**Supporting Information**

**Point-of-care testing for *Toxoplasma gondii* IgG/IgM using *Toxoplasma* ICT IgG-IgM test with sera from the United States and implications for developing countries**

Ian J. Begeman1¶, Joseph Lykins2¶, Ying Zhou1, Bo Shiun Lai1, Pauline Levigne3, Kamal El Bissati1, Kenneth Boyer1,4, Shawn Withers1, Fatima Clouser1, A. Gwendolyn Noble1,5, Peter Rabiah1,6, Charles N. Swisher1,5, Peter T. Heydemann1,4, Despina G. Contopoulos-Ioannidis7,8, Jose G. Montoya8,9, Yvonne Maldonado7, Raymund Ramirez8, Cindy Press8, Eileen Stillwaggon10, François Peyron3, Rima McLeod1,11\*

1 Department of Ophthalmology and Visual Science, The University of Chicago, Chicago, IL, USA

2 Pritzker School of Medicine, The University of Chicago, Chicago, IL, USA

3 Institut de Parasitologie et de Mycologie Médicale Hôpital de la Croix Rousse, 103 grande rue de la Croix Rousse, 69317, Lyon, France

4 Rush University and Medical Center, Chicago, IL, USA

5 Lurie Children’s Hospital and Northwestern University, Chicago, IL, USA

6 Northshore Hospital, Evanston, IL, USA

7 Department of Pediatrics, Division of Infectious Diseases, Stanford University School of Medicine, Stanford, CA, USA

8 Palo Alto Medical Foundation *Toxoplasma* Serology Laboratory, Palo Alto, CA, USA

9 Department of Medicine, Division of Infectious Diseases and Geographic Medicine, Stanford University School of Medicine, Stanford, CA, USA

10 Gettysburg College, Gettysburg, PA, USA

11 Department of Pediatrics (Infectious Diseases), Institute of Genomics, Genetics, and Systems Biology, Global Health Center, Toxoplasmosis Center, the Center for Health and the Social Sciences, CHeSS, the College, The University of Chicago, Chicago Medicine, Chicago IL, USA

\* Corresponding author

E-mail: rmcleod@uchicago.edu

¶ These authors contributed equally to this work.

