UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF GEORGIA

JENNER BENAVIDES, *et al.,* Petitioners/Plaintiffs, v. PATRICK GARTLAND, *et al.,* Respondents/Defendants.	Case No.:4:20-cv-00069-RSB-CLR **HEARING REQUESTED**

MEMORANDUM OF LAW IN SUPPORT OF MOTION FOR TEMPORARY RESTRAINING ORDER AND EMERGENCY WRIT OF HABEAS CORPUS

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Petitioners[1] are detained in ICE custody in Folkston ICE Processing Center ("Folkston"), in rural southern Georgia. Due to their medical conditions, Petitioners are vulnerable to serious cases of COVID-19. If Petitioners contract COVID-19, there is a high risk they will require critical care—largely unavailable in southern Georgia—and face serious illness or death. In detention it is impossible for Petitioners to practice the only known methods to avoid COVID-19—social distancing and diligent hand hygiene. It is all but inevitable that they will be exposed to the virus and face serious harm, possibly including death, absent an immediate order from this court releasing them from detention.

I. FACTUAL BACKGROUND

As of the evening of April 7, 2020, the COVID-19 pandemic has infected over 1.4 million people and taken at least 81,858 lives globally, with 394,278 confirmed cases and 12,716 deaths in the United States, including 8,818 cases and 329 deaths in Georgia.[2] Compl. ¶¶ 22, 24. COVID-19 can require hospitalization and the use of a ventilator and may result in long-term organ damage or death.[3] Ex. 1 ¶ 7; Ex. 2 ¶ 6. There is no known vaccine or cure for COVID-19. Ex. 1 ¶ 5; Ex. 2 ¶ 10. COVID-19 is highly contagious and is transmitted between people who are within about six feet of each other through respiratory droplets from coughing or sneezing.[4] Ex. 2 ¶ 7; *see also* Ex. 1 ¶ 11; Ex. 3 ¶ 11. Scrupulous hand hygiene and social distancing—staying at least six feet away

[1] Petitioners-Plaintiffs have filed this action using pseudonyms. They seek leave to proceed pseudonymously in a concurrently filed motion.

[2] The number of cases is likely an underestimate "due to lack of availability of testing" in the United States. Ex. 1 ¶ 3.

[3] All exhibits cited in this motion are exhibits attached to the Declaration of Mark Reeves, which is attached to this motion.

[4] Breaking research suggests that COVID-19 may also spread when people merely talk or breathe. *See* Elizabeth Cohen, *Experts Tell White House Coronavirus Can Spread Through Talking or Even Just Breathing*, CNN, https://cnn.it/349RUeI.

from all other people—are the only known ways to avoid the illness. Ex. 1 ¶¶ 5, 9, 11; Ex. 2 ¶ 11; Ex. 3 ¶ 11, 22.

A. Petitioners Are Detained Individuals in Georgia at High Risk of Serious Injury or Death from COVID-19

Advanced age and certain underlying medical conditions, including compromised immune system, diabetes and other endocrine disorders, metabolic disorders, heart and lung disease, and neurological and neurodevelopmental conditions, greatly increase the likelihood of contracting a serious case of COVID-19 that requires hospitalization and support from a ventilator. Ex. 1 ¶¶ 6, 8; Ex. 2 ¶¶ 4-5; *see also* Ex. 3 ¶ 5. According to preliminary data from China, 20% of people in these high-risk categories who contract COVID-19 have died. Ex. 1 ¶ 6.

Petitioners are individuals detained at Folkston who all have underlying medical conditions that put them at high risk for COVID-19. Ex. 7-9. Petitioners have safe places to live where they can practice social distancing and hand hygiene upon release. They will comply with all conditions of release including attending immigration court hearings.[5] Ex. 7 ¶¶ 37-38; Ex. 8 ¶¶ 30-31; Ex. 9 ¶¶ 20-21.

B. Because They Are Detained in South Georgia, Petitioners Are at High Risk of COVID-19 Exposure.

1. People Enter and Exit These Facilities on a Daily Basis

Detention center staff, ICE officers, contractors, vendors, and legal visitors enter and exit Folkston on a daily basis. *See* Ex 1 ¶¶ 11, 15; *see generally* Ex. 5. Neither ICE nor the corporations that manage the detention centers mandate that staff or legal visitors use personal protective

[5]ICE regularly releases individuals using various alternatives to detention with documented success. For example, an evaluation of ICE's conditional supervision program, ISAP, reported a 99% attendance rate at all immigration court hearings. *See* U.S. Gov't Accountability Office, GAO-15-26, Alternatives to Detention: Improved Data Collection and Analyses Needed to Better Assess Program Effectiveness 10-11 (Nov. 2014).

equipment ("PPE"). Ex. 5 ¶¶ 7-9; Ex. 7 ¶¶ 28-30; Ex. 8 ¶¶ 13, 22; Ex. 9 ¶ 11. Petitioners reported seeing ICE personnel maintaining close contact with detainees without wearing face masks or gloves. Ex. 7 ¶ 29; Ex. 8 ¶ 13; Ex. 9 ¶ 11. ICE's guidance on PPE fails to account for the ongoing nationwide shortage. Ex. 3 ¶¶ 10-11, 22. ICE continues to arrest and bring new people into detention facilities, while also moving currently detained immigrants in and out of facilities and transferring them between different facilities.[6] Ex. 7 ¶ 34 (Petitioner Benavides noting that new immigrants have been brought into her pod unit during the outbreak); Ex. 8 ¶ 26.

Every person who enters the detention center is a potential source of COVID-19 exposure. ICE may be sporadically screening people for symptoms or contacts with known cases, but such screening is not an effective way to avoid exposure, given the known risk of asymptomatic and pre-symptomatic carriers. Ex. 1 ¶¶ 4, 14; Ex. 2 ¶ 18; Ex. 3 ¶¶ 6, 18, 22; *see also In re Extradition of Alejandro Toledo Manrique*, 2020 WL 1307109, at *1 (N.D. Cal. Mar. 19, 2020). The only effective screening tool to prevent transmission of COVID-19 into Folkston is a COVID-19 test. But testing every detained individual, as well as every staff member, contractor, or legal visitor on their entry into the detention center, is impossible because of the severe shortage of testing available in the United States. Ex. 3 ¶¶ 18, 22.

2. Hygiene and Sanitation Materials Are Lacking

A person can contract COVID-19 by touching a surface or object that an infected person has touched and then touching their own face. Ex. 2 ¶ 7. Folkston has shared living, eating, and recreation spaces with poor sanitation where thorough hygiene practices are not possible. Ex. 1 ¶ 12; Ex. 2 ¶ 13; Ex. 3 ¶ 19; Ex. 7 ¶¶ 21, 23; Ex. 8 ¶¶ 9-12, 17, 25; Ex. 9 ¶¶ 6-8, 10. Individuals in

[6]Miriam Magaña Lopez & Seth M. Holmes, *Ice Agents Are Still Performing Raids – And Using Precious N95 Masks to Do So*, The Guardian (Mar. 31, 2020), https://bit.ly/2UEiEkr.

detention share bathrooms, showers, and sinks with little opportunity for adequate disinfection between uses. Ex. 1 ¶ 12; Ex. 7 ¶ 22, 25-26; Ex. 9 ¶¶ 6, 10.

