Blood and Plasma Donors' Contributions to Epidemiological Surveillance and Response

Creative Testing Solutions

Marion LANTERI, PhD
Vice President of Scientific Affairs



Agenda

- Leveraging a Unique Infrastructure
- To Conduct Donor-Based Research Studies
  - To Maintain Blood Safety
  - To Support Epidemiological Surveillance
  - To Prepare for Public Health Response

About Creative Testing Solutions

Central Blood Screening Lab for:

- Blood donations collected by American Red Cross, Vitalant, OneBlood, and others
- Plasma collected by Grifols and others in the U.S. and Canada

- **Eight** U.S. laboratories
- **~1,000** employees



Testing **22 million** blood and plasma donations annually

CTS maintains responsibility for 65% of the U.S. blood supply



Blood and Plasma Screening at Creative Testing Solutions

Test 8 Million Blood and 14 Million Plasma Donations Annually

Blood Screening Results

Blood Centers

Collection Sites

Collection

Donors



BCO and plasma collection sites

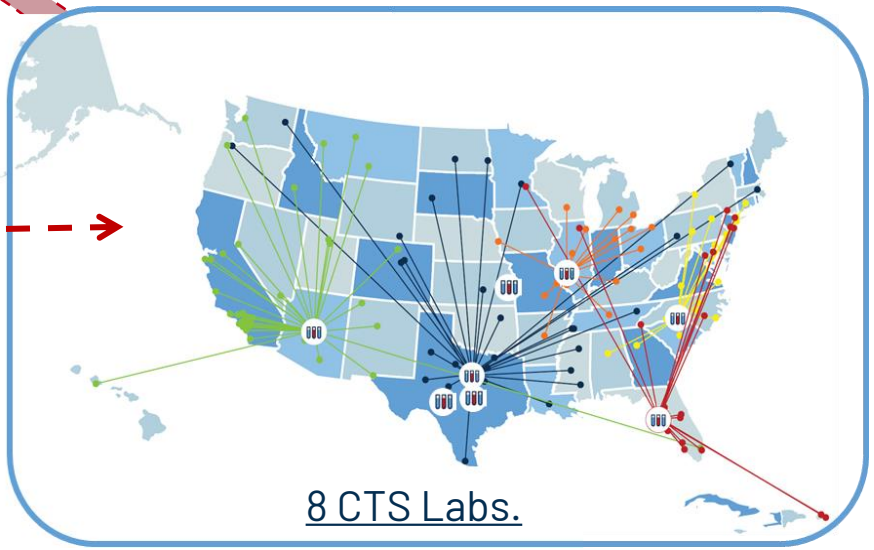
Retention tubes



Blood components



Blood Safety



8 CTS Labs.

Safe Blood Products for Patients

PDMPs

Nationwide Access to Biospecimens



+

BCO Donor Database

Research

- Consented Donors
- Infectious Disease Screening
- Surveys

➢ Cross-sectional or longitudinal donor cohorts

➢ **Epidemiological Surveillance**

CTS

Joining Efforts in Research

- Vitalant Research Institute
- American Red Cross
- OneBlood
- Creative Testing Solutions

➢ **U.S. Blood and Plasma Research Consortium**



CTS

U.S. Donation Screening (per CTS)

Blood Screening

Marker	Test	Vendor	System
Classic Agents	**HIV/HCV/HBV NAT**	Grifols	Panther
	Anti-HIV-1/2 Combo	Abbott	Alinity s
	Anti-HCV	Abbott	Alinity s
	Anti-HBc	Abbott	Alinity s
	HBsAg	Abbott	Alinity s
	Anti-HTLV-I/II	Abbott	Alinity s
	CMV	Fujirebio	PK7400
	Syphilis	New Market Bio.	PK7400
	Syphilis RPR	Arlington	ASI
Vector-Borne Agents	**WNV NAT**	Grifols	Panther
	***Babesia* species NAT**	Grifols	Panther
	Anti-*T. cruzi*	Abbott	Alinity s
Blood Typing	**ABO/Rh**	Diagast	PK7400
	HLA Class I and II	Immucor GTI	Gemini
	RBC Antibody Screen	Immucor	Neo Iris
	Antibody Identification	QuidelOrtho	Vision
Donor Health	**Triglyceride**	Beckman Coulter	AU680
	A1C	Abbott	Alinity c
	Ferritin	Beckman Coulter	AU680

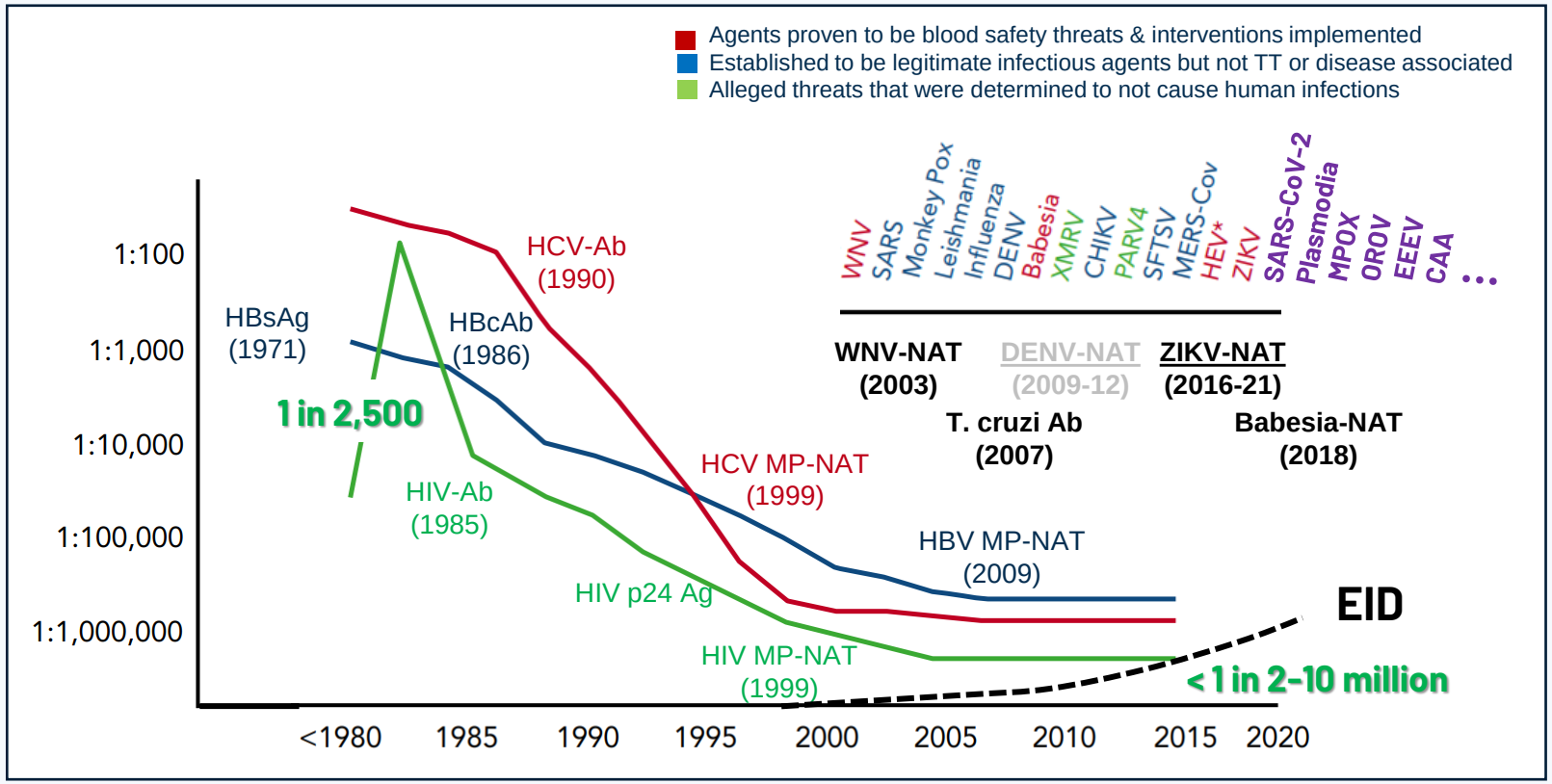
Plasma Screening Assays

Marker	Test	Vendor	System
Classic Agents	**HIV/HCV/HBV NAT**	Grifols	Panther
	Anti-HIV-1/2 Combo	Abbott	Alinity s
	Anti-HCV	Abbott	Alinity s
	HBsAg	Abbott	Alinity s
	Syphilis RPR	Arlington	ASI
	HAV/B19 NAT	Grifols	Panther
	HAV/B19 NAT (recovered)	Roche	c6800
Donor Health	***Serum Protein***	*Sebia*	*Capillarys*
	ALT		

Of Note:

- Regional Babesia screening (14 U.S. states +D.C.)
- HIV/HBV/HCV NAT performed in MP-16
- *T. cruzi* only for first time donors
- Plasma: Quantitative HAV and B19 to limit the amount of virus entering plasma pools not to exceed the viral inactivation capacity

Advances in Blood Screening Tests Progressively Decreased the Risk of Transfusion-Transmitted Infections



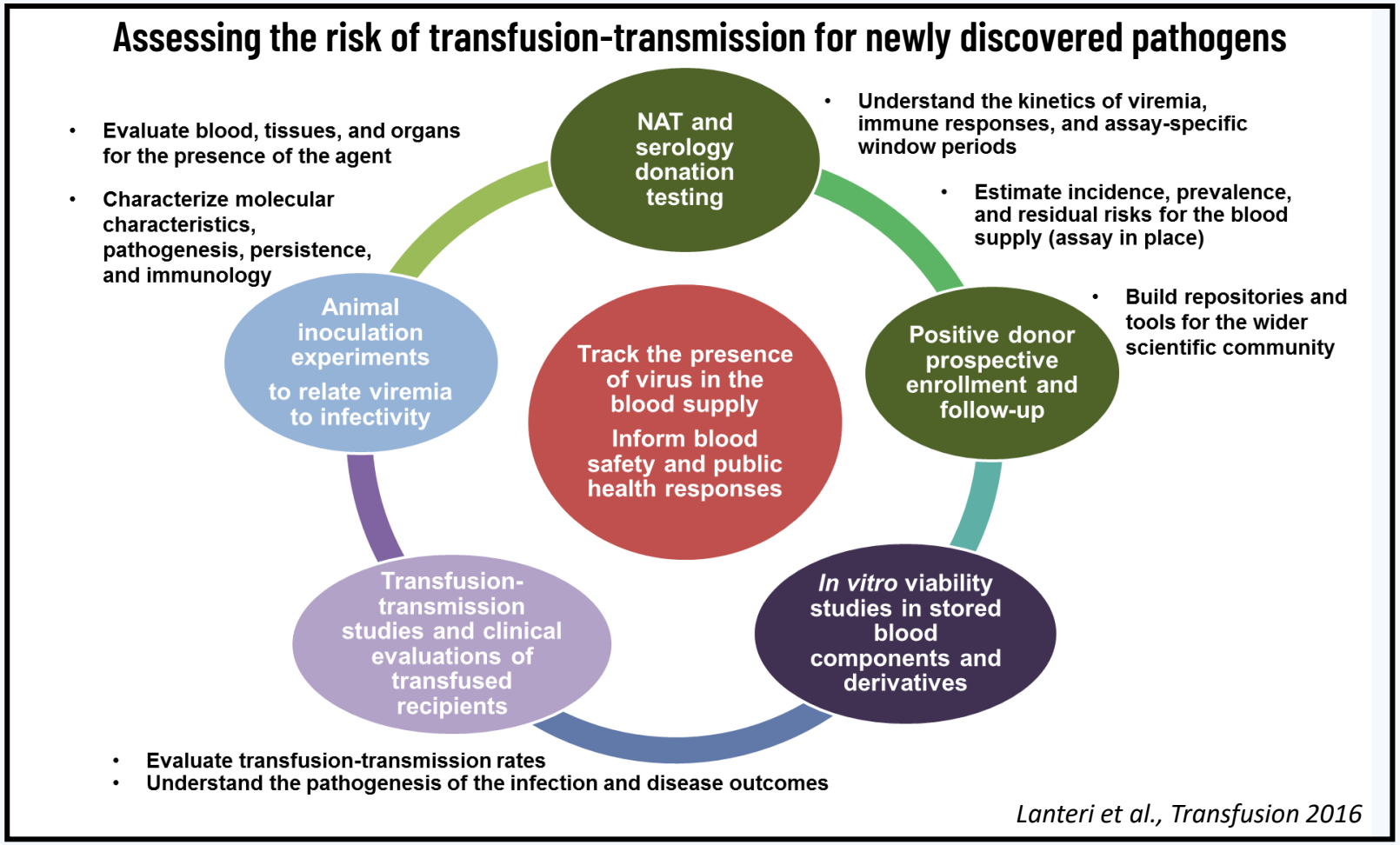
Adapted from Busch Blood 2018

✓ Blood safety ➢ Blood availability

❑ Preparedness for EID outbreaks

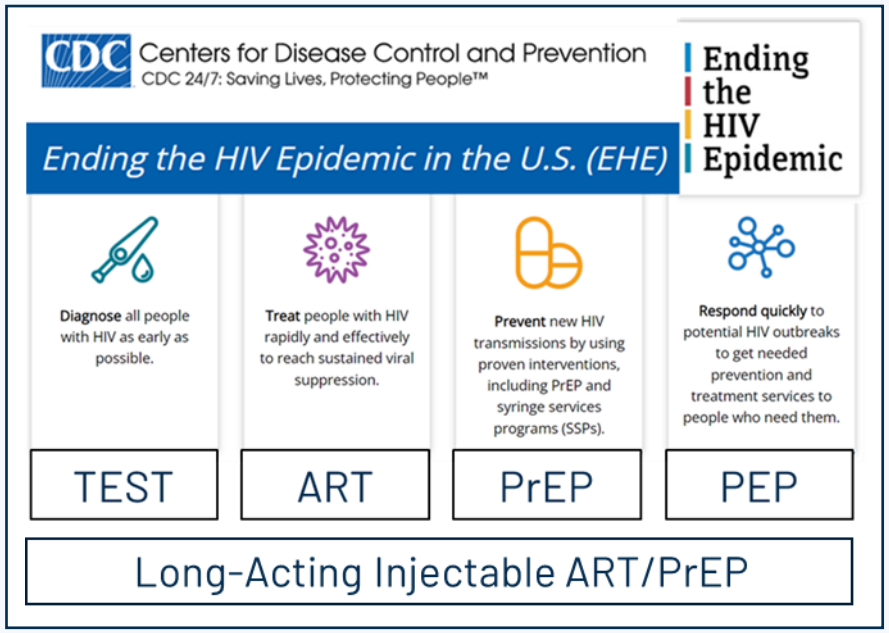
From Blood Safety to Public Health Surveillance

1. Conducting Donor-Based Research
2. With Innovative Technologies in Blood Screening
3. To Maintain Blood Safety
4. To inform Public Health Policies

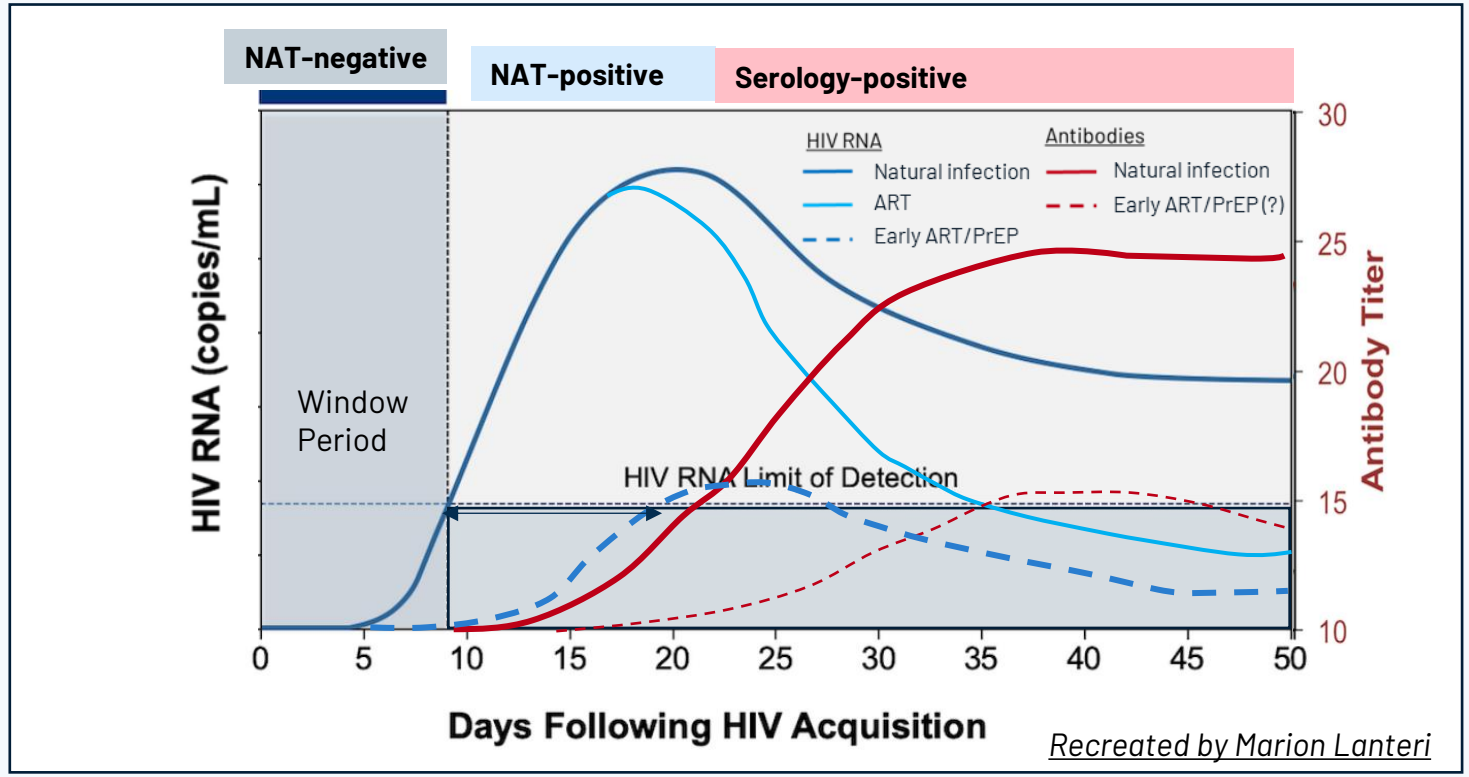


Advances in HIV prevention and treatment

Donor interview: Questions about HIV status/treatment/prevention



➢ Impact on blood screening algorithms?



Recreated by Marion Lanteri

HIV/AIDS • CID 2016:63 (15 August) • 555

Initiation of Antiretroviral Therapy During Acute HIV-1 Infection Leads to a High Rate of Nonreactive HIV Serology

Mark S. de Souza,[1,2,3] Suteeraporn Pinyakorn,[4,5] Siriwat Akapirat,[6] Supanit Pattanachaiwit,[2] James L. K. Fletcher,[1] Nitiya Chomchey,[1] Eugene D. Kroon,[1,2] Sasiwimol Ubolyam,[7] Nelson L. Michael,[5,8] Merlin L. Robb,[4,5] Praphan Phanuphak,[1,2] Jerome H. Kim,[9] Nittaya Phanuphak,[1,2] and Jintanat Ananworanich[1,4,5]; for the RV254/SEARCH010 Study Group

Journal of the International AIDS Society 2019, **22**:e25419

Challenges of HIV diagnosis and management in the context of pre-exposure prophylaxis (PrEP), post-exposure prophylaxis (PEP), test and start and acute HIV infection: a scoping review

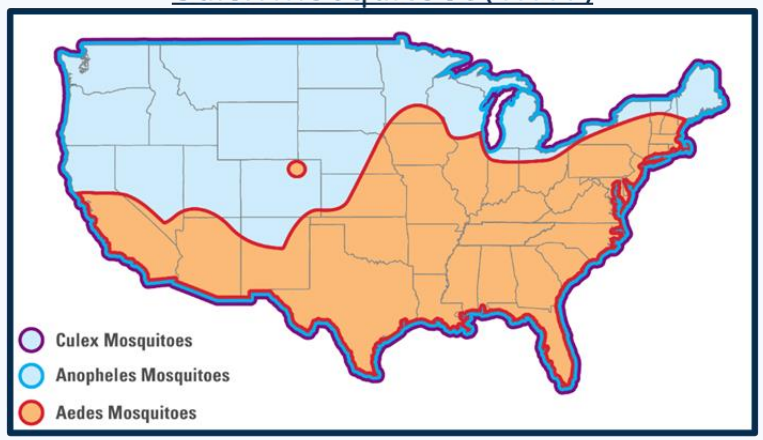
Tamara Elliott[1,2], Eduard J Sanders[3,4], Meg Doherty[5], Thumbi Ndung'u[6,7,8,9], Myron Cohen[10], Pragna Patel[11], Gus Cairns[12,13], Sarah E Rutstein[10], Jintanat Ananworanich[14,15], Colin Brown[16,17] and Sarah Fidler[1,18,§]

➢ TTIMS : Monitoring blood safety in the context of changing deferrals/behaviors

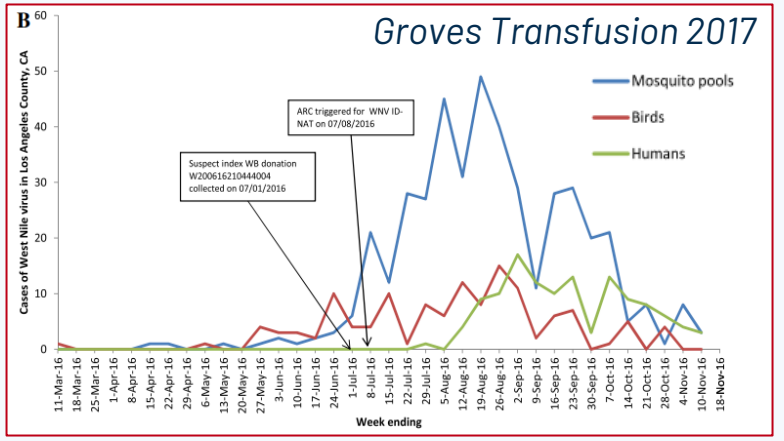
CTS

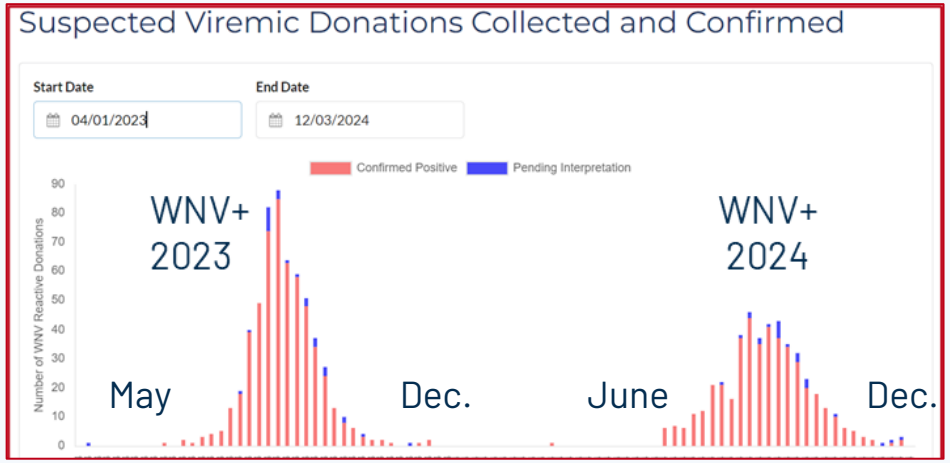
Current Risk Associated with West Nile Virus in the U.S.

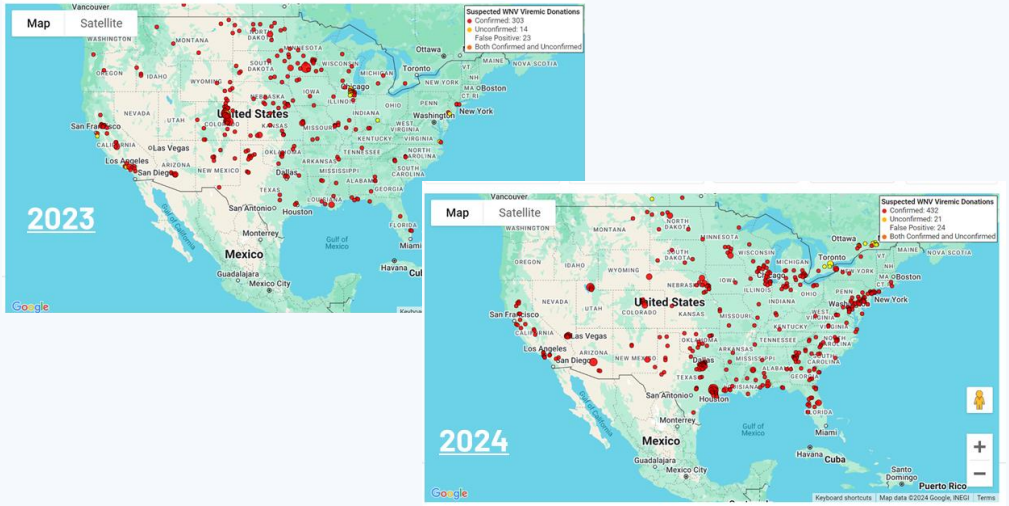
Culex mosquitoes (WNV)



- WNV emerged in 1999
- 23 TTI cases in 2002, NAT IND 2003
- MP-NAT → seasonal ID-NAT
  - Triggering strategies
- 16 TT-WNV documented for 95,005,117 donations screened
- Residual risk: 1:5.94 million

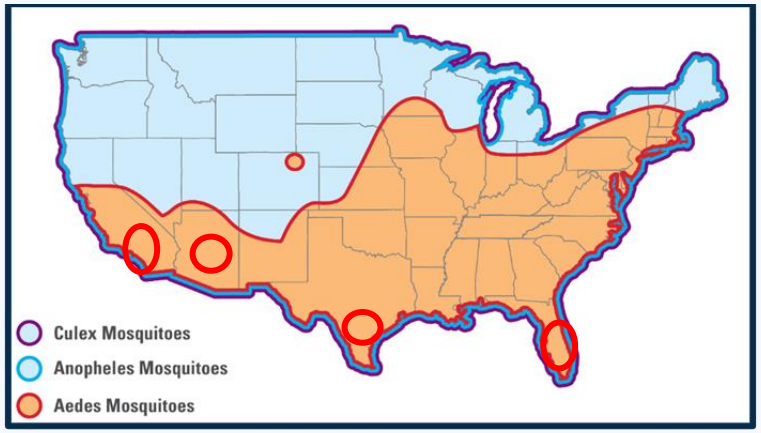




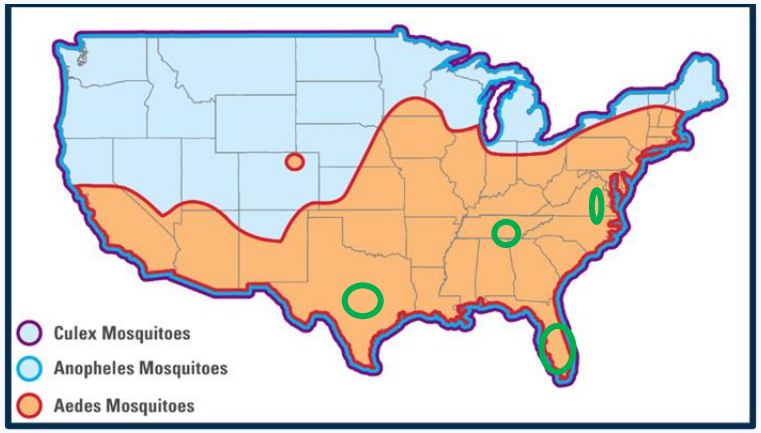


Recent Concerns with Locally Acquired DENV and Malaria Infections

Autochthonous cases of DENV



Autochthonous cases of Malaria



1634 TRANSFUSION Volume 52, August 2012

Marion C. Lanteri, PhD
Michael P. Busch, MD, PhD

EDITORIAL

Dengue in the context of "safe blood" and global epidemiology: to screen or not to screen?

Volume 56, January 2016 TRANSFUSION 215

TRANSFUSION COMPLICATIONS

Probable and possible transfusion-transmitted dengue associated with NS1 antigen–negative but RNA confirmed-positive red blood cells

Desiree Matos,[1] Kay M. Tomashek,[2] Janice Perez-Padilla,[2] Jorge Muñoz-Jordán,[2] Elizabeth Hunsperger,[2] Kalanthe Horiuchi,[3] David Noyd,[2] Colleen Winton,[4] Gregory Foster,[4] Marion Lanteri,[5] Jeffrey M. Linnen,[6] and Susan L. Stramer[4]

JID 2016:213 (1 March) • Sabino et al

The Journal of Infectious Diseases

MAJOR ARTICLE

Transfusion-Transmitted Dengue and Associated Clinical Symptoms During the 2012 Epidemic in Brazil

Ester C. Sabino,[1] Paula Loureiro,[2] Maria Esther Lopes,[3] Ligia Capuani,[1] Christopher McClure,[4] Dhuly Chowdhury,[4] Claudia Di-Lorenzo-Oliveira,[5] Lea C. Oliveira,[1] Jeffrey M. Linnen,[6] Tzong-Hae Lee,[7] Thelma Gonçalez,[7] Donald Brambilla,[4] Steve Kleinman,[7,8] Michael P. Busch,[7,8,a] and Brian Custer[7,8,a]; for the International Component of the NHLBI Recipient Epidemiology and Donor Evaluation Study-III

[1]Departamento de Moléstias Infecciosas e Parasitárias, Instituto de Medicina Tropical, Universidade de São Paulo, [2]Faculdade de Ciências Médicas–UPE/Fundação Hemope, Recife, and [3]Fundação Hemorio, Rio de Janeiro, Brazil; [4]RTI International, Rockville, Maryland; [5]Universidade Federal de São Joao del Rey, Divinopolis, Brazil; [6]Hologic, San Diego, [7]Blood Systems Research Institute, San Francisco, California; [8]University of British Columbia, Vancouver, Canada; and [9]Department of Laboratory Medicine, University of California–San Francisco

(See the editorial commentary by Levi on pages 689–90.)

Downloaded from

Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Weekly / Vol. 72 / No. 36 September 8, 2023

Outbreak of Locally Acquired Mosquito-Transmitted (Autochthonous) Malaria — Florida and Texas, May–July 2023

Dawn Blackburn, BVMS[1,2,*]; Michael Drennon, MSPH, MPA[3,*]; Kelly Broussard, MPH[4,*]; Andrea M. Morrison, PhD[5]; Danielle Stanek, DVM[5]; Elizabeth Sarney, MA[3]; Christina Ferracci, MPH[3]; Steve Huard[3]; Wade Brennan[6]; John Eaton[6]; Sara Nealeigh[6]; Natalie Barber[6]; Rebecca A. Zimler, PhD[5]; Jeremy N. Adams, PhD[5]; Carina Blackmore, DVM[5]; Manuel Gordillo, MD[7]; Robert Mercado, MD[7]; Harold Vore, MS[7]; Kelly Scanlan[7]; Ian Motie, MD[7]; Leslie Stanfield[8]; Ahmed Farooq, MD[8]; Kimberly Widel, MBA[8]; Kelly Tomson, MS[9]; Nancy Kerr[9]; John Nasir[9]; Marshall Cone, MPH[10]; Connor Rice, MPH[11]; Thomas Larkin[11]; Edwin Hernandez, MD[11]; Jennifer Bencie, MD[11]; Christopher R. Lesser, MS[12]; Max Dersch[12]; Samantha Ramirez-Lachmann, MPH[12]; Marah Clark[13]; Susan Rollo, DVM, PhD[4]; Amira Bashudi, MPH[4]; Ronald Tyler, DVM[14]; Bethany Bolling, PhD[15]; Brent Moore, DVM[16]; Brendan Sullivan, DVM[17]; Eric Fonken, DVM[4]; Raquel Castillo, MPH[18]; Yaziri Gonzalez, MS[19]; Gustavo Olivares[19]; Kimberly E. Mace, PhD[2]; Dean Sayre, MD[2]; Audrey Lenhart, PhD[2]; Alice Sutcliffe, MS[2]; Ellen Dotson, DSc[2]; Claudia Corredor[2]; Emma Rogers, MS[2]; Brian H. Raphael, PhD[2]; Sarah G. H. Sapp, PhD[2]; Yvonne Qvarnstrom, PhD[2]; Alison D. Ridpath, MD[2]; Peter D. McElroy, PhD[2]

Morbidity and Mortality Weekly Report

Locally Acquired (Autochthonous) Mosquito-Transmitted *Plasmodium vivax* Malaria — Saline County, Arkansas, September 2023

Ashleah P. Courtney, MD[1,2]; Bobby L. Boyanton Jr., MD[1,2]; Paige V. Strebeck, MD[1,2]; Keith Blount, PhD[3]; Savanna Ledford, DrPH[3,4]; Alison D. Ridpath, MD[5]; Kimberly E. Mace, PhD[5]; Cherie Smith[3]; Kelley Garner, MPH[3]; Catherine Waters[3]; Michael J. Cima, PhD[3]; Naveen Patil, MD[3]; Peter D. McElroy, PhD[5]; Brian H. Raphael, PhD[5]; Sarah G.H. Sapp, PhD[5]; Yvonne Qvarnstrom, PhD[5]; Audrey Lenhart, PhD[5]; Alice Sutcliffe, MS[5]; Arkansas Locally Acquired Mosquito-Transmitted Malaria Response Team; Theresa M. Dulski, MD[3,6,*]; Laura Rothfeldt, DVM[3,*]

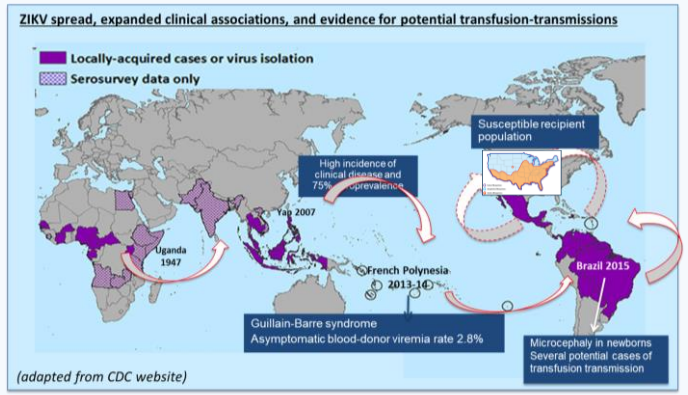
Recommendations to Reduce the Risk of Transfusion-Transmitted Malaria

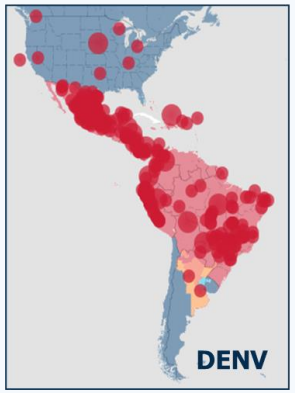
Draft Guidance for Industry

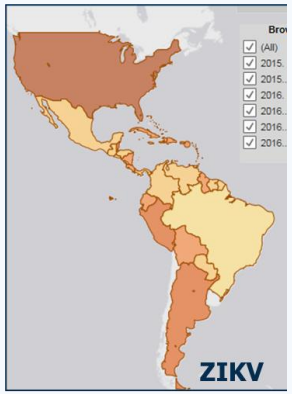
U.S. Department of Health and Human Services
Food and Drug Administration
Center for Biologics Evaluation and Research
January 2025

ZIKV Emergence

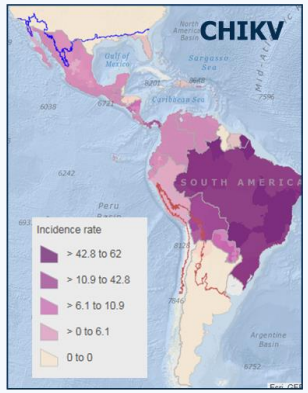
The Risk With Mosquito-Borne-Agents

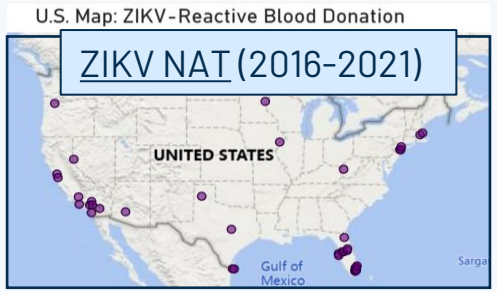












Learning about Zika virus epidemiology and diagnostics from blood donor studies

*Lyle R Petersen, M Cristina Cassetti

www.thelancet.com/infection Vol 20 December 2020

Assay Characterization

Relative analytical sensitivity of donor nucleic acid amplification technology screening and diagnostic real-time polymerase chain reaction assays for detection of Zika virus RNA

TRANSFUSION 2017;57;734–747

Mars Stone,[1] Marion C. Lanteri,[1,2] Sonia Bakkour,[1] Xutao Deng,[1] Susan A. Galel,[3] Jeffrey M. Linnen,[4] Jorge L. Muñoz-Jordán,[5] Robert S. Lanciotti,[6] Maria Rios,[7] Pierre Gallian,[8,9] Didier Musso,[10] José E. Levi,[11] Ester C. Sabino,[12] Lark L. Coffey,[13] and Michael P. Busch[1,2]

Natural History and Surveillance

Zika virus RNA and IgM persistence in blood compartments and body fluids: a prospective observational study

Mars Stone, Sonia Bakkour, Marion C Lanteri, Donald Brambilla, Graham Simmons, Roberta Bruhn, Zhanna Kaidarova, Tzong-Hae Lee, Jose Orlando Alsina, Phillip C Williamson, Susan A Galel, Lisa L Pate, Jeffrey M Linnen, Steve Kleinman, Michael P Busch, for the NHLBI Recipient Epidemiology Donor Evaluation Study REDS-III Program

www.thelancet.com/infection Published online July 13, 2020

Blood, Organ and Tissue Safety

Received: 10 October 2022 | Revised: 5 December 2022 | Accepted: 5 December 2022
DOI: 10.1111/trf.17243

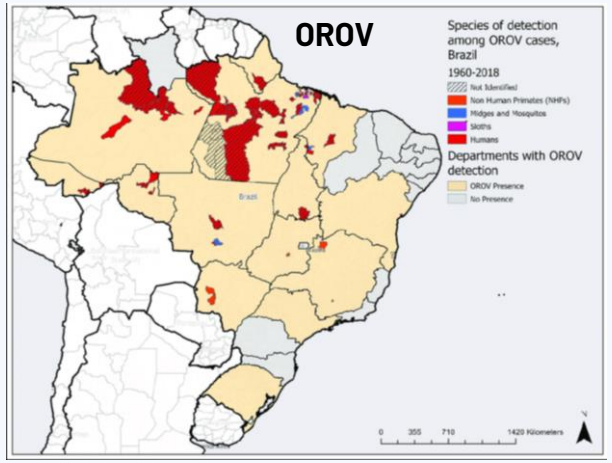
DONOR INFECTIOUS DISEASE TESTING

TRANSFUSION

Plasma transfusion–transmission of Zika virus in mice and macaques

Koen K. A. Van Rompay[1,2] | Lark L. Coffey[2] | JoAnn L. Yee[1] | Anil Singapuri[2] | Jackson Stuart[2] | Marion C. Lanteri[3] | Felicia Santa Maria[3] | Kai Lu[4] | Inderdeep Singh[4] | Sonia Bakkour[4] | Mars Stone[4,5] | Phillip C. Williamson[6] | Marcus O. Muench[4,5] | Michael P. Busch[4,5] | Graham Simmons[4,5]

- Outbreaks are unpredictable but can be anticipated
- Most probable in vector-endemic areas
  - ✓ Blood screening assays for blood safety and EID surveillance



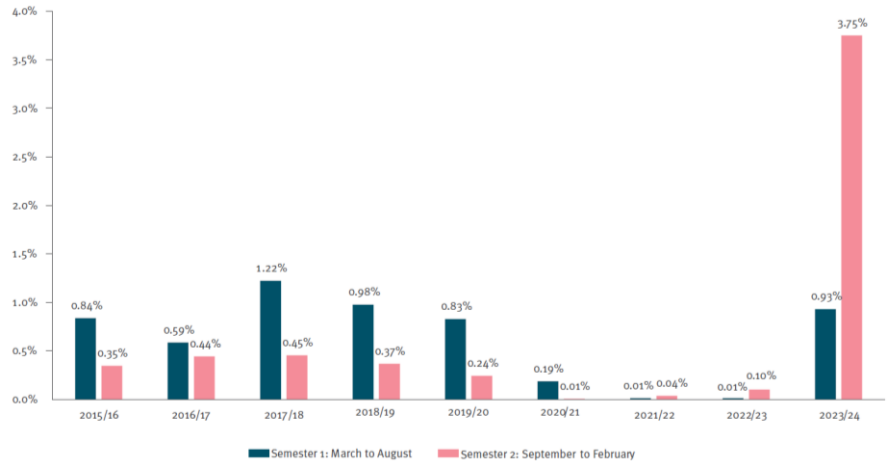
Plasma Donation Screening for ParvoB19
Informing Emergency Response and Confirming Global Trends

New atypical epidemiological profile of parvovirus B19 revealed by molecular screening of blood donations, France, winter 2023/24

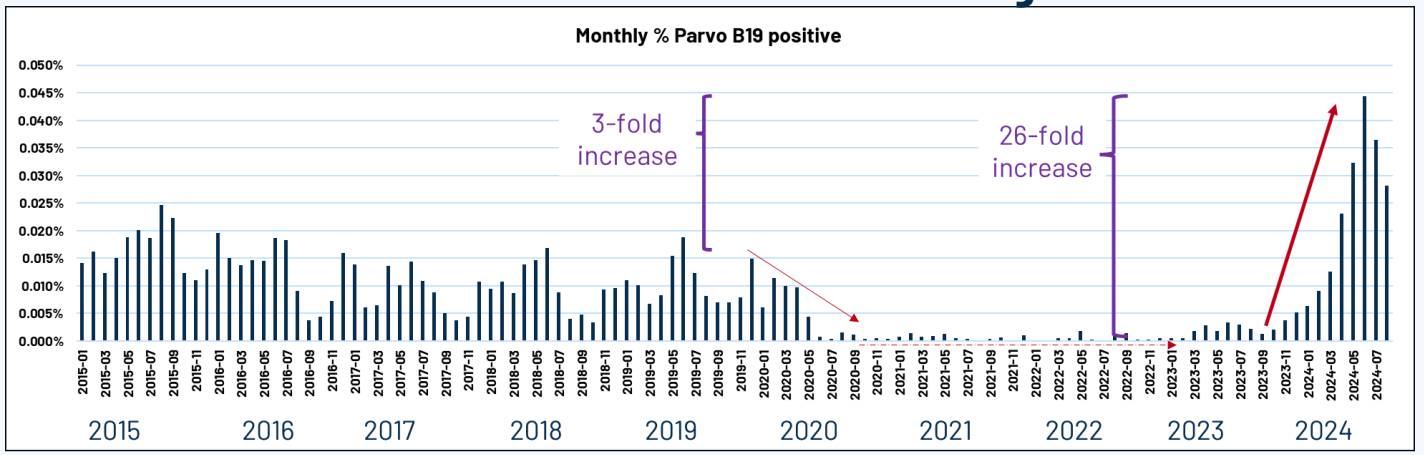
Marlène Guillet[1], Ariane Bas[2], Marjorie Lacoste[3], Céline Ricard[4], Catherine Visse[5], Valérie Barlet[2], Lucile Malard[6], Sophie Le Cam[6], Pascal Morel[6], Xavier de Lamballerie[7], Syria Laperche[6], Pierre Gallian[6,7]

FIGURE 2

Seasonality of the prevalence of parvovirus B19 DNA-positive pools of 96 blood donations, France, March 2015–February 2024 (n = 265,016 pools tested)

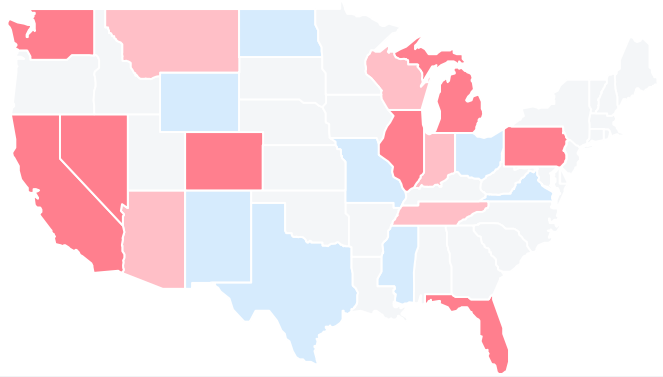


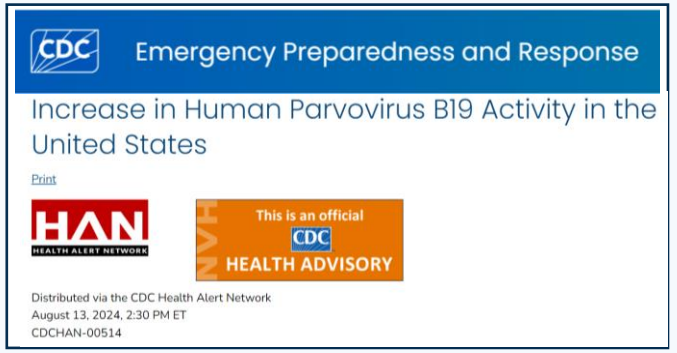
CTS Source Plasma In Process Testing Data



Geographic distribution

Cumulative numbers January-June 2024





- COVID social distancing

→ decreased ParvoB19 transmission

- Rebound after COVID (respiratory and TTI)

Alerted the medical community to protect at risk populations

CTS

Using Blood Donors for Epidemiological Surveillance

Screening ~65% of the blood supply



Samples from various geographies



Unprecedented access to samples

Donors consent to "research"

Range of demographics

Blood screening results

- Infectious disease and metabolic markers
  - Immunology, microbiome, proteome, metabolome, lipidome, exposome,
  - Drugs intake (prescription, recreational)

Surveys - lifestyle, vaccination, symptoms

Received: 29 April 2022 | Revised: 13 September 2022 | Accepted: 13 September 2022
DOI: 10.1111/trf.17140

HOW DO I DO IT

TRANSFUSION

How do we decide how representative our donors are for public health surveillance?

Sheila F. O'Brien[1,2] | Steven J. Drews[3,4] | Antoine Lewin[5,6] | Alton Russell[7] | Katy Davison[8] | Mindy Goldman[1,9] | International Society for Blood Transfusion, Transfusion Transmitted Infectious Disease Working Party, Surveillance, Risk Assessment & Policy Sub-group

"Surveillance of blood donors is fundamental to safety of the blood supply and can also be useful for public health policy but tend to be underutilized."

"Donors are an ideal convenience population for surveillance of infectious agents…."

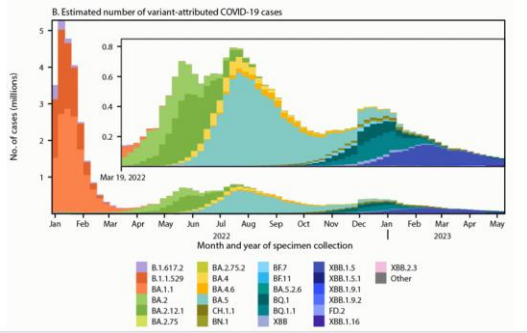
➢ Leveraging cross-sectional *or* longitudinal donor cohorts

❖ Challenges: Large scale programs require coordinated teams and funding

UU CTS

Responding to evolving SARS-CoV-2 pandemic

SARS-CoV-2 Serologic Surveillance in the U.S. Blood Donor Population



NBDS cross sectional donor serosurveillance

~152,000 monthly donations, 17 BCOs

Track infections, Vx, hybrid immunity

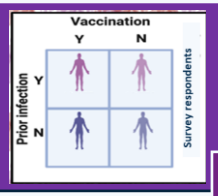
Nationally representative weighted seroprevalence





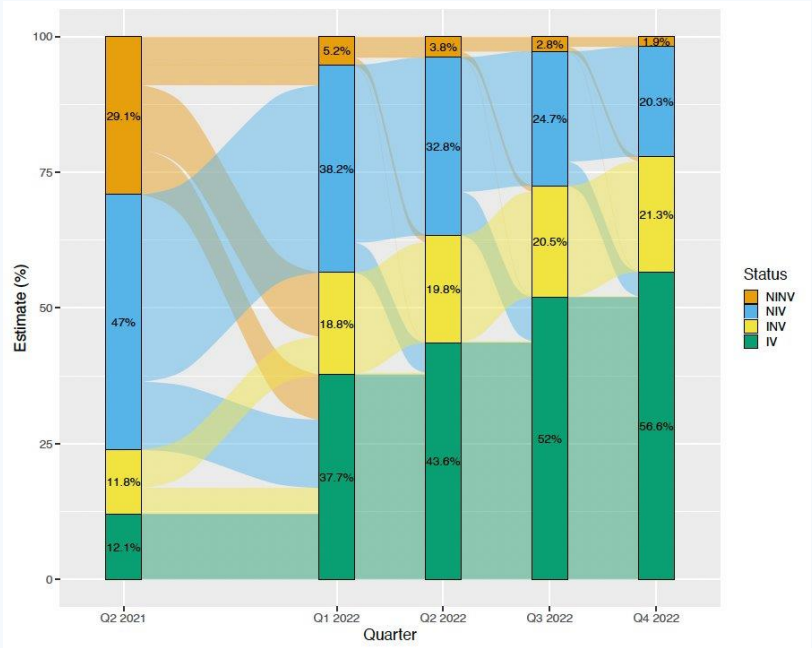
NBDC longitudinal donor cohort

~142,000 routine donors



Vx breakthrough and reinfections, Vx effectiveness, Correlates of protection, impact of VoC, surveys

Revised seroprevalence estimates

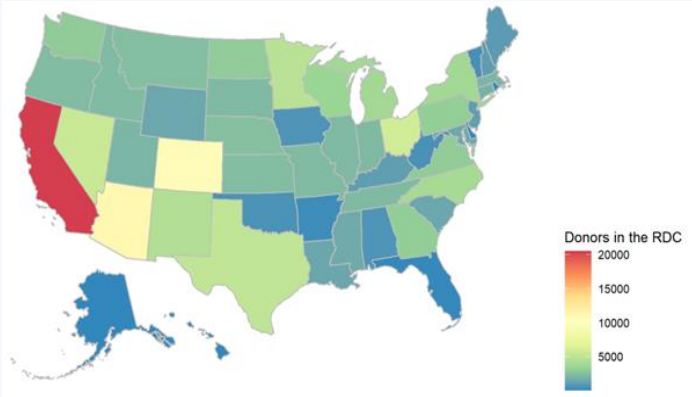


2023 Repeat Donor Cohort

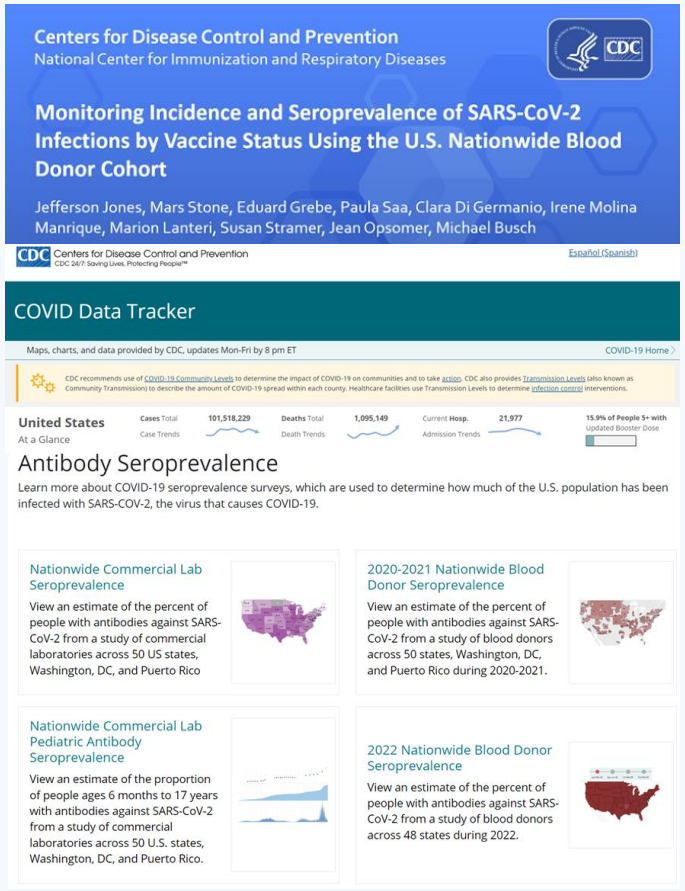
~45,000 informative donors

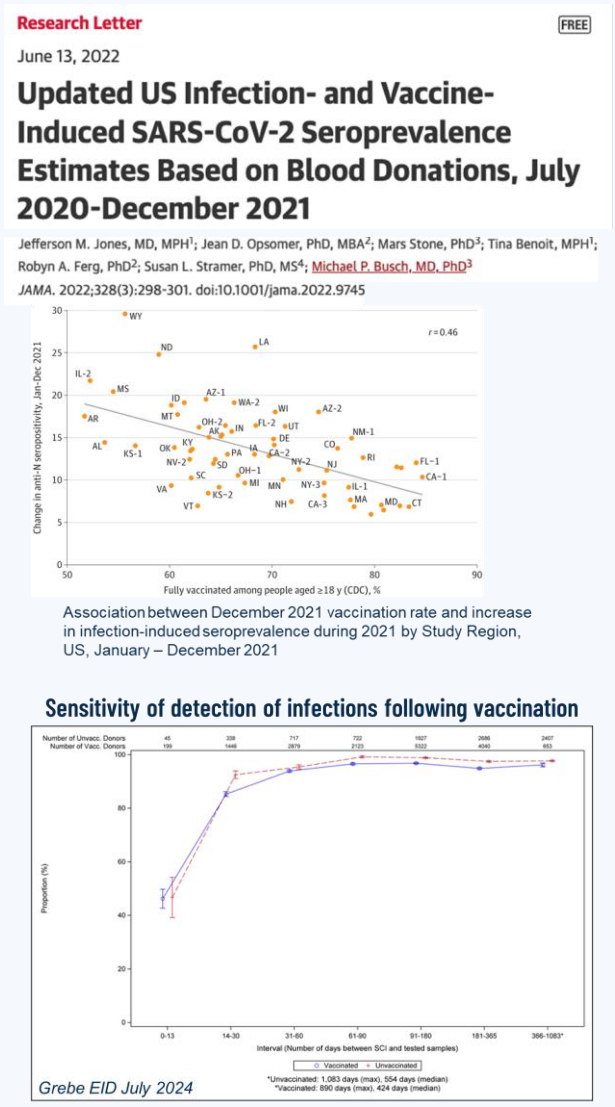
Self funded sample and survey data acquisition, real time quarterly testing

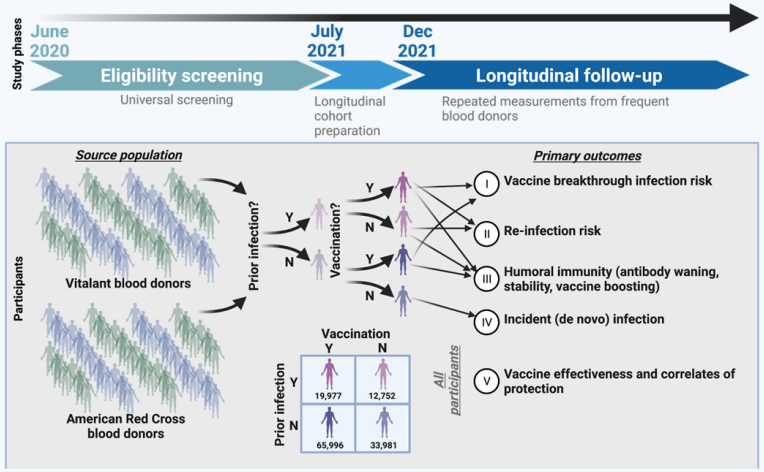
Inform current and future public health needs



Contributing to Public Health Surveillance

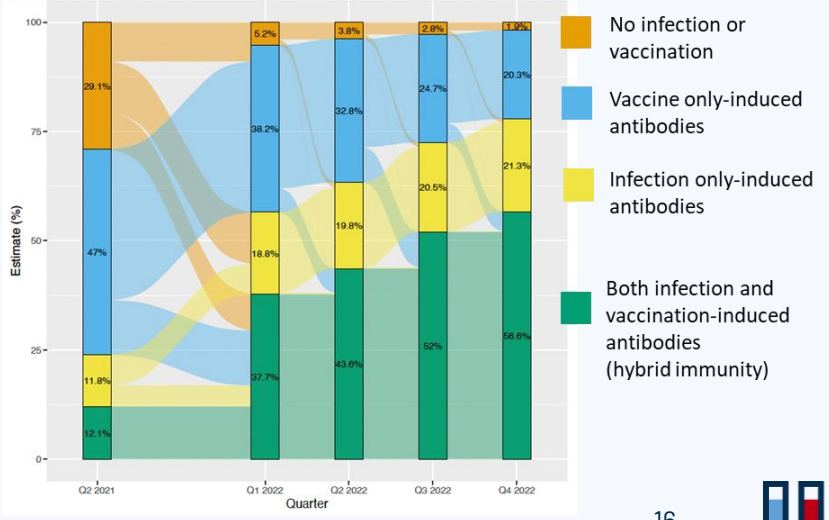






~75,000 donors donate per quarter, providing ~120,000 donations per quarter

Longitudinal donor cohort with single quarterly samples per donor tested for anti-N Ig and anti-S IgG



NBDC: Longitudinal Study to Characterize Evolving Immunity, Identify Breakthrough and Reinfections, and Correlates of Protection

Ascertainment of SARS-CoV-2 Reinfections

National Blood Donor Cohort Surveys

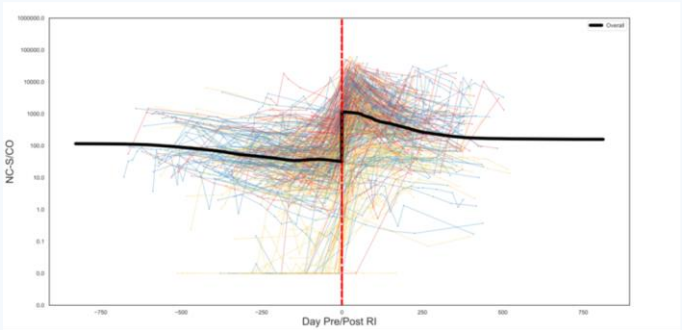
Index survey:

- Infection and vaccine history to start of pandemic
- Co-morbidities, infection outcomes (symptoms, hospitalization)

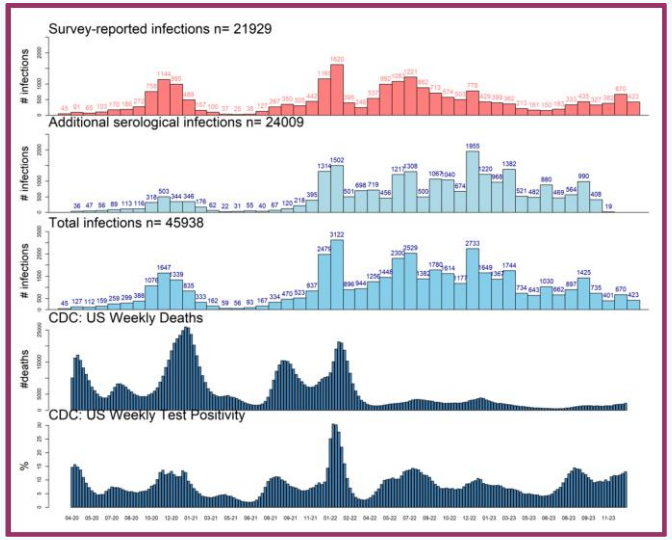
Follow-up surveys:

- Infection and vaccine history since last survey completion

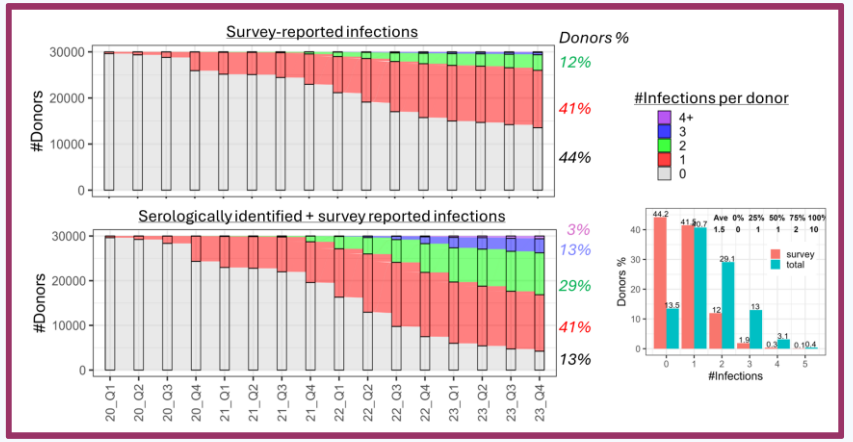
Detection of SARS-CoV-2 reinfections based on NC antibody boosting with expanded dynamic range



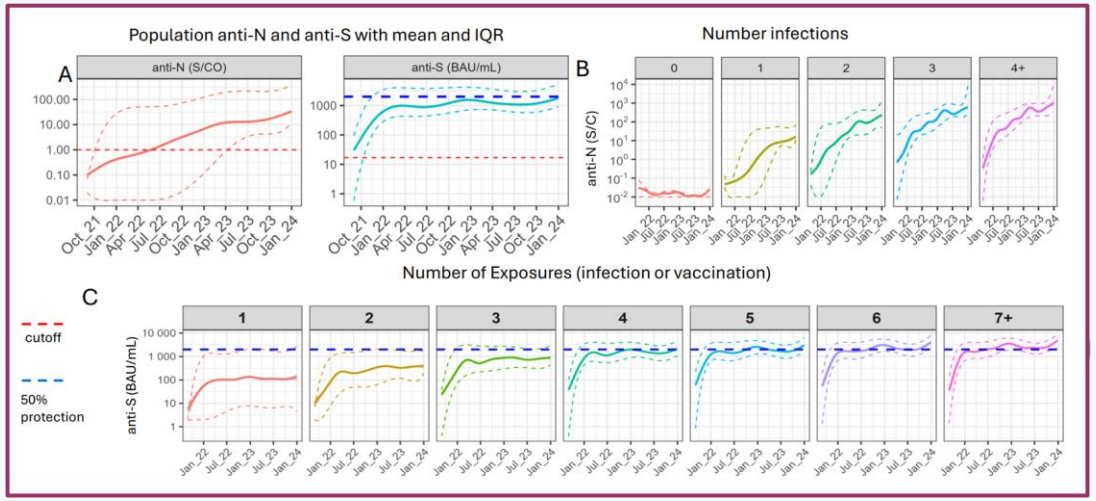
of survey reported, serologically identified vs. total infections



Accumulation of survey reported vs. total infections from 2020 to 2023



Average population anti-N and anti-S Ab levels as a function of infection, reinfection, and vaccination events



Anti-N Ab boosting is useful to identify reinfections. Of donors who reported no infections in surveys, 69% had been infected by the end of 2023 based on serologic testing. 52% of total infections were identified using serology only, suggesting many infected donors had asymptomatic or mild infections that did not get diagnosed.

The increasing anti-N and anti-S Ab levels reflect progressive population immunity over the period of the study with continued reinfections.

New funding opportunity by CDC ($26.5 M for 5 years - 2024-2029)

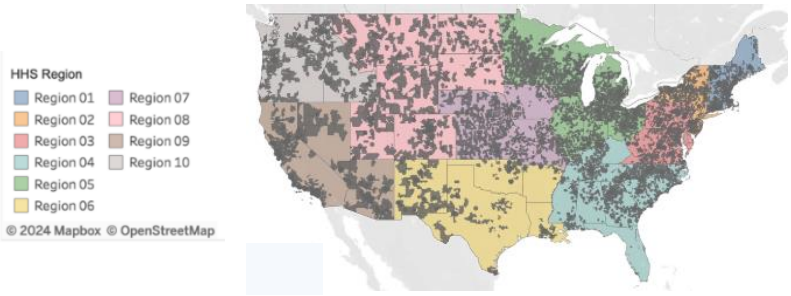
This project will *establish* and *sustain* a national longitudinal cohort of 50,000 repeat blood donors with the purpose of monitoring changes in antibody titers against common or novel respiratory viruses:

1) Estimating the national burden of incident SARS-CoV-2, RSV, influenza, parainfluenza, human metapneumovirus infections and other emerging respiratory infectious diseases;
2) Determining antibody thresholds for protection across multiple respiratory viruses;
3) Assessing state- or region-specific population-level immunity to/risk for infection through tracking median antibody titers within various populations;
4) Monitoring waning immunity and changes in immune capabilities in the context of ongoing viral evolution.

- ➢ To improve U.S. capacity to track major respiratory virus infections
- ➢ To respond to public health emergencies resulting from novel emerging respiratory viruses with pandemic potential

- ❖ Preparing for the next emerging infectious disease outbreak (TTI)

2023 Repeat Donor Cohort (n=45,000)



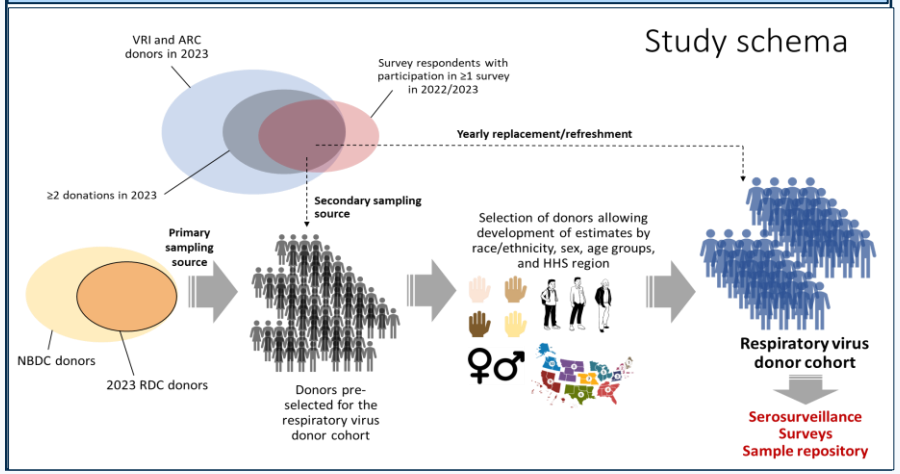
Respiratory Viruses program:

- SARS-CoV-2

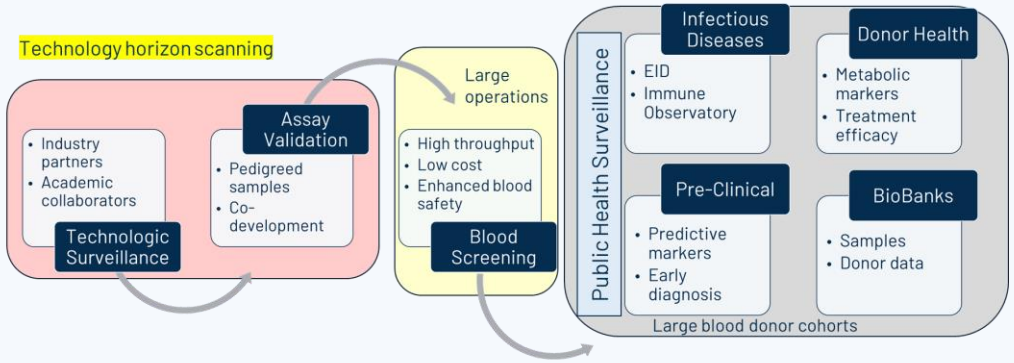
→ RSV, Flu, Metapneumo, EVD-68…

Innovative technologies:

✓ “Seroplex” assays!



New technologies: applications for donor screening and public health surveillance



Innovative Technology Horizon Scanning

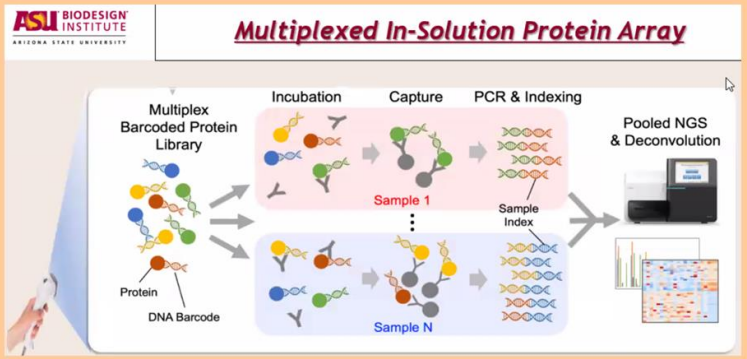
✓ Multiplex molecular and serology assays!

SCIENCE FORUM

A Global Immunological Observatory to meet a time of pandemics

MICHAEL J MINA[†*], C JESSICA E METCALF[†*], ADRIAN B MCDERMOTT, DANIEL C DOUEK, JEREMY FARRAR AND BRYAN T GRENFELL

MISPA-type x3



2,000 samples/run, 200 Antigens/run, 3-6 logs dynamic

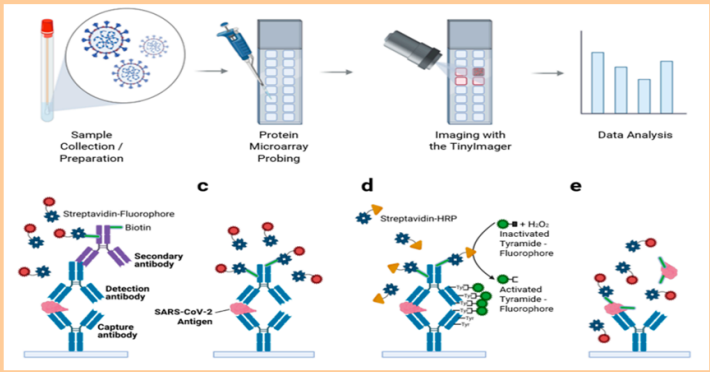
- **MISPA by ASU - LaBaer J.** (Song L et al. Microbic
- **PepSeq by ASU - Altin J.** (Henson SN et al. Nat F
- **MIPSA by Infinity Bio.** – Larman B. (Infinity Bio.c

Pilot study:

-Evaluating 5 platforms for SARS-CoV-2 Ab detection using sample panels

-Selecting 2 promising platforms for further studies

Protein Array-type x2



16 samples/run, 30 Antigens/run, 3-6 logs dynamic

- **Ab chip by UC Irvine – Felgner P.** (Beck S et al. Biomedicines. 2022)
- **V-plex (15 Ag) by MesoScaleDiscovery – Sigal G.**

Next steps:

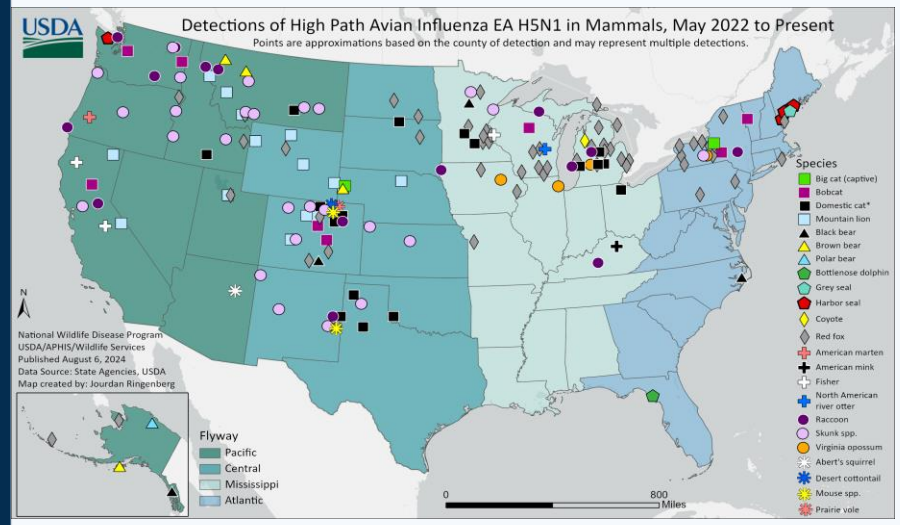
-Assay performance for Influenza viruses and other RV antigen targets

-Capacity to rapidly add antigens for other known and emerging infectious agents

- **Driving scientific innovation in blood screening**
- **Positioning our group to scale up public health surveillance and response to EIDs (including TTIs)**

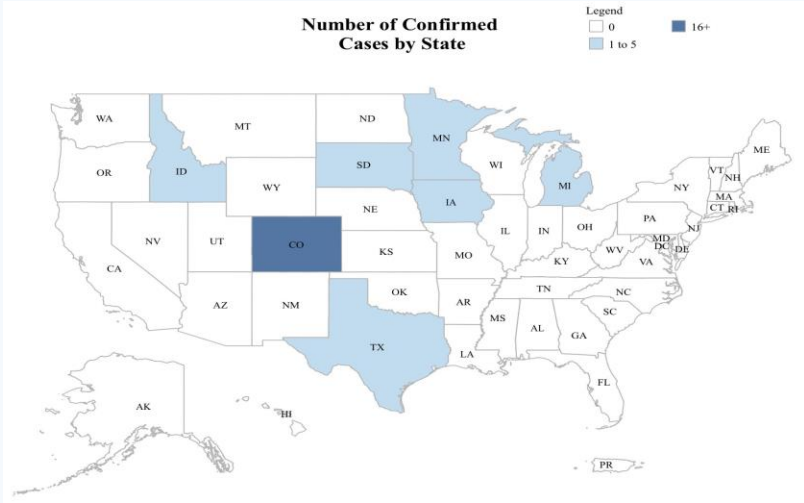
HPAI H5N1 impacted U.S. Dairy Cattle and Poultry Farms

H5N1 in mammals



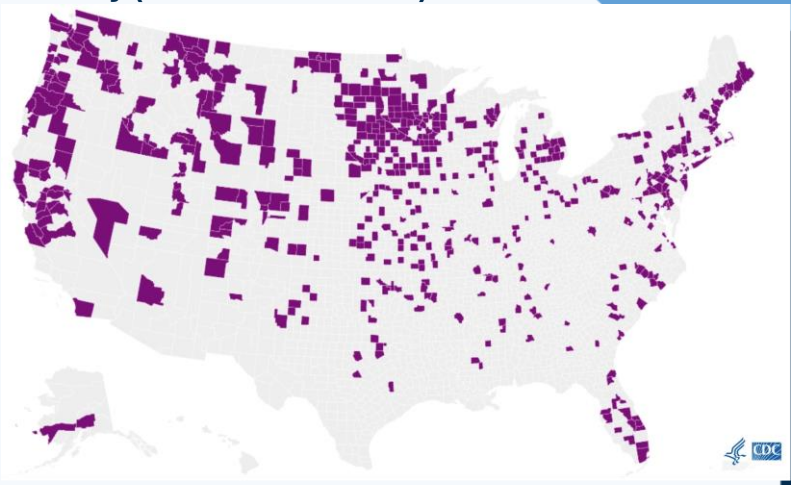
https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/mammals

Dairy cattle (affected states):



https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/hpai-confirmed-cases-livestock

Poultry (affected counties):



https://www.cdc.gov/bird-flu/situation-summary/data-map-commercial.html

Serosurveillance of blood donors to monitor seasonal respiratory virus infections and respond to H5N1 outbreak

5/23/2025

OneHealth Applied to Emerging Infectious Diseases

- Interdisciplinary collaborative approach at a global, national, international level to address health issues that happen at the human, animal, and environmental interface.

Sample EID *Hotspots* ⇒ Perform Pathogen Discovery ⇒ Characterize Risk



- Hot spots = Higher rates of prevalence/incidence for ID markers
- Specific geographies (ZIP codes / Florida)
- PDI cases
- Repeat Donor Cohort

CDC:

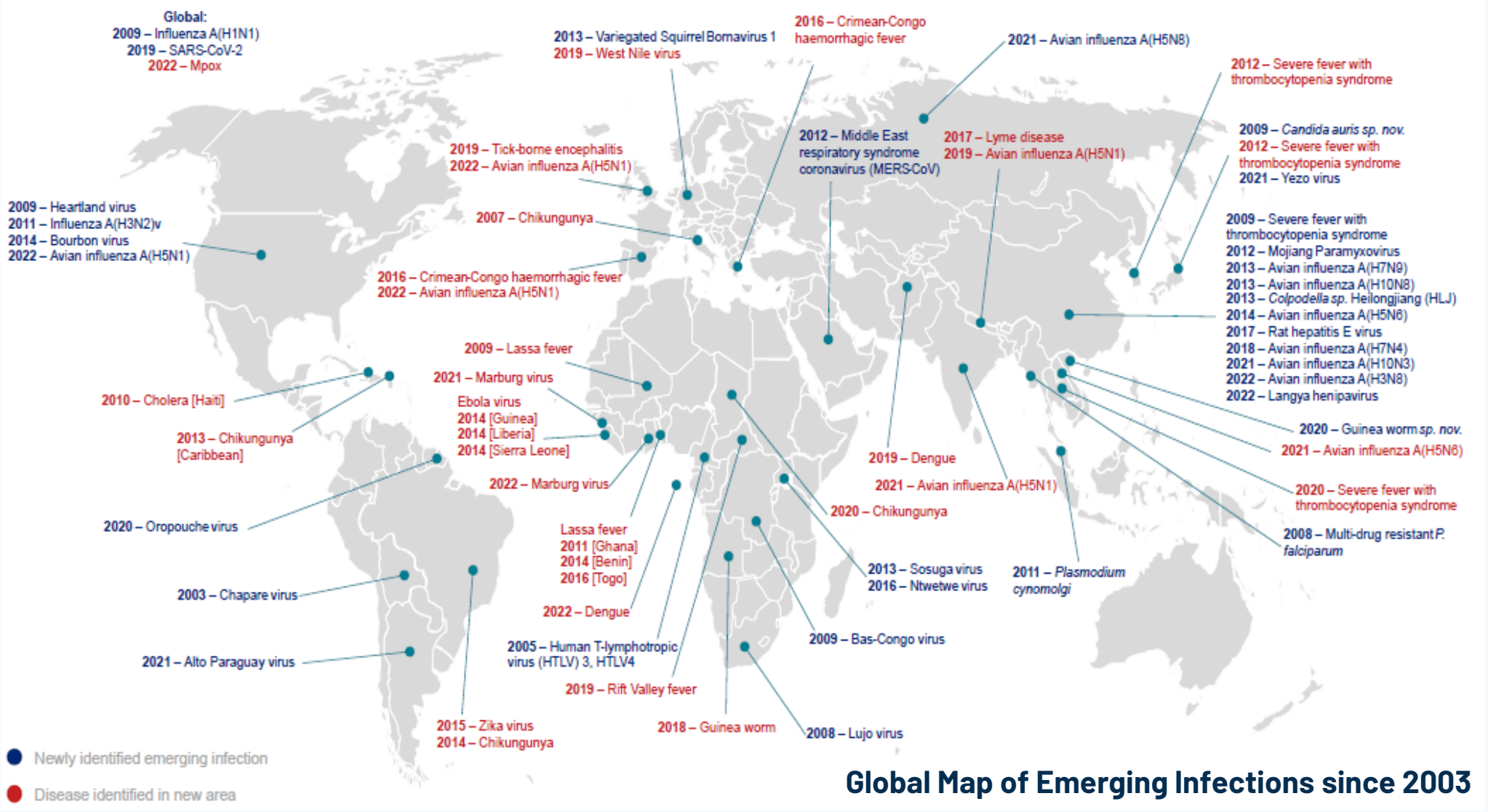
- Cattles / Vets
- Farmworkers
- Wastewater

→ Establishing baseline immunity

→ Monitoring infection in communities in outbreak areas

UIU CTS

Preparedness



Global Map of Emerging Infections since 2003

Responding to EID

Multi-faceted approach according to timeline



Convalescent plasma

- Blood and plasma donors
- High Ab titers
- Neutralizing Abs

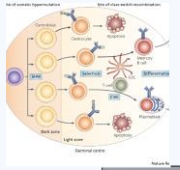
BCOs



Hyperimmune IVIG

- Plasma donors
- High Ab titers
- Enriched plasma pools

Grifols

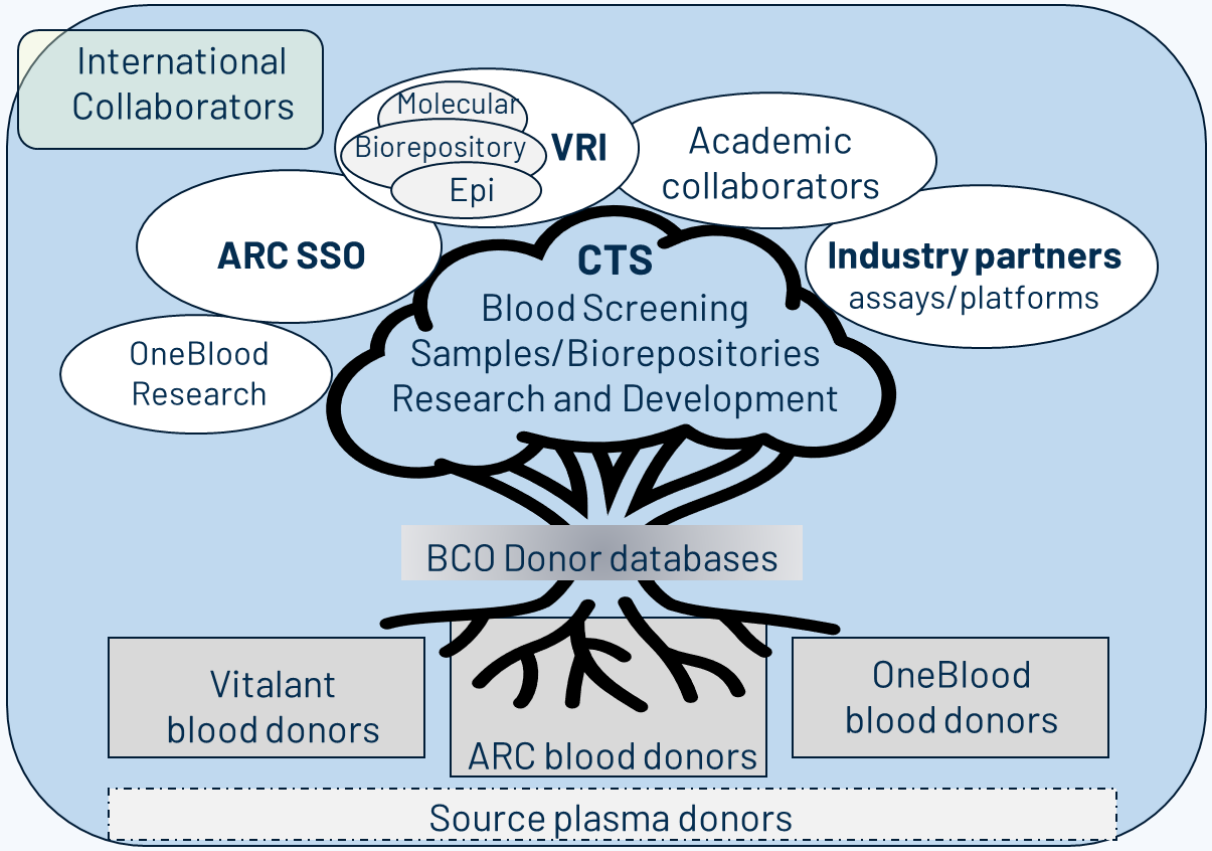


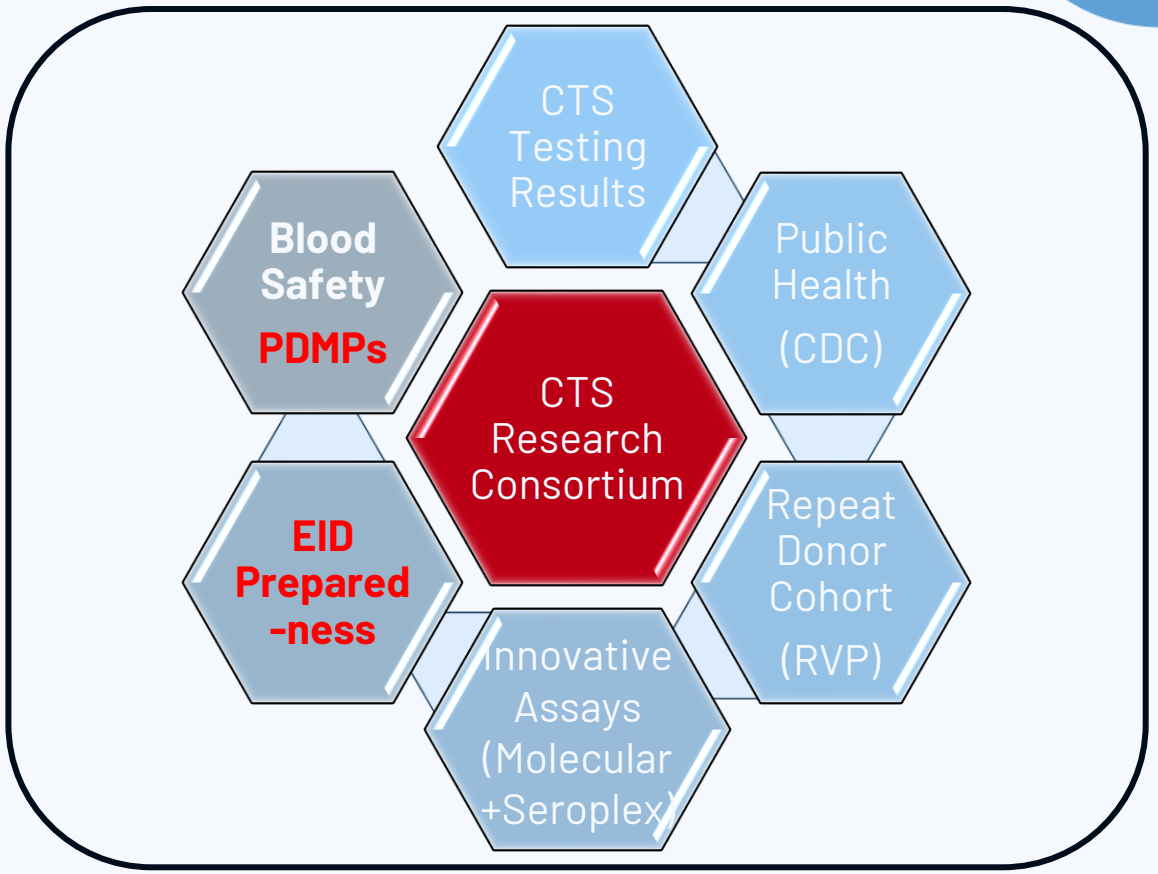
Recombinant Polyclonal Abs

- Plasma donors high Ab titers
- Isolate B cells for hybridomas
- Produce polyclonal Ab

Gigagen

Conclusion: From Blood Safety to Public Health Response





Capitalizing on a unique infrastructure (testing capacity, sample capture, donor-based research) to maintain blood safety, perform epidemiological surveillance, drive innovation in blood screening, and support preparedness and response efforts.

Conclusion

- Maintaining Blood Safety
  - Assays and Platforms
    - Performance
    - Availability (Clinical Trials)

- Supporting Research:
  - Inform Blood Safety
  - Drive Innovation
  - Enable Public Health Surveillance
  - Provide Value to Healthcare Partners

Questions?

Contact me!

mlanteri@mycts.org