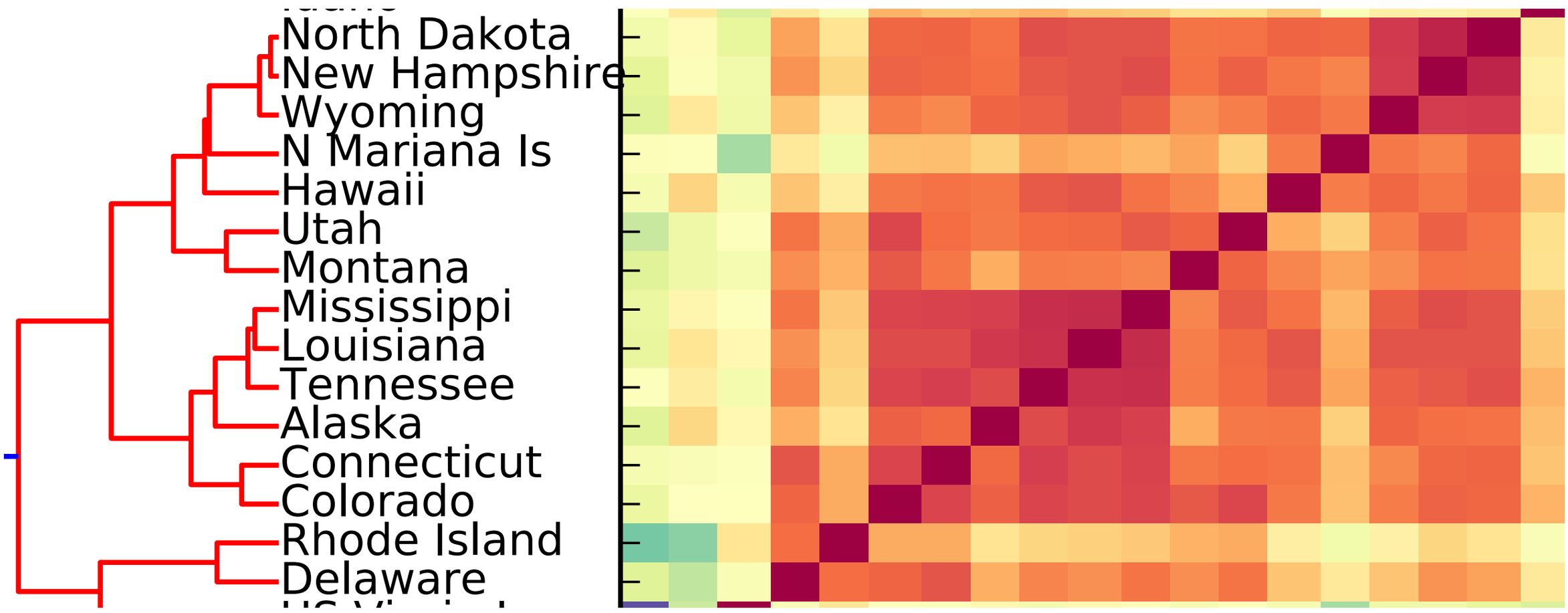




Awareness Signature



Awareness Signature