Petitioners report a lack of access to soap and cleaning materials, preventing compliance with the Centers for Disease Control's recommended hand hygiene and sanitation measures. Ex. 7 ¶¶ 24-27; Ex. 8 ¶¶ 14-17, 20; Ex. 9 ¶¶ 9, 11. Petitioner Benavides described receiving only four single-use squares of liquid soap a week for the past few weeks of the COVID-19 outbreak, which she was expected to use for both hand washing and showers. Ex. 7 ¶ 24. During an infectious disease outbreak, providing soap for four uses per week is egregious. *See* Ex. 7 ¶ 24; Ex. 2 ¶ 16; Ex. 3 ¶ 11.

3. Social Distancing Is Impossible

Detention centers are particularly susceptible to rapid spread due to the congregate nature of detention centers and overcrowding. Ex. 1 ¶¶ 11, 12, 20f; Ex. 3 ¶¶ 20, 23; Ex. 4 ¶ 5 ("The design of these facilities requires inmates to remain in close contact with one another.").

There is no way to practice social distancing at Folkston. Ex. 7 ¶ 23; Ex. 8 ¶¶ 9-11, 25; Ex. 9 ¶¶ 6, 8. Detained people live in extremely close quarters, often in shared dorms with dozens of people sleeping feet apart from each other, or in small shared cells. *E.g.* Ex. 8 ¶¶ 9-10; Ex. 9 ¶¶ 6, 8. Petitioners have observed very few if any changes within their facilities over the last several weeks in response to the pandemic. *See, e.g.*, Ex. 7 ¶¶ 24-33; Ex. 8 ¶¶ 18-24; Ex. 9 ¶¶ 11-12.

4. COVID-19 Introduction to the Facilities Is Imminent

Petitioners seek emergency relief from this Court at a time when COVID-19 has already begun to ravage Georgia. There are three confirmed cases in Charlton County, where Folkston is

located.[7] In neighboring Duval County, Florida, there were 524 confirmed cases as of April 6, 2020. Compl. ¶ 65 Reports from detained people inside Folkston indicate that reports of symptoms associated with COVID-19 are going ignored. Ex. 6 ¶ 28. If the virus has not yet reached people detained Folkston, it is only a matter of time. *See* Ex. 1 ¶ 10; Ex. 2 ¶ 19.

C. Folkston and the Surrounding Rural Hospital Infrastructure in South Georgia Are Incapable of Safely Handling a Detention Center Outbreaks.

The threat posed by COVID-19—a harrowing and highly contagious illness that spreads like wildfire in crowded spaces—is unlike anything ICE has ever managed. Folkston is ill-equipped to address medical emergencies and disease outbreaks. *See* Ex. 5 ¶ 17 (recounting previous outbreaks at Folkston); Ex. 6 ¶¶ 28-29 (describing delays in medical care and limited medical resources at Folkston). Specifically, ICE has long been unable to provide even basic medical care to detained people at Folkston, resulting in needless deaths and other medical emergencies. Ex. 5 ¶ 15, 17; Ex. 6 ¶¶ 28-29; Ex. 7 ¶¶ 11-15; Ex. 8 ¶ 8; Ex. 9 ¶¶ 13-15; Compl. ¶¶ 57-64 (collecting sources). There have been reports that ICE needed to procure medical equipment locally due to the detention center's limited resources, including a report that an ICE officer was required to drive to different local drugstores for thermometers because there were none at Folkston. Ex. 6 ¶ 29. When ICE has consistently demonstrated that it is incapable of managing the health and medical care of those in its custody during ordinary times, it is a foregone conclusion that ICE cannot protect the medically vulnerable in the face of a pandemic that has overwhelmed health systems the world over. *See* Ex. 1 ¶ 13, 16; Ex. 3 ¶ 21; Ex. 4 ¶ 6.

The minimal steps ICE has taken to address the pandemic, as well as the limited additional steps—short of release—that they can feasibly take, will necessarily be ineffective in curbing the

[7]Georgia Dep't of Public Health COVID-19 Daily Status Report, https://bit.ly/3aGfOBf (last visited Apr. 7).

virus's spread in detention centers. *See* Ex. 1 ¶¶ 18-23; Ex. 3 ¶¶ 22-23. ICE cannot dramatically expand its infrastructure overnight to make space for social distancing. *Cf.* Ex. 1 ¶ 20e; Ex. 4 ¶ 5. DHS has issued guidance to isolate, quarantine, and cohort (segregate as a group from others in the facility) to attempt to mitigate spread, yet these will make matters worse. Ex. 1 ¶ 22 (describing mental health risks and increased physical contact in isolation); Ex. 2 ¶ 20 ("Isolation of symptomatic individuals within detention settings similarly will not stop transmission before symptom onset."); Ex. 3 ¶¶ 8 (describing medical isolation as an "unacceptable and potentially deadly form of quarantine").

Furthermore, Folkston is geographically isolated from appropriate levels of medical care to treat COVID-19. Ex. 3 ¶¶ 13-14. There are no hospitals in all of Charlton County.[8] The nearest hospital to Folkston with ICU capabilities at all is approximately 26 miles away and only has five ICU beds. Patients would likely require initial transport or transfer to Southeast Georgia Health System – Brunswick, which only has 24 ICU beds and is about 45 miles away. Compl. ¶ 77. The time it will take to transport infected individuals to hospitals could make the difference between life and death. Ex. 3 ¶ 16.

D. Releasing Petitioners Would Reduce the Devastating Public Health Impact of COVID-19 on Georgia

Petitioners' continued detention not only threatens their own health and wellbeing but also subjects all other detained individuals and staff at Folkston to an increased risk of illness or death. *See* Ex. 1 ¶¶ 12, 20a, 25; Ex. 4 ¶ 7; Ex. 3 ¶ 21. The release of vulnerable individuals mitigates the overall risk of a COVID-19 outbreak in any detention facility because it reduces the total number

[8] *Counties without Hospitals*, Georgia Hospital Ass'n, https://www.gha.org/Data/Maps (last visit Apr. 7, 2020).

of detained individuals, thereby permitting greater social distancing and reducing the staff's workload. Ex. 4 ¶ 9; Ex. 1 ¶¶ 17, 24-27; Ex. 3 ¶ 22.[9]

An outbreak of COVID-19 at any of Georgia's immigration detention centers, including Folkston, would likely overwhelm the local health infrastructure in the surrounding communities. Ex. 3 ¶¶ 14-15 (explaining impact of a detention center outbreak on regional hospitals that serve large swaths of south Georgia). Southeast Georgia Health System – Brunswick—the closest hospital to Folkston that is equipped to manage even a moderate number of serious cases of COVID-19—serves five different counties and will quickly become overwhelmed if there is an outbreak in Folkston. Ex. 3 ¶ 15 (citing predictions that all Georgia hospital resources will be in use by April 22, 2020). If particularly vulnerable detained individuals like Petitioners fall critically ill from COVID-19, their need for intensive medical care would strain local hospitals that already have scarce resources. Compl. ¶¶ 72-78; Ex. 1 ¶ 25; Ex. 2 ¶ 5 (fatality rates increase as hospitals become overburdened) Ex. 3 ¶¶ 14-15.

Petitioners filed a habeas petition and complaint for declaratory and injunctive relief on April 8, 2020, alleging that their detention during the pandemic violates the Fifth Amendment Due Process Clause. The emergency nature of this situation cannot be overstated: because they are detained at Folkston, Petitioners are at imminent near-certain risk of exposure to an illness from which they have a 20% chance of dying. If they remain detained in southern Georgia, where hospitals are wholly unprepared to treat the impending volume of COVID-19 patients, there is also an unreasonably high risk that Petitioners will be unable to access life-saving medical treatment.

[9]Already prisons and detention centers in other countries and many U.S. states have begun releasing people from custody or reducing new arrests. *See, e.g.*, Compl. ¶ 50.

Civil detention with such odds of grave harm cannot be constitutional. Petitioners implore the Court to save their lives and order their immediate release.

II. ARGUMENT

Petitioners seek emergency release through a writ of habeas corpus or, alternatively, through injunctive relief under Rule 65. "Habeas is at its core a remedy for unlawful executive detention." *Munaf v. Geren*, 553 U.S. 674, 693 (2008). Habeas vests in federal courts broad, equitable authority to "dispose of the matter as law and justice require," 28 U.S.C. § 2243; the "very nature of the writ demands that it be administered with the initiative and flexibility essential to insure that miscarriages of justice . . . are surfaced and corrected." *Harris v. Nelson*, 394 U.S. 286, 291 (1969). Habeas corpus is, "above all, an adaptable remedy," *Boumediene v. Bush*, 553 U.S. 723, 779 (2008), conferring "broad discretion" on courts to right wrongs, *Hilton v. Braunskill*, 481 U.S. 770, 775 (1987). Accordingly, the illegality of custody under the "Constitution or laws . . . of the United States" may stem from the fact of detention and the duration of detention—what is often referred to as the historical core of habeas—or from unlawful placement or conditions of detention. *See Wilwording v. Swenson*, 404 U.S. 249, 249, 251 (1971) (habeas challenging "living conditions and disciplinary measures" is "cognizable in federal habeas corpus"). The Court is fully empowered to remediate through habeas the particular illegality here—an outbreak of lethal and unavoidable virus that threatens Petitioners and violates their constitutional rights—by ordering Petitioners' release. *See Boumediene*, 553 U.S. at 779.

Courts have similarly broad power under Rule 65 to fashion equitable remedies to address constitutional violations in prisons. *Hutto v. Finney*, 437 U.S. 678, 687 n.9 (1978); *see, e.g.*, *Brown v. Plata*, 563 U.S. 493, 511 (2011) (recognizing authority to "plac[e] limits on a prison's population" when necessary to ensure constitutional compliance); *Duran v. Elrod*, 713 F.2d 292,

297-98 (7th Cir. 1983), *cert. denied*, 465 U.S. 1108 (1984) (court had authority to direct release of low-bond pretrial detainees as necessary to reach a population cap).

A TRO is warranted when the movant demonstrates: (1) a substantial likelihood of success on the merits; (2) a substantial threat of irreparable injury unless the order issues; (3) the threatened injury to the movant outweighs any harm the injunction may cause the opposing party; and (4) the injunction would not undermine the public interest. *Levi Strauss & Co. v. Sunrise Int'l Trading Inc.*, 51 F.3d 982, 985 (11th Cir. 1995); *accord Friedenberg v. Sch. Bd. of Palm Beach Cty.*, 911 F.3d 1084, 1090 (11th Cir. 2018). "Where, as here, the 'balance of the equities weighs heavily in favor of granting the [injunction]' the Plaintiffs need only show a 'substantial case on the merits.'" *Schiavo ex rel. Schindler v. Schiavo*, 403 F.3d 1289, 1298 (11th Cir. 2005). Petitioners easily satisfy all four factors.

A. Petitioners are Likely to Succeed on the Merits of Their Due Process Claim.

All immigration detainees, even those with prior criminal convictions, are civil detainees held pursuant to immigration laws and protected by the Fifth Amendment Due Process Clause. *Zadvydas v. Davis*, 533 U.S. 678, 690 (2001). Petitioners are likely to succeed on the merits of their Due Process claim for two independent reasons: continuing to detain Petitioners at Folkston during the COVID-19 global pandemic (1) constitutes impermissible punishment, and (2) amounts to deliberate indifference to a substantial risk of harm.

1. Petitioners' Continued Detention During the COVID-19 Pandemic Constitutes Impermissible Punishment.

The Fifth Amendment Due Process Clause, like the Fourteenth Amendment, prohibits punishment of people in civil custody. *Bell v. Wolfish*, 441 U.S. 520, 535 n.16 (1979); *Magluta v. Samples*, 375 F.3d 1269, 1273 (11th Cir. 2004). Civilly detained people "are generally 'entitled to more considerate treatment and conditions of confinement than criminals whose conditions of

confinement are designed to punish.'" *Marsh v. Fla. Dep't of Corrections*, 330 F. App'x 179 (11th Cir. 2009) (quoting *Youngberg v. Romeo*, 457 U.S. 307, 322 (1982)).

To establish that a particular condition or restriction of detention constitutes impermissible punishment, a petitioner must show either (1) an expressed intent to punish; or (2) lack of a reasonable relationship to a legitimate governmental purpose, from which an intent to punish may be inferred. *See Wolfish*, 441 U.S. at 538. Absent explicit intent, courts must ask first "whether any 'legitimate goal' was served by the prison conditions" and second, "whether the conditions are 'reasonably related' to that goal." *Jacoby v. Baldwin County*, 835 F.3d 1338, 1345 (11th Cir. 2016). "[I]f conditions are so extreme that less harsh alternatives are easily available, those conditions constitute 'punishment.'" *Telfair v. Gilberg*, 868 F. Supp. 1396, 1412 (S.D. Ga. 1994) (citing *Wolfish*, 441 U.S. at 538-39 n.20).

The threat of serious illness and death from COVID-19 is not reasonably related to, and vastly outweighs, any purported government interest in Petitioners' civil confinement. As set forth previously, *supra* I.A, Petitioners' underlying health conditions make them especially susceptible to severe illness, life-altering complications, or death if they contract COVID-19. The measures required to prevent Petitioners from contracting COVID-19 are impossible at Folkston, and the medical resources needed to treat even a moderate volume of critical care patients are unavailable in south Georgia. *Supra* I.C. Under these circumstances, the government's detention of Petitioners is clearly excessive in relation to any countervailing government interest. And any government interest in detaining Petitioners can be satisfied with less harsh alternatives. *See supra* n. 5.

2. By Continuing to Detain Petitioners During the COVID-19 Pandemic, Respondents Are Knowingly Subjecting them to a Substantial Risk of Serious Harm

When Respondents "take[] a person into its custody and hold[] him there against his will, the Constitution imposes . . . a corresponding duty to assume some responsibility for his safety and general well-being." *DeShaney v. Winnebago Cty. Dep't of Soc. Servs.*, 489 U.S. 189, 199-200 (1989). Failure to provide detained individuals with basic necessities, such as adequate medical care, violates due process. *Hamm v. DeKalb County*, 774 F.2d 1567, at 1573 (11th Cir. 1985); *Cook ex rel. Estate of Tessier v. Sheriff of Monroe Cty.*, 402 F.3d 1092, 1115 (11th Cir. 2005). At a minimum, due process prohibits Respondents' deliberate indifference to a substantial risk of serious harm that would rise to the level of an Eighth Amendment violation in the post-conviction context.[10] *Revere v. Mass. Gen. Hosp.*, 463 U.S. 239, 244 (1983); *Hale v. Tallapoosa County*, 50 F. 3d 1579, 1582 n.4 (11th Cir. 1995). To show that Respondents are acting with deliberate indifference, Petitioners must show they were exposed to a substantial risk of serious harm, and Respondents knew or should have known of the risk but disregarded it. *Farmer v. Brennan*, 511 U.S. 825, 834, 837–38 (1994); *Marbury v. Warden*, 936 F.3d 1227, 1233 (11th Cir. 2019).

The government may violate the Eighth Amendment when it "ignore[s] a condition of confinement that is sure or very likely to cause serious illness and needless suffering the next week or month or year," including "exposure of inmates to a serious, communicable disease," even when "the complaining inmate shows no serious current symptoms." *Helling v. McKinney*, 509 U.S. 25, 33 (1993); *see also Gates v. Collier*, 501 F.2d 1291, 1300-01 (5th Cir. 1974) (Eighth Amendment

[10]Civil immigration detainees should not have to satisfy the Eighth Amendment's requirement that a prison official had subjective knowledge of a substantial risk in order to establish a Fifth Amendment violation related to conditions of confinement. The Eleventh Circuit has not yet directly addressed this issue. Other courts have held that an objective deliberate indifference standard should apply to individuals in this context. *See Gordon v. County of Orange*, 888 F.3d 1118, 1124-25 (9th Cir. 2018), *cert. denied*, 139 S. Ct. 794 (2019); *Darnell v. Pineiro*, 849 F.3d 17, 32-36 (2d Cir. 2017). But the court need not address this issue because the evidence is clear that ICE is aware of the substantial risk of serious harm to Petitioners.

violation due to the mingling of "inmates with serious contagious diseases" with other inmates). Courts do not require a plaintiff to "await a tragic event" before seeking relief from unconstitutionally dangerous conditions. *Helling*, 509 U.S. at 33. "It would be odd to deny an injunction to inmates who plainly proved an unsafe, life-threatening condition in their prison on the ground that nothing yet had happened to them." *Id.*

Thus, the harm Petitioners fear—that their confinement will result in a COVID-19 infection that will seriously injure and possibly kill them—need not become a reality to establish a constitutional violation.

a. Substantial Risk of Serious Harm

By continuing to detain Petitioners, who have medical conditions that render them particularly vulnerable to COVID-19, Respondents are jeopardizing their health and possibly their lives. *See supra* I.A. Petitioners have a 20% risk of death if they contract the disease, and a higher risk of suffering severe complications requiring hospitalization, including intubation and the use of a ventilator, and long-term organ damage. Yet if Petitioners remain detained in south Georgia, there may not be even one critical care bed available to them in the event of serious infection. *Cf. Farrow v. West*, 320 F.3d 1235, 1247 (11th Cir. 2003) (denial or delay in access to needed medical care may amount to deliberate indifference); *accord McElligott v. Foley*, 182 F.3d 1248 (11th Cir. 1999); *Brown v. Hughes*, 894 F.2d 1533 (11 Cir. 1990); *Ancata v. Prison Health Servs., Inc.*, 769 F.2d 700, 704 (11th Cir. 1985). These risks constitute the most serious of harms.

b. Knowing Disregard of the Substantial Risk

Respondents have "subjective knowledge of a substantial risk of serious harm" to Petitioners but are "disregard[ing] that known risk by failing to respond to it in an (objectively) reasonable manner." *Rodriguez v. Sec'y for Dep't of Corr.*, 508 F.3d 611, 617, 619 n.15 (11th Cir. 2007); *see also Farmer*, 511 U.S. at 842. Where a risk is obvious, such as the threat posed to

medically vulnerable people during a highly contagious and deadly disease outbreak, courts can presume that government officials are aware of the risk. *See, e.g.*, *id.*

There is no question that ICE has actual knowledge of the excessive risk of harm that the coronavirus presents to individuals in ICE custody with underlying medical conditions, including Petitioners. DHS whistleblowers raised the alarm as early as February 25, 2020, recommending release of most detained immigrants due to the specific risks that COVID-19 poses to them.[11] In the last several weeks, ICE has received numerous letters from advocates, medical professionals, and members of Congress emphasizing these same risks, including letters specifically addressing Folkston.[12] There have also been many news articles highlighting the risk of coronavirus outbreaks in ICE facilities.[13]

The federal government itself has issued warnings about the particular risk of COVID-19 for people with high-risk medical conditions.[14] It has also issued guidance to the public that social distancing and proper hand hygiene—measures which Petitioners cannot possibly practice in immigration detention—are effective ways to reduce the risk of exposure to COVID-19. Despite ICE's awareness of the heightened risk faced by Petitioners, the agency continues to detain them under conditions where there is no effective way to protect them from exposure.

Courts across the United States have recognized that urgent release of medically vulnerable individuals from immigration detention is the only appropriate course of action in the face of a

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[11] *See, e.g.*, Letter from Dr. Scott Allen and Dr. Josiah Rich, Medical Experts for DHS, to House Comm. on Homeland Sec. (Mar. 19, 2020), https://bit.ly/3dQxP1J.
[12] Ex. 6 ¶ 30; *see also* Letter from 763 non-governmental organizations to Matthew T. Albence, ICE Acting Director (Mar. 19, 2020), https://bit.ly/2UUKtUG.
[13] *See, e.g.*, Abigail Hauslohner, Nick Miroff & Matt Zapotosky, *Coronavirus Could Pose Serious Concern in ICE Jails, Immigration Courts*, The Washington Post (Mar. 12, 2020), https://wapo.st/2X5BxOY.
[14] *Are You at Higher Risk for Severe Illness?, Centers for Disease Control and Prevention* (accessed Mar. 23, 2020), https://bit.ly/3bPkxkk.

highly contagious disease with a death toll that continues to rises daily. *See* Compl. ¶ 5 n.1 (collecting cases).

For the foregoing reasons, Petitioners are likely to succeed on the merits of their claim that their continued detention violates their Fifth Amendment due process right to reasonable safety and freedom from punishment in government custody.

B. Petitioners Face an Imminent and Substantial Threat of Irreparable Harm from COVID-19

An injury is irreparable when a plaintiff cannot obtain adequate compensatory or corrective relief through the ordinary course of litigation. *Cunningham v. Adams*, 808 F.2d 815, 821 (11th Cir. 1987). The injury must be "actual and imminent, not remote or speculative." *Odebrecht Constr., Inc. v. Sec'y, Fla. Dep't of Transp.*, 715 F.3d 1268, 1288 (11th Cir. 2013). Absent a TRO, Petitioners face the most fundamental kind of irreparable harm—imminent and substantial risk of serious, lasting illness or death. "There can be no injury more irreparable." Memorandum and Order at 9, *Thakker*, No. 1:20-cv-00480-JEJ; *see also J.M. v. Crittendon*, No. 1:18-CV-568-AT, 2018 WL 7079177, at *7 (N.D. Ga. May 21, 2018).

Petitioners are highly likely to contract COVID-19 if they remain in ICE detention, where their sole defenses against the risk of a coronavirus infection—social distancing and scrupulous hygiene—are simply impossible for the reasons stated above. *See supra* I.B.2, 3. "[I]t is not a matter of *if* COVID-19 will enter . . . prisons, but *when* it is finally detected therein." Memorandum and Order at 8, *Thakker v. Doll*, No. 1:20-cv-00480-JEJ (M.D. Pa. Mar. 31, 2020). Further exacerbating the risk of injury to Petitioners is their lack of access to adequate medical care in the event of a serious COVID-19 infection. *See supra* I.C. The closest hospitals that can provide critical care services are far away and will quickly become overwhelmed if there are outbreaks in these detention centers.

As the COVID-19 pandemic continues to ravage communities in the United States, courts across the country have begun to acknowledge, in no uncertain terms, the gravity of the danger medically vulnerable individuals like Petitioners face in ICE detention. *See, e.g.*, Memorandum and Order at 24, *Thakker*, No. 1:20-cv-00480-JEJ (stating that ICE's facilities were "plainly not equipped" to protect petitioners from a potentially fatal exposure to COVID-19 and that failure to urgently release petitioners would be an "unconscionable and possibly barbaric result"); *Coronel v. Decker*, 2020 WL 1487274 (S.D.N.Y. March 27, 2020); Memorandum and Order at 3-4, *Basank v. Decker*, 2020 WL 1481503 (S.D.N.Y. Mar. 26, 2020) ("The risk that Petitioners will face a severe, and quite possibly fatal, infection if they remain in immigration detention constitutes irreparable harm . . . "); Temporary Restraining Order and Order to Show Cause, *Fraihat v. Wolf* (C.D. CA March 30, 2020).

Additionally, continuing to detain Petitioners—when their medical conditions put them at grave risk of severe illness or death if they contract COVID-19—violates due process under the Fifth Amendment. Deprivations of constitutional rights that cannot be compensated monetarily generally amount to irreparable injury as a matter of law. *See Cunningham v. Adams*, 808 F.2d 815, 822 (11th Cir. 1987). As public health experts make clear, Respondents cannot ameliorate the life-threatening risk to Petitioners through any means other than immediate release. Release is the sole remedy that can effectively protect Petitioners against the grave and imminent threat that COVID-19 poses to their health and redress Respondents' violations of their due process rights.

C. The Balance of Equities and Public Interest Weigh Heavily in Petitioners' Favor.

The final two factors of the TRO inquiry "merge when the Government is the opposing party." *Nken v. Holder*, 556 U.S. 418, 435 (2009). In contrast to Petitioners' significant risk of serious illness or death, *see supra* I.A, Respondents will not be injured by an injunction. Indeed, it

is in both the Respondents' and the broader public interest to release medically vulnerable individuals from custody, rather than needlessly jeopardizing their health and lives. Moreover, "the public interest is served when constitutional rights are protected." *Jones v. Governor of Fla.*, 950 F.3d 795, 830 (11th Cir. 2020) (citation omitted); *KH Outdoor, LLC v. City of Trussville*, 458 F.3d 1261, 1272 (11th Cir. 2006).

ICE has an interest in preventing any potential spread of COVID-19 in its detention facilities in order to maintain the health and safety of everyone who has contact with the facilities. The release of people most vulnerable to COVID-19—which would permit greater social distancing and decrease staff workloads—reduces the overall health risk for detained individuals and facility staff alike at Folkston, as well as for surrounding communities. Far from harming the government, Petitioners' release would further ICE's interests in maintaining a healthy and orderly environment at Folkston.

Releasing Petitioners is unquestionably in the public interest. Ex. 4 ¶ 6. *See, e.g.*, *Grand River Enters. Six Nations, Ltd. v. Pryor*, 425 F.3d 158, 169 (2d Cir. 2005) (referring to "public health" as a "significant public interest[]"); *see also* Allen & Rich Ltr., *supra* n. 11 ("[I]t is essential to consider releasing all detainees who do not pose an immediate risk to public safety"). In the unprecedented and rapidly evolving circumstances COVID-19 crisis, the continued civil detention of aging or ill individuals does not serve the public's interest. An outbreak of COVID-19 at Folkston would strain both local and state health infrastructure and contribute to more massive community spread and more deaths. The health and safety of the public would thus be best served by rapidly decreasing the number of individuals detained in confined, unsafe conditions. Ex. 4 ¶ 9. By releasing such individuals now, ICE would reduce the spread and severity of infection inside Folkston. This, in turn, would reduce the number of people who will become ill enough to require

hospitalization and thereby decrease the health and economic burden on local communities. Ex. 1 ¶ 26.

To the extent the equities weigh in favor of some restraint of Petitioners' liberty, that can be achieved through fashioning reasonable release conditions that ICE already uses and that have demonstrated success. *See supra* n. 5; Brief of Amicus Curiae at 36-37, *Jennings v. Rodriguez*, No. 15-1204, 2016 WL 6276890 (Oct. 24, 2016).

D. The Court Should Not Require Petitioners to Provide Security Prior to Issuing a Temporary Restraining Order.

Courts have discretion to waive the requirement in Federal Rule of Civil Procedure 65(c) that a movant provide a security upon the issuance of a preliminary injunction or TRO. *BellSouth Telecomms., Inc. v. MCImetro Access Transmission Servs., LLC*, 425 F.3d 964, 971 (11th Cir. 2005). District courts in this Circuit often exercise this discretion to require no security in cases brought by indigent and/or incarcerated people. *See, e.g.*, *Schultz v. Alabama*, 330 F. Supp. 3d 1344, 1376 (N.D. Ala. 2018) (county prisoners); *Campos v. I.N.S.*, 70 F. Supp. 2d 1296, 1310 (S.D. Fla. 1998) (indigent immigrants). This Court should do the same here.

III. CONCLUSION

For the foregoing reasons, Petitioners' motion for a temporary restraining order should be granted.

Dated: April 8, 2020

Respectfully submitted,

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**pro hac vice motions forthcoming*

CERTIFICATE OF SERVICE

I hereby certify that I am counsel of record for the Petitioners in the above-captioned action and that on April 8, 2020, Petitioners' counsel electronically filed the foregoing with the Clerk of the Court using the CM/ECF System. Given the emergency nature of this action, and the fact that no appearances have yet been entered by Respondents-Defendants in this case, I further certify that on April 8, 2020, Petitioners' counsel emailed copies of this filing to Woelke

Leithart, Assistant United States Attorney in the Southern District of Georgia, at Woelke.Leithart@usdoj.gov.

/s/ Kathryn E. Isted
Kathryn E. Isted

EXHIBIT 1

DECLARATION OF ROBERT B. GREIFINGER, MD

I, Robert B. Greifinger, M.D., hereby declare under the penalty of perjury pursuant to 28 U.S.C. § 1746:

1. I am a physician who has worked in health care for prisoners for more than 30 years. I have managed the medical care for inmates in the custody of New York City (Rikers Island) and the New York State prison system. I have authored more than 80 scholarly publications, many of which are about public health and communicable disease. I am the editor of *Public Health Behind Bars: from Prisons to Communities,* a book published by Springer (a second edition is due to be published in early 2021); and co-author of a scholarly paper on outbreak control in correctional facilities.[1]

2. I have been an independent consultant on prison and jail health care since 1995. My clients have included the U.S. Department of Justice, Division of Civil Rights (for 23 years) and the U.S. Department of Homeland Security, Section for Civil Rights and Civil Liberties (for six years). I am familiar with immigration detention centers, having toured and evaluated the medical care in approximately 20 immigration detention centers, out of the several hundred correctional facilities I have visited during my career. I currently monitor the medical care in three large county jails for Federal Courts. My resume is attached as Exhibit A.

COVID-19 Background

3. COVID-19 is a coronavirus disease that has reached pandemic status. As of today, according to the World Health Organization, more than 850,000 people have been diagnosed with COVID-19 around the world and 42,000 have died.[2] In the United States, about 214,000 people have been diagnosed and 4,800 people have died thus far.[3] These numbers are likely an underestimate, due to the lack of availability of testing, especially in the United States.

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[1] Parvez FM, Lobato MN, Greifinger RB. Tuberculosis Control: Lessons for Outbreak Preparedness in Correctional Facilities. Journal of Correctional Health Care OnlineFirst, published on May 12, 2010 as doi:10.1177/1078345810367593.

[2] See https://experience.arcgis.com/experience/685d0ace521648f8a5beeeee1b9125cd, accessed April 2, 2020.

[3] See https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html?searchResultPosition=1, accessed April 2, 2020.

4. There is emerging evidence, from researchers in Singapore, that the virus that causes COVID-19 is transmissible from an asymptomatic person for one to two days before the person develops symptoms.[4]

5. COVID-19 is a serious disease, ranging from no symptoms or mild ones for people at low risk, to respiratory failure and death in older patients and patients with chronic underlying conditions. There is no vaccine to prevent COVID-19. There is no known cure or anti-viral treatment for COVID-19 at this time. In the absence of a vaccine, the only way to mitigate the spread of COVID-19 is scrupulous hand hygiene and social distancing.

6. People in the high-risk category for COVID-19, i.e., the elderly or those with underlying disease, are likely to suffer serious illness and death when they are infected. According to preliminary data from China, 20% of people in high risk categories who contract COVID-19 have died.

7. Those who do not die have prolonged serious illness, for the most part requiring expensive hospital care, including ventilators that are in very short supply.

8. The Centers for Disease Control and Prevention (CDC) has identified underlying medical conditions that may increase the risk of serious COVID-19 for individuals of any age: blood disorders, chronic kidney or liver disease, compromised immune system, endocrine disorders, including diabetes, metabolic disorders, heart and lung disease, neurological and neurologic and neurodevelopmental conditions, and current or recent pregnancy.

9. Social distancing and hand hygiene are the only known ways to prevent the rapid spread of COVID-19. For that reason, public health officials have recommended extraordinary measures to combat the spread of COVID-19. Schools, courts, collegiate and professional sports, theater and other congregate settings have been closed as part of risk mitigation strategy.

Risk of Outbreak of COVID-19 in Detention Centers

10. The conditions of immigration detention facilities pose a heightened public health risk to the spread of COVID-19, even greater than other non-carceral institutions. ICE will not be able to stop the spread of COVID-19 within its

[4] https://www.cdc.gov/mmwr/volumes/69/wr/mm6914e1.htm?s_cid=mm6914e1_w, accessed April 2, 2020.

facilities. ICE has already reported the presence of detainees with confirmed COVID-19 in multiple detention facilities.[5]

11. One of the few means of preventing a COVID-19 infection is through social distancing—that is maintaining a distance of at least six feet between individuals so as not to unintentionally spread the virus to others. This is nearly impossible in a detention center, where crowding of individuals is commonplace. Immigration detention facilities are enclosed environments, much like the cruise ships that have been sites of large concentrated outbreaks of COVID-19. Immigration detention facilities have even greater risk of virus transmission because of crowding, the proportion of vulnerable people detained, the ingress and egress of staff, and often scant medical care resources.

    Take the sally-port or control port, for example. This is a series of two locked gates that bring all staff and detained persons past a guard in a window control room. These areas often become severely crowded, especially during shift changes for staff or leading up to count for the detained people. In this context, close contact is unavoidable; it creates a breeding ground for COVID-19 infection.

    These sally-ports are also a focal point for staff to transfer keys, radios, and other equipment through a hand to hand transaction, intensifying the risk of transmitting infection from a staff member to others.

12. In a detention center, people live in close quarters and cannot achieve the "social distancing" needed to effectively prevent the spread of COVID-19. Toilets, sinks, and showers are shared, without disinfection between use. Food preparation and food service is communal, with little opportunity for surface disinfection. Staff arrive and leave on a shift basis; there is little to no ability to adequately screen staff for new, asymptomatic infection.

13. Many immigration detention facilities lack adequate medical care infrastructure to address the spread of infectious disease and treatment of high-risk people in detention. As examples, immigration detention facilities often use practical nurses who practice beyond the scope of their licenses; have part-time physicians who have limited availability to be on-site; and facilities with no formal linkages with local health departments or hospitals.

[5] https://www.ice.gov/coronavirus, accessed April 2, 2020.

14. It is difficult to capture the full extent of the problem because testing materials have been in very short supply and the fact that people who are infected with COVID-19, as far as we know, can be asymptomatic for up to two days before showing the symptoms associated with the disease.

15. ICE is not set up to be able to contain the disease once it is inside of its facilities or the facilities of its contractors. This is because of the realities of an infectious disease within the tight confines of a detention center and the history of inadequate health care that ICE has provided to detainees, directly or through its contractors. The CDC has warned detention centers to plan for staffing shortages due to the impact of COVID-19 on detention center staff.[6] The COVID-19 crisis only exacerbates ICE's longstanding struggle to maintain adequately staffed facilities.

16. Moreover, the Georgia detention centers have well-documented problems in the provision of adequate medical care.[7] Extended wait times for detained individuals who are ill to see a medical professional, compounds the risk of transmission. Densely congregated living areas and food preparation practices fail to comply with the standards that would prevent the spread of COVID-19.

17. The only viable public health strategy available is risk mitigation. Even with the best-laid plans to address the spread of COVID-19 in detention facilities, the release of vulnerable individuals is a key part of a risk mitigation strategy.

ICE'S Ameliorative Measures Will Not Be Effective

18. There are no changes in procedure that can alleviate these concerns. Approaches like solitary confinement or keeping individuals locked into their cells more hours of the day will make the problem worse. These approaches are psychologically damaging to detained people and may lead to a spike in severe depression, attempted and completed suicides, and medical emergencies. In the context of an outbreak in the facility, when

[6] 3 https://www.cdc.gov/coronavirus/2019-ncov/community/correction-detention/guidance-correctional-detention.html#social_distancing, accessed April 2, 2020

[7] https://www.oig.dhs.gov/sites/default/files/assets/FOIA/OIG_FOIA_Stewart-Detention-Center-Work-Papers.pdf; https://www.oig.dhs.gov/sites/default/files/assets/2017-12/OIG-18-32-Dec17.pdf. Accessed April 2, 2020.

onsite medical staff are operating at or over capacity, the problems can accelerate.

19. In addition to social distancing, another key measure to prevent the spread of COVID-19 is frequent and thorough hand washing. Handwashing stations are often few and far between in detention centers; soap is often in short supply. Many facilities do not have handwashing stations that allow water to be turned on and remain on. Instead, the faucets automatically shut off after a period of time, making it nearly impossible to wash one's hands for the recommended twenty seconds.

20. In addition to these challenges, ICE has failed to adequately respond to the COVID-19 pandemic. Both the March 6, 2020 interim guidance sheet[8] produced by ICE Health Services Corps, the body that oversees ICE detention facilities' medical care, ICE's guidance on its website,[9] and the ICE internal guidance dated March 27, 2020 are wholly insufficient to adequately face the crisis at hand. They fail in these ways:

    a. The protocol focuses on travel contacts, instead of community spread. Questions focus on detainee's recent travel history. This misses the mark. At this point in the course of the pandemic, nearly everyone who is not practicing social distancing is in contact with someone who has the virus. The correct focus is monitoring active symptoms, including fever and interaction with sick individuals upon entry into the ICE facility, including sick detained people and staff. Staff is an especially important vector in this outbreak. Since they go back and forth between the detention centers and the communities where they live, the detention centers will be hit by COVID-19 at the same time as the surrounding communities, staff and their families included.

    b. The ICE protocol does not follow the measures in the CDC guidelines for long term care facilities. Specifically, it does not ensure access to hand sanitizer or provide masks for individuals with a cough. Although the March 27, 2020 guidance recommends access to hand sanitizer inside the detention centers, it does so only for ICE-operated facilities, not contract detention centers like those in Georgia. It also fails to specify the alcohol content of the hand sanitizer, leading to the risk of low-content hand sanitizers that are not effective.

[8] https://www.aila.org/infonet/ice-interim-reference-sheet-coronavirus, accessed April 2, 2020.
[9] https://www.ice.gov/covid19, accessed April 2, 2020.

c. The ICE protocol does not provide guidance on how to deal with surge capacity, which will almost certainly be necessary as the number of cases in the detention facility increases and the number of healthy staff who can treat detained people decreases. The March 27, 2020, guidance merely recommends that detention centers continue to hire staff, which is not a meaningful suggestion where individuals are instructed to shelter in place and socially distance.

d. There is no guidance on when to test detained people. ICE Health Service Corps leadership should provide daily updates to medical staff disseminating criteria for testing in this rapidly changing environment. Epidemiologists working in conjunction with local and federal COVID-19 responders must be part of the decision-making process guiding this daily protocol. The March 27, 2020, guidance to simply follow CDC guidelines with regard to testing is insufficient and will lead to inconsistent testing.

e. The protocol does require close contacts of people with suspected COVID-19 to be monitored for 14 days for symptoms. However, many people who arrive at the detention facility, including both staff and detained persons, will have had contact with someone with COVID-19. The detention facility's medical unit simply cannot handle the volume of patients that would need this level of monitoring. There needs to be significantly more facilities and staffing to meet these needs, but, to my knowledge, ICE has not made the appropriate changes to accommodate such a level.

f. There is no guidance in the protocol to identify the highest risk patients or steps to protect them from contracting COVID-19. The plan needs to include an improved intake process, cohorted housing areas for high-risk patients, increased infection control measures, and increased medical surveillance, including daily checks for signs and symptoms. And these measures will mean nothing if social distancing is not followed. Social distancing of six feet, as recommended by the CDC, will be impossible in all ICE facilities, especially in light of practices such as double celling.

g. There are no clear criteria for hospital transfer. As clinical staff have no experience with this disease, ICE should develop rational clinical criteria for transfer to an acute care hospital.

21. The ICE response envisions using isolation rooms to monitor individuals with COVID-19 symptoms. However, most facilities only have one to four of these rooms. There will be many more than one to four people with COVID-19 in the detention center. Instead, ICE must create entire housing units reserved for people with COVID-19 symptoms, so that symptomatic patients can live separately from those who are asymptomatic or at risk.

22. Isolation is not a proper solution for people without symptoms or confirmed disease. Detainees who are isolated are monitored less frequently. If they develop COVID-19 symptoms, or their symptoms escalate, they may not be able to get the medical attention they desperately need in a timely fashion. It also makes it more likely that these detained people will attempt suicide or self-harm, giving rise to more medical problems in the midst of a pandemic. Isolation also increases the amount of physical contact between staff and detained people—in the form of increased handcuffing, escorting individuals to and from the showers, and increased use of force due to the increased psychological stress of isolation. My expert opinion is that the use of isolation or lockdown is not a medically appropriate method for abating the substantial risks of COVID-19.

23. Transferring individuals between facilities, a common ICE practice, is medically inappropriate during the outbreak. ICE does not have the staffing needed to monitor the transferred patients for the appropriate 14-day period to check for symptoms. However, ICE has not provided guidance to halt or limit transfers.

Release is the Most Effective Public Health Measure to Curb Morbidity and Mortality

24. In my opinion, the public health recommendation is to release vulnerable people from detention, given the heightened risks to their health and safety, especially given the lack of a viable vaccine for prevention or effective treatment at this stage. To the extent that vulnerable detainees have had exposure to known cases with laboratory-confirmed infection with the virus that causes COVID-19, they should be tested immediately in concert with the local health department. Those who test negative should be released.

25. Releasing the most vulnerable patients reduces the burden on local health care resources, as it reduces the risk of transmission of the disease to a large number of people living in close proximity for an extended period of time.

26. This release cohort can be separated into two groups. Group 1 could be released to home quarantine for 14 days, assuming they can be picked up from detention centers by their families or sponsors. Group 2 comprises those who cannot be easily transported to their homes by their families or sponsors. Group 2 could be released to a housing venue for 14 days, determined in concert with the Georgia Department of Health.

27. ICE must release all people with risk factors who pose no danger to society. This will prevent serious illness including death. ICE's response has made abundantly clear that they do not plan to establish special protections for high-risk patients, instead waiting for them to become infected, symptomatic, and in danger. The lack of special protections will lead to unnecessary illness and death for the people most vulnerable to this disease. ICE is walking willingly into a preventable disaster by keeping high-risk and vulnerable patients in detention facilities during the rapid spread of COVID-19.

Pursuant to 28 U.S.C. 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed this *2nd* day in April 2020 in New York City, New York.

Robert B. Greifinger, M.D.

EXHIBIT A

ROBERT B. GREIFINGER, M.D.

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New York, New York 10025

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Physician consultant with extensive experience in development and management of complex community and institutional health care programs. Demonstrated strength in leadership, program development, negotiation, communication, operations and the bridging of clinical and public policy interests. Teacher of health and criminal justice.

SUMMARY OF EXPERIENCE

MEDICAL MANAGEMENT AND QUALITY IMPROVEMENT SERVICES 1995-Present

Consultant on the design, management, operations, quality improvement, and utilization management for correctional health care systems.

- Recent clients include (among others) the U.S. Department of Justice Civil Rights Division, monitoring multiple correctional systems and the U.S. Department of Homeland Security Office of Civil Rights and Civil Liberties. Federal court monitor for the Metropolitan Detention Center, Albuquerque, New Mexico, Orleans Parish Sheriff's Office, New Orleans, Louisiana, and Miami-Dade Corrections and Rehabilitation Department.
- National Commission on Correctional Health Care. Principal Investigator for an NIJ funded project to make recommendations to Congress on identifying public health opportunities in soon-to-be-released inmates.
- Associate Editor, Puisis M (ed), Clinical Practice in Correctional Medicine, Second Edition, St. Louis. Mosby 2006.
- Editor, Greifinger, RB (ed), Public Health Behind Bars: From Prisons to Communities, New York. Springer 2007.
- John Jay College of Criminal Justice. Professor (adjunct) of Health and Criminal Justice and Distinguished Research Fellow 2005 – 2016.
- Co-Editor, International Journal of Prison Health 2010 – 2016.

NEW YORK STATE DEPARTMENT OF CORRECTIONAL SERVICES 1989 - 1995

Operating budget of $1.4 Billion. Responsible for inmate safety, program, and security. Sixty-nine facilities housing over 68,000 inmates with 30,000 employees.

Deputy Commissioner/Chief Medical Officer, 1989 - 1995

- Operating budget of $140 million; health services staff of 1,100. Accountable for inmate health services and public health. Directed major initiatives in policy and program development, quality and utilization management.
- Developed and implemented comprehensive program for HIV prevention, surveillance, education, and treatment in nation's largest AIDS medical practice.
- Managed the rapid implementation of an infection control program responding to a major outbreak of multidrug-resistant tuberculosis. Helped bring the nation's tuberculosis epidemic to public attention.
- Developed $360 million five-year capital plan for inmate health services. Opened the first of five regional medical units for multispecialty ambulatory and long-term care.
- Implemented a centralized and regional pharmacy system, improving quality, service and cost management.

MONTEFIORE MEDICAL CENTER, Bronx, NY 1985 - 1989

A major academic medical center with 8,000 employees and annual revenue of $500 million.

Vice President, Health Care Systems, 1986 - 1989

Director, Alternative Delivery Systems, 1985 - 1986

Operating budget of $60 million with 1,100 employees. Managed a multi-specialty group, a home health agency, and prison health programs.

- Negotiated contracts, including bundled service, risk capitation, fee-for-service arrangements, and major service contracts. Developed a high technology home care joint venture.
- Taught epidemiology and health care organization at Albert Einstein College of Medicine. Lectured nationally on health care delivery and managed care.
- Conceived and collaborated in development of a consortium of six academic medical centers, leading to a metropolitan area-wide, joint venture HMO. Organized a network of physicians to contract with HMO's preparing for cost-containment.

WESTCHESTER COMMUNITY HEALTH PLAN, White Plains, NY 1980 - 1985

Independent, not-for-profit, staff-model HMO, acquired by Kaiser-Permanente in 1985. Operating revenue $17 million with 200 employees and 27,000 members.

Vice President and Medical Director

Chief medical officer and COO. Managed the delivery of comprehensive medical services. Accountable to the Board of Directors for quality assurance and utilization management. Practiced pediatrics.

- Accomplished turnaround with automated utilization management, improved service, sound personnel management principles, and quality management programs.
- Implemented performance based compensation program.

COMMUNITY HEALTH PLAN OF SUFFOLK, INC. 1977 - 1980

Community based, not-for-profit, staff model HMO, with enrollment of 18,000.

Medical Director

- Developed and operated clinical services. Accountable for quality of care. Practiced clinical pediatrics, and taught community health and medical ethics at SUNY Stony Brook School of Medicine.

MONTEFIORE MEDICAL CENTER, Bronx, NY 1976 - 1977

Residency Program in Social Medicine, Deputy Director, 1976-1977

Unique clinical training program focused on community health and change agentry. Developed curriculum and supervised 40 residents in internal medicine, pediatrics and family medicine.

UNITED STATES PUBLIC HEALTH SERVICE 1972 - 1974

Commissioned officer in the National Health Service Corps. Functioned as medical director and family physician in a federally funded neighborhood health center in Rock Island, Illinois. Honorable Discharge.

ROBERT B. GREIFINGER, M.D.

FACULTY APPOINTMENTS

1976 - 2002
Assistant Professor of Epidemiology and Social Medicine, Albert Einstein College of Medicine

2005 - 2016
Professor (adjunct) of Health and Criminal Justice and Distinguished Research Fellow, John Jay College of Criminal Justice

NATIONAL COMMITTEE FOR QUALITY ASSURANCE

Worked with NCQA since its inception in 1980. Began training surveyors in 1989, and continued as faculty for NCQA sponsored educational sessions. Served for six years as a charter member of the Review Oversight (accreditation) Committee. Served on the Reconsideration (appeals) Committee for six years. Surveyed dozens of managed care organizations, and reviewed several hundred quality management programs.

OTHER PROFESSIONAL ACTIVITIES

2012 – present	Member, Board of Directors, Prison Legal Services, New York
2012 – present	Member, Board of Directors, National Health Law Program
2011 – 2015	Member, Board of Directors, Academic Consortium of Criminal Justice Health
2010 - 2016	Co-editor, International Journal of Prisoner Health
2009	Recipient, B. Jaye Anno Award for Lifetime Achievement in Communication
2007-2015	Member, National Advisory Group on Academic Correctional Health Care
2007	Recipient, Armond Start Award, Society of Correctional Physicians
2005 - 2011	Member, Advisory Board to the Prisoner Reentry Institute, John Jay College
2002 - present	Member, Editorial Board, Journal of Correctional Health Care
2002 - present	Peer reviewer for multiple journals, including Journal of Correctional Health Care, International Journal of Prison Health, Journal of Urban Health, Journal of Public Health Policy, Annals of Internal Medicine, American Journal of Public Health, Health Affairs, and American Journal of Drug and Alcohol Abuse.
2001 - 2003	Member, Advisory Board to CDC on Prevention of Viral Hepatitis in Correctional Facilities
1999 - 2003	Member, Advisory Board to CDC on Prevention and Control of Tuberculosis in Jails
1997 - 2003	Member, Reconsideration Committee, NCQA
1997 - 2001	Moderator, Optimal Management of HIV in Correctional Systems, World Health Communications
1997 - 2000	Member, Reproductive Health Guidelines Task Force, CDC
1993 - 1995	Co-chair, AIDS Clinical Trial Community Advisory Board, Albany Medical Center
1992 - Present	Society of Correctional Physicians
1991 - 1997	Member, Review Oversight (accreditation) Committee, NCQA

1983 - 1985 Executive Committee, Medical Directors' Division, Group Health Association of America (Secretary, 1984-1985)

EDUCATION

University of Pennsylvania, College of Arts and Sciences, Philadelphia; B.A., 1967 (Amer. Civilization)

University of Maryland, School of Medicine, Baltimore; M.D., 1971

Residency Program in Social Medicine (Pediatrics), Montefiore Medical Center, Bronx, NY; 1971-1972, 1974-1976, Chief Resident 1975-1976

CERTIFICATION

Diplomate, National Board of Medical Examiners, 1971

Diplomate, American Board of Pediatrics, 1976

Fellow, American Academy of Pediatrics, 1977

Fellow, American College of Physician Executives, 1983

Fellow, American College of Correctional Physicians (formerly Society of Correctional Physicians), 2000

License: New York, Pennsylvania (inactive)

ROBERT B. GREIFINGER, M.D.

Updated February 2018

PUBLICATIONS

Greifinger RB, A Summer Program in Life Sciences. Journal of Medical Education 1970; 45: 620-622.

Greifinger RB, Sidel VW, American Medicine - Charity Begins at Home. Environment 1977; 18(4): 7-18.

Greifinger RB, An Encounter With the System. The New Physician 1977; 26(9): 36-37.

Greifinger RB, Sidel VW, Career Opportunities in Medicine. In Tice's(eds) Practice of Medicine. Hagerstown: Harper & Row 1977; 1(12): 1-49.

Greifinger RB, Grossman RL, Toward a Language of Health. Health Values 1977; 1(5): 207-209.

Grossman RL, Greifinger RB, Encouraging Continued Growth in the Elderly. In Carnevali DL & Patrick M (eds), Nursing Management for the Elderly. Philadelphia: Lippincott 1979: 543-552.

Greifinger RB, Jonas S, Ambulatory Care. In Jonas S (ed), Health Care Delivery in the United States (second edition). New York: Springer 1980: 126-168.

Greifinger RB, Toward a New Direction in Health Screening. In Health Promotion: Who Needs It? Washington: Medical Directors Division, Group Health Association of America 1981: 61-67.

Greifinger RB, Sidel VW, American Medicine. In Lee, Brown & Red (eds), The Nation's Health. San Francisco: Boyd & Fraser 1981: 122-134.

Greifinger RB, Bluestone MS, Building Physician Alliances for Cost-Containment. Health Care Management Review 1986: 63-72.

Greifinger RB, An Ethical Model for Improving the Patient-Physician Relationship. Chicago: Inquiry 1988: 25(4): 467-468.

Glaser J, DeCorato DR, Greifinger RB, Measles Antibody Status of HIV-Infected Prison Inmates. Journal of Acquired Immunodeficiency Syndrome 1991; 4(5): 540-541.

Ryan C, Levy ME, Greifinger RB, et al, HIV Prevention in the U.S. Correctional System, 1991. MMWR 1992; 41(22): 389-397.

Greifinger RB, Keefus C, Grabau J, et al, Transmission of Multidrug- resistant Tuberculosis Among Immunocompromised Persons in a Correctional System. MMWR 1992; 41(26): 509-511.

Greifinger RB, Tuberculosis Behind Bars, in Bruce C Vladeck ed, The Tuberculosis Revival: Individual Rights and Societal Obligations In a Time of AIDS. New