## S1 Table. Infected patient primary data.

| ***Toxoplasma* ICT**  **IgG-IgM Test Result (Test/Control)a** | **Parasite Serotype/Cohortb** | **Days from Birth to Sample Collectionc** | **Year Sample Obtainedd** | **Reciprocal IgGe** | **IgMe** | **IgAe** | **Aviditye** | **AC/HSe** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Positive/Positive | Atypical | 2372H | 1991 | 128 | ELISA: 1.1 | 0.6 | ND | 50/800 |
| Positive/Positive | Atypical | 83A | 1993 | 2048 | ELISA: 4 | 11.9 | ND | 400/3200 |
| Positive/Positive | Atypical | 481 | 1993 | 4096 | ELISA: 2.9 | 9.7 | ND | 1600/3200 |
| Positive/Positive | Atypical | 551 | 1994 | 8000 | ELISA: 2.6 | 1.8 | ND | 400/3200 |
| Positive/Positive | AtypicalA | -2 | 1995 | 1024 | ELISA: 8.7 | 4.9 | ND | 400/100 |
| Positive/Positive | Atypical | 69A | 1995 | 4096 | ELISA: 4.4 | 9.6 | ND | 1600/3200 |
| Positive/Positive | Atypical | 3874 | 1995 | 16000 | ELISA: 2.8 | ND | ND | ND |
| Positive/Positive | Atypical | 112 | 1995 | 4096 | ELISA: 5.0 | ND | ND | 1600/3200 |
| Positive/Positive | Atypical | 1401 | 1995 | 8000 | ELISA: 5.4 | 22.4 | ND | 1600/3200 |
| Positive/Positive | Atypical | 3720 | 1996 | 8000 | ELISA: 0.7 | ND | ND | ND |
| Positive/Positive | Atypical | 1286H | 1996 | 512 | ELISA: .2 | 0.5 | ND | 50/800 |
| Positive/Positive | Atypical | 0A | 1997 | 8000 | ELISA: 7.4 | 1.3 | ND | 200/3200 |
| Positive/Positive | Atypical | 1308 | 1997 | 4096 | ISAGA: 12 | 10.7 | ND | 1600/3200 |
| Positive/Positive | Atypical | 910 | 1998 | 2048 | 5.7 | 1.2 | ND | 50/1600 |
| Positive/Positive | Atypical | 2150 | 2003 | 8000 | ELISA: 7.4 | 1.3 | ND | 200/3200 |
| Positive/Positive | Atypical | 5293 | 2004 | 4096 | ELISA: 3.8 | 5.3 | ND | 800/3200 |
| Positive/Positive | Atypical | 3828 | 2005 | 16000 | ELISA: 9.4 | 17.6 | ND | 1600/1600 |
| Positive/Positive | Atypical | 1519 | 2007 | 16000 | ND | ND | ND | ND |
| Positive/Positive | Atypical | 5455H | 2008 | 512 | ELISA: 0.2 | 1.0 | ND | ND |
| Positive/Positive | Atypical | 5716 | 2008 | 4096 | ELISA: 3.8 | 11.4 | ND | 1600/3200 |
| Positive/Positive | Atypical | 6280 | 2008 | 1024 | ELISA: 9.3 | 10.8 | ND | 1600/3200 |
| Positive/Positive | Atypical | 9137 | 2008 | 1024 | ELISA: 6.9 | ND | ND | ND |
| Positive/Positive | Atypical | 5466 | 2009 | 8000 | ISAGA: 12 | 18.1 | ND | 1600/3200 |
| Positive/Positive | Atypical | 3524 | 2009 | 8000 | ELISA: 2.3 | 9.1 | ND | 1600/3200 |
| Positive/Positive | Atypical | 7683 | 2009 | 2048 | ELISA: 3.1 | ND | ND | 1600/3200 |
| Positive/Positive | Atypical | 3605 | 2010 | 16000 | ELISA: 9.1 | 9.5 | ND | 1600/3200 |
| Positive/Positive | Atypical | 6976 | 2010 | 8000 | ELISA: 10.8 | 2.4 | ND | 1600/3200 |
| Positive/Positive | Atypical | 1955 | 2010 | 16000 | ELISA: 10 | ND | Low | 1600/3200 |
| Positive/Positive | Atypical | 5698 | 2011 | 4096 | ELISA: 5.6 | 22.4 | ND | ND |
| Positive/Positive | Atypical | 2666 | 2011 | 2048 | Negative | Negative | ND | 200/1600 |
| Positive/Positive | Atypical | 5397 | 2012 | 32000 | ELISA: 9.1 | 1.5 | ND | 1600/3200 |
| Positive/Positive | Atypical | 9170H | 2016 | 2048 | ELISA: 0 | 0.7 | ND | 50/3200 |
| Positive/Positive | I/III | 1585 | 1992 | 4096 | ELISA: 3.4 | ND | ND | ND |
| Positive/Positive | I/III | 145 | 1993 | 2048 | ELISA: 5.6 | 12.4 | ND | 1600/3200 |
| Positive/Positive | I/III | 1880H | 1997 | 2048 | ELISA: 2.6 | 2.5 | ND | 200:3200 |
| Positive/Positive | I/III | 5362H | 1997 | 2048 | ELISA: 0.6 | 0.7 | ND | 50/200 |
| Positive/Positive | I/III | 59A | 2001 | 16000 | ELISA: 7.8 | 14.4 | ND | 1600/800 |
| Positive/Positive | I/III | 3453 | 2004 | 4096 | ELISA: 2.6 | ND | ND | 1600/3200 |
| Positive/Positive | I/III | 1246 | 2004 | 16000 | ELISA: 7.8 | 14.4 | ND | 1600/800 |
| Positive/Positive | I/III | 2800 | 2005 | 3000f | ISAGA: 12f | ND | ND | ND |
| Positive/Positiveg | I/IIIg | 22519g,H | 2008g | 16g | ELISA: 0g | 0g | NDg | 50/200g |
| Positive/Positive | I/III | 636 | 2009 | 128 | ELISA:2.1 | ND | Low | <50/<100 |
| Positive/Positive | I/III | 7961 | 2009 | 8000 | ELISA: 10.9 | ND | ND | 400/3200 |
| Positive/Positive | I/III | 6494 | 2011 | 16000 | ELISA: 10.2 | 10.9 | ND | 1600/3200 |
| Positive/Positive | I/III | 1858 | 2012 | 4096 | ELISA: 5.4 | ND | ND | ND |
| Positive/Positive | I/III | 1949 | 2012 | 32000 | ELISA: 6.1 | 11.2 | ND | 1600/3200 |
| Positive/Positive | I/III | 7482H | 2013 | 512 | ELISA: 0.0 | 0.4 | ND | 200/800 |
| Positive/Positive | I/IIIa | 558 | 1990 | 2048 | ELISA: 8.4 | ND | ND | 1600/3200 |
| Positive/Positive | I/IIIa | 856 | 1992 | 8000 | ELISA: 5.5 | 8.5 | ND | 1600/1600 |
| Positive/Positive | I/IIIa | 3798 | 2004 | 4096 | ISAGA: 12 | 8.2 | ND | 1600/3200 |
| Positive/Positive | I/IIIa | 4560H | 2005 | 1024 | ELISA: 0.1 | 0.1 | ND | 50/3200 |
| Positive/Positive | I/IIIa | 1721 | 2005 | 8000 | ELISA: 8.1 | 6.2 | ND | 1600/1600 |
| Positive/Positive | I/IIIa | 7331H | 2006 | 8000 | ELISA: 1.2 | ND | ND | ND |
| Positive/Positive | I/IIIa | 5210H | 2007 | 1024 | ELISA: 3.3 | 1.6 | ND | 100/800 |
| Positive/Positive | I/IIIa | 3657 | 2007 | 2048 | ELISA: 1.6 | 0.2 | ND | 50/3200 |
| Positive/Positive | I/IIIa | 5435 | 2008 | 128h | ISAGA: 11h | 3h | NDh | 1600/3200h |
| Positive/Positive | I/IIIa | 5350 | 2009 | 8000 | ELISA: 2.8 | 2.6 | ND | 1600/3200 |
| Positive/Positive | I/IIIa | 1662 | 2009 | 2048 | ND | ND | Low | 400/800 |
| Positive/Positive | I/IIIa | 7197 | 2009 | 8000 | ELISA: 0.2 | 0.2 | ND | 400/3200 |
| Positive/Positive | I/IIIa | 7250 | 2010 | 4096 | ELISA: 10.9 | 7.6 | ND | 200/800 |
| Positive/Positive | I/IIIa | 8563 | 2010 | 4096 | ELISA: 4.6 | ND | ND | ND |
| Positive/Positive | I/IIIa | 7265 | 2010 | 8000 | ELISA: 8.3 | 8.1 | ND | 1600/3200 |
| Positive/Positive | I/IIIa | 3447 | 2011 | 16000 | ELISA: 2.6 | 20.1 | ND | 800/3200 |
| Positive/Positive | I/IIIa | 3689 | 2011 | 8000 | ELISA: 3.4 | 22.2 | ND | 1600/3200 |
| Positive/Positive | I/IIIa | 5334 | 2011 | 32000 | ELISA: 10.5 | 24 | ND | 1600/3200 |
| Positive/Positive | I/IIIa | 4506H | 2011 | 512 | ELISA: 0.2 | 1.6 | ND | 50/800 |
| Positive/Positive | I/IIIa | 5497 | 2011 | 32000 | ELISA: 9.2 | 35 | ND | 1600/3200 |
| Positive/Positive | I/IIIa | 6701 | 2012 | 4096 | ISAGA: 12 | 10.8 | ND | 1600/3200 |
| Positive/Positive | I/IIIa | 7296 | 2012 | 4096 | ELISA: 1.8 | 14.7 | ND | 1600/3200 |
| Positive/Positive | I/IIIa | 3934 | 2013 | 8000 | ELISA: 10 | ND | ND | ND |
| Positive/Positive | I/IIIa | 2740 | 2014 | 4096 | ELISA: 5.4 | ND | ND | ND |
| Positive/Positive | I/IIIa | 3024 | 2015 | 4096 | ELISA: 9.6 | ND | ND | ND |
| Positive/Positive | II | 1097 | 1987 | 2048 | ELISA: 6.3 | ND | ND | ND |
| Positive/Positive | II | 53A | 1990 | 256 | ELISA: 3.9 | 2.8 | ND | 200/100 |
| Positive/Positive | II | 4382H | 1994 | 512 | ELISA: 1.3 | ND | ND | ND |
| Positive/Positive | II | 2819 | 1994 | 2048 | ELISA: 1.1 | ND | ND | ND |
| Positive/Positive | II | 64A | 1994 | 16000 | ELISA: 3.3 | 22.2 | ND | 1600/3200 |
| Positive/Positive | II | 366 | 1994 | 1024 | ELISA: 6.7 | 5.8 | ND | 1600/3200 |
| Positive/Positive | II | 2762H | 1995 | 256 | ELISA: 3.8 | ND | ND | 50/800 |
| Positive/Positive | II | 3667 | 1995 | 4096 | ELISA: 1.5 | 2.3 | ND | ND |
| Positive/Positive | II | 382 | 1995 | 512 | ELISA: 0 | 1.1 | ND | 800/1600 |
| Positive/Positive | II | 8696H | 1998 | 4 | ND | ND | ND | 50/200 |
| Positive/Positive | II | 4558H | 1998 | 512 | ELISA: 0.4 | 0.4 | ND | 50/200 |
| Positive/Positive | II | 247 | 2000 | 16000 | ELISA: 1.6 | ND | ND | 1600/3200 |
| Positive/Positive | II | 3702 | 2002 | 2048 | ELISA: 3 | 2.3 | ND | 400/3200 |
| Positive/Positive | II | 6196 | 2003 | 8000 | ELiSA: 4.5 | ND | ND | ND |
| Positive/Positive | II | 3825 | 2003 | 2048 | ELISA: 2.1 | 0.8 | ND | 800/3200 |
| Positive/Positive | II | 4110 | 2003 | 4096 | ELISA: 6.7 | 5.6 | ND | 1600/3200 |
| Positive/Positive | II | 3598 | 2003 | 2048 | ELISA: 5.4 | 7.9 | ND | 1600/3200 |
| Positive/Positive | II | 45A | 2004 | 2048 | ELISA: 2.5 | 2.3 | ND | ND |
| Positive/Positive | II | 17A | 2005 | 8000 | ELISA: 1.5 | Negative | 2.1 low | 400/800 |
| Positive/Positive | II | 51A | 2005 | 2048 | ELISA: 5.2 | 0.8 | Low | 400/400 |
| Positive/Positive | II | 5420H | 2006 | 2048 | 1.5 | ND | ND | 400/3200 |
| Positive/Positive | II | 376 | 2006 | 8000h | ISAGA: Negativeh | 0.7h | NDh | NDh |
| Positive/Positive | II | 388 | 2006 | 8000 | ELISA: 1.5 | Negative | 2.1 low | 400/800 |
| Positive/Positive | II | 6585 | 2006 | 128 | ELISA: 7.2 | ND | ND | 50/400 |
| Positive/Positive | II | 5380 | 2007 | 4096 | ELISA: 5.2 | 6.9 | ND | 1600/3200 |
| Positive/Positive | II | 7293 | 2007 | 8000 | ELISA: 2 | ND | ND | ND |
| Positive/Positive | II | 375 | 2007 | 512 | ELISA: 8.7 | 3.8 | ND | 50/100 |
| Positive/Positive | II | 7754H | 2008 | 256 | ELISA: 0 | 1 | ND | 50/400 |
| Positive/Positive | II | 7595H | 2008 | 1024 | ELISA: 1.6 | 3.2 | ND | 400/3200 |
| Positive/Positive | II | 7098H | 2009 | 128 | ELISA: 0.5 | ND | ND | ND |
| Positive/Positive | II | 7206H | 2009 | 256 | ELISA: 2.8 | ND | ND | ND |
| Positive/Positive | II | 3667 | 2009 | 2048 | ELISA: 5.0 | 0.8 | ND | ND |
| Positive/Positive | II | 3568 | 2009 | 32000 | ELISA: 7.1 | 28 | ND | 1600/1600 |
| Positive/Positive | II | 5559 | 2010 | 8000 | ISAGA: 7 | 3.5 | ND | 400/3200 |
| Positive/Positive | II | 7367H | 2010 | 128 | ELISA: 0.8 | ND | ND | ND |
| Positive/Positive | II | 8504 | 2010 | 16000 | ELISA: 1.6 | ND | ND | ND |
| Positive/Positive | II | 2242 | 2011 | 2048 | ELISA: 5.2 | 0.8 | Low | 400/400 |
| Positive/Positive | II | 4697 | 2011 | 512 | ELISA: 4.1 | 3.7 | ND | 200/800 |
| Positive/Positive | II | 3750 | 2011 | 16000 | ELISA: 2.8 | 1.2 | ND | 1600/3200 |
| Positive/Positive | II | 2204 | 2011 | 2048 | ELISA: 3.1 | 0.7 | ND | 800/800 |
| Positive/Positive | II | 7192 | 2011 | 2048 | ELISA: 3.7 | 2.1 | ND | 1600/3200 |
| Positive/Positive | II | 3548 | 2012 | 8000 | ELISA: 2.9 | 1.8 | High | 1600/800 |
| Positive/Positive | II | 3013 | 2012 | 4096 | ELISA: 8.5 | 1 | Low | 1600/800 |
| Positive/Positive | II | 6113 | 2012 | 2048 | ELISA: 1.4 | 0.6 | ND | 400/800 |
| Positive/Positive | II | 9515 | 2013 | 2048 | ELISA: 3.5 | ND | ND | ND |
| Positive/Positive | II | 7480H | 2013 | 1024 | ND | ND | ND | ND |
| Positive/Positive | II | 8203 | 2013 | 1024 | ELISA: 3.3 | 5.3 | ND | 1600/800 |
| Positive/Positive | II | 1863 | 2013 | 8000h | ISAGA: Positiveh | 11.1h | NDh | NDh |
| Positive/Positive | II | 9718 | 2013 | 4096 | ELISA: 2.8 | ND | ND | ND |
| Positive/Positive | II | 3715 | 2013 | 16000 | ELISA: 3.2 | 10.5 | Low | 800/1600 |
| Positive/Positive | II | 7654 | 2014 | 16000 | ELISA: 8 | 4.3 | ND | 1600/3200 |
| Positive/Positive | II | 3088 | 2014 | 8000 | ELISA: 1.7 | 1.5 | ND | 1600/3200 |
| Positive/Positive | II | 4281 | 2016 | 2048 | ELISA: 2.5 | 2.3 | ND | ND |
| Positive/Positive | Type not known | 8A | 2006 | 2048 | ELISA: 3.5 | ND | ND | 800/800 |
| Positive/Positive | Type not known | 50A | 2009 | 8000 | ELISA: 3 | 3.5 | Equivocal | 1600/3200 |
| Positive/Positivei | Type not knowni | 445i | 2010i | 16000i | ISAGA: Positivei | 8.5i | NDi | NDi |
| Positive/Positive | Type not known | 57A | 2011 | 32000 | ELISA: 0.1 | Negative | Equivocal | 800/3200 |

These samples were chosen to reflect measurement for patients in real time. The samples stored present a unique opportunity to know the precise time from seroconversion (birth of infected infant) to the time the serum sample was obtained. The goal was to determine whether the *Toxoplasma* ICT IgG-IgM POC test resulta could distinguish serum from patients infected with parasites of differing serotypes, present in the U.S.b, from the sera of uninfected persons. We selected these serum samples at later times after primary infection during gestation that resulted in the birth of an infected infantc. The year reflects the time the stored sample was obtained from 1991-2016d. The serologic tests in this table were the mother’s serologic tests at the time of the birth of an infected infante. The time after birth the serum was obtained demonstrates that these samples were remote from the primary infection, which is what we were trying to detect. Thirteen samples closer to the time of primary infection were also tested (labeled A). Not all samples from acutely infected persons had serotype data available, reflected by N/A. These data are also displayed in Fig 1. An IgG dye test is considered negative for values <1:16 and positive for values ≥1:16 [27]. An IgM ELISA performed with serum is considered negative for values 0.0-1.6, equivocal for values 1.7-1.9, and positive for values ≥2.0 in serum [28]. An IgM ISAGA is positive for values ≥3 [29]. An IgA ELISA for patients >6 months of age is considered negative for values 0.0-1.4, equivocal for values 1.5-2.0, and positive for values ≥2.1, and an IgA ELISA for patients <6 months of age is considered negative for values 0.0-0.9 and positive for values ≥1.0 [30]. High avidity signifies that infection occurred more than 4 months ago [31]. f Serology not performed at Palo Alto Medical Foundation *Toxoplasma* Serology Laboratory. g Chronic seropositive patient. h Serology values for child are listed. i Chronic seropositive father; serology values for child are listed. H Historical control.