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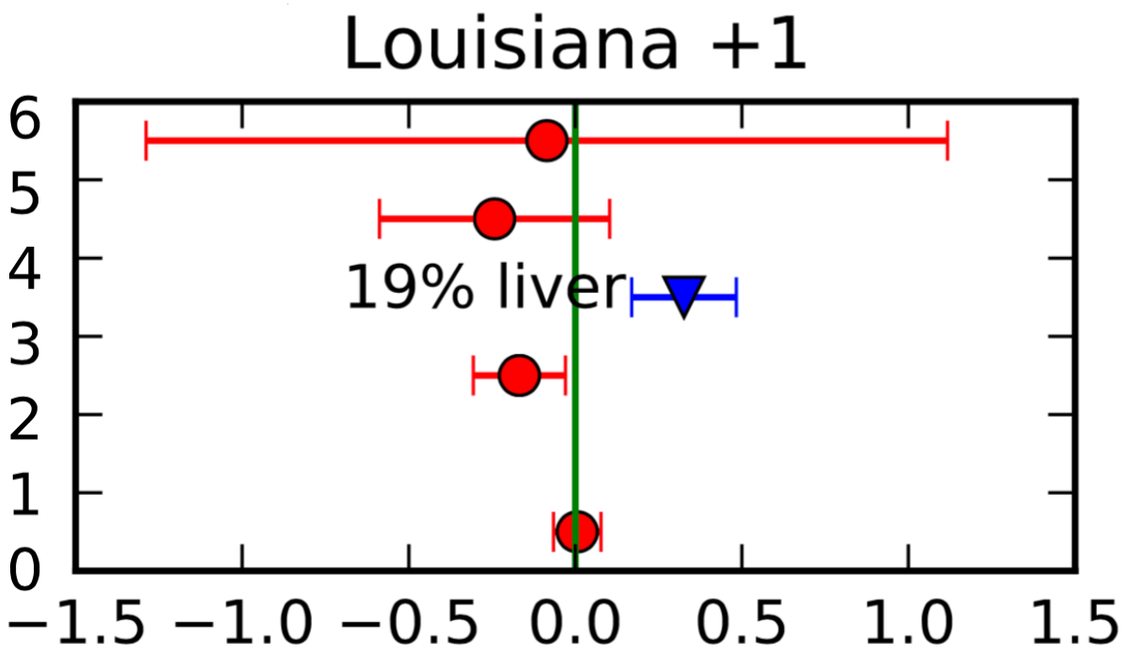
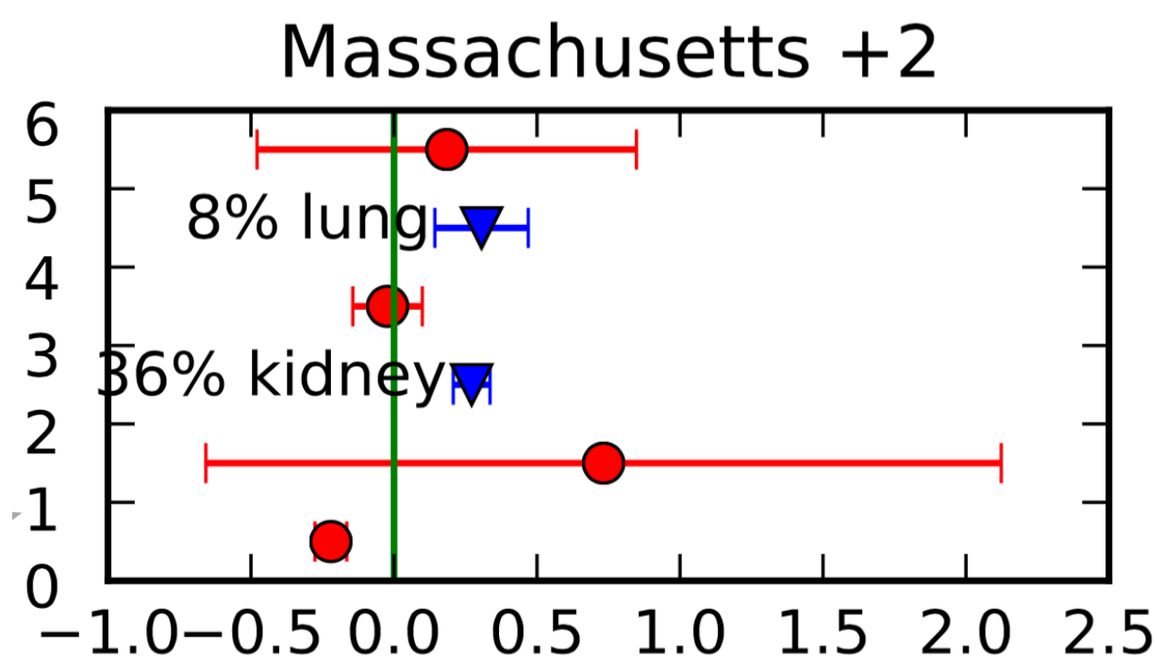
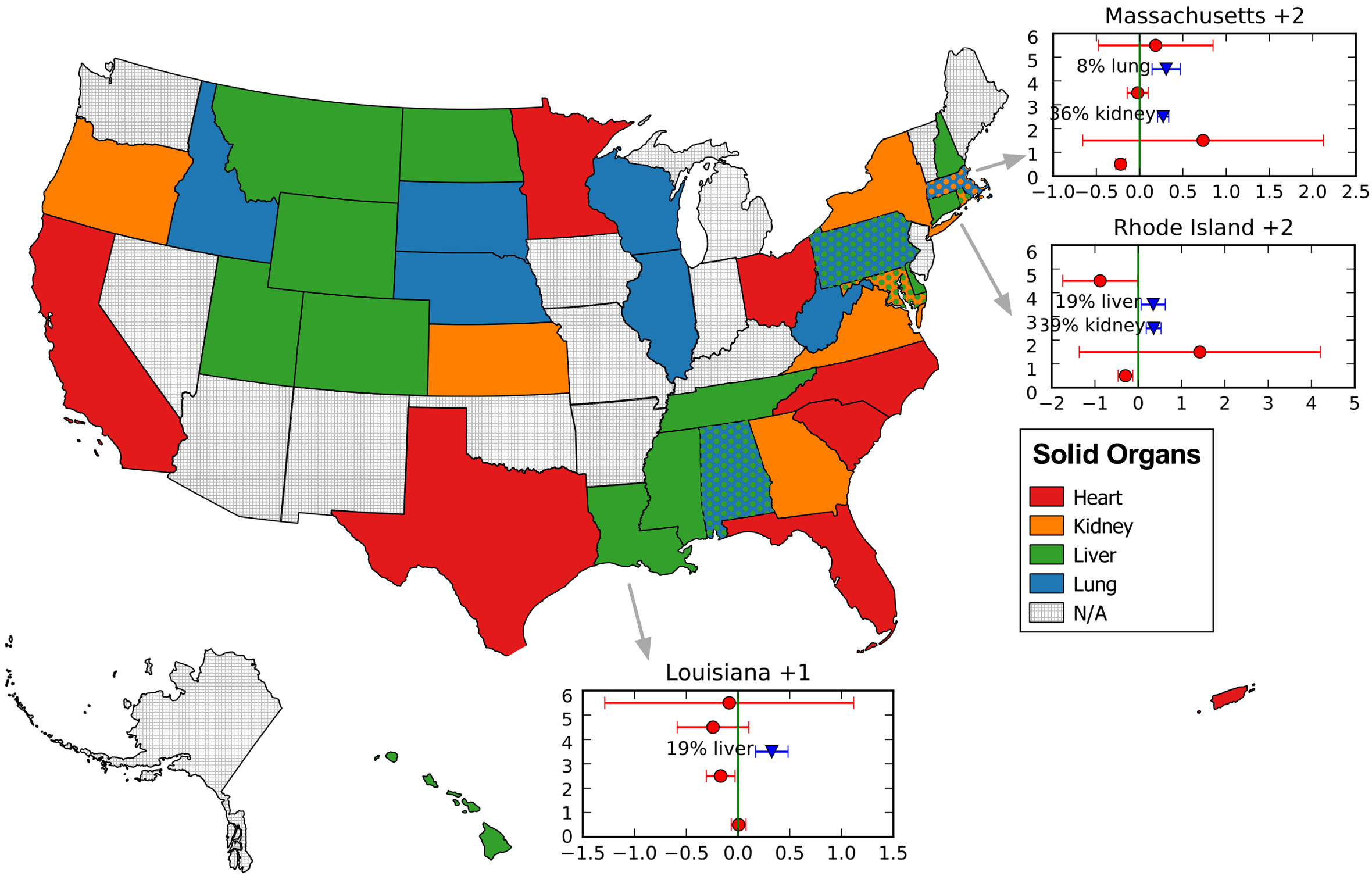
Geographical Variations

$$RR_{ir} = \frac{\rho_{ir}}{\rho_{in}}$$





Geographical Variations



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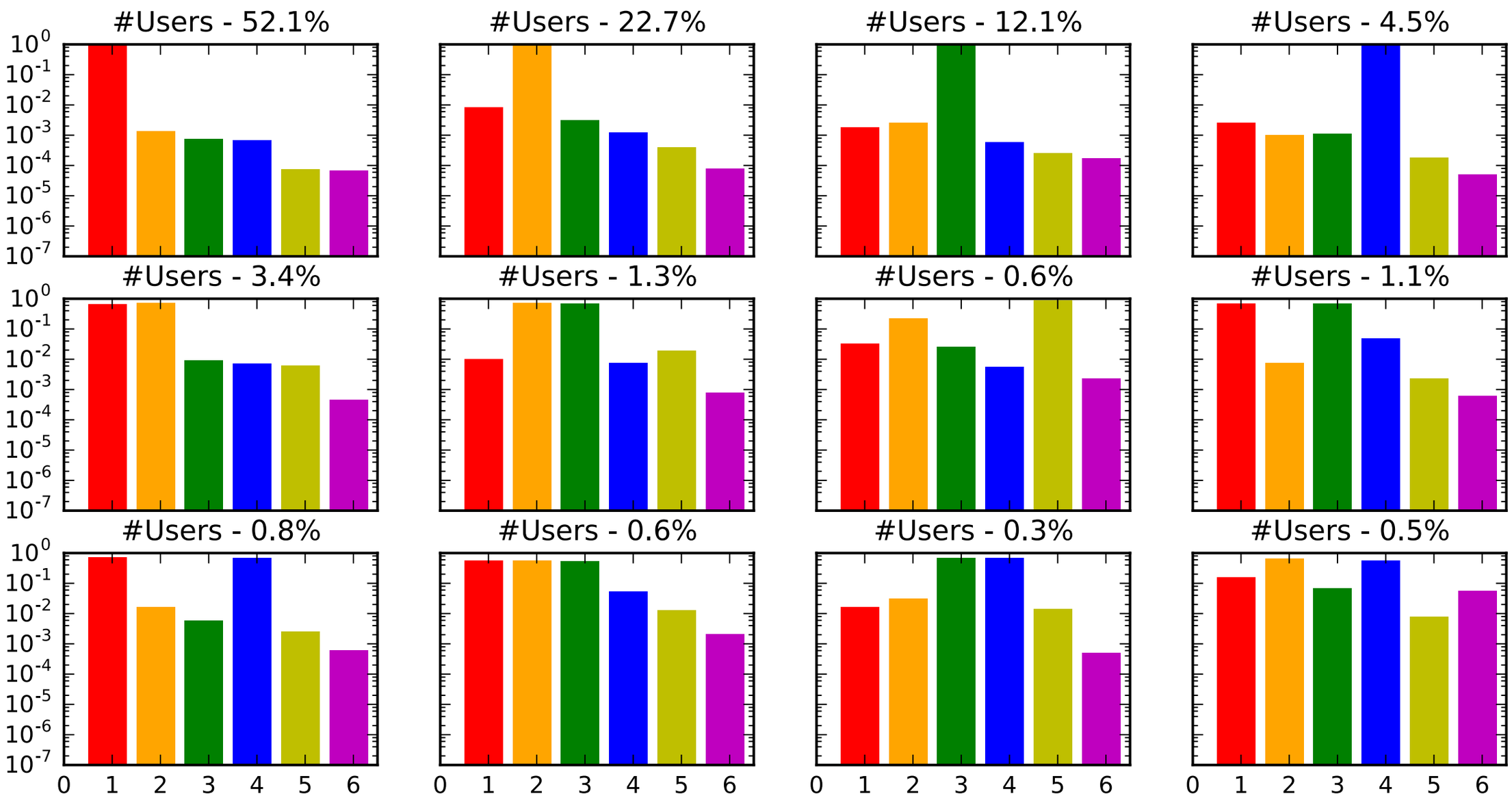
Organ-Aware Users



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Limitations and Future Works

1. Demographic Bias on Twitter;
2. Improve Data Collection;
3. Infer Demographics;
4. Multilevel Approach;
5. Real-Time Monitoring.

Acknowledgments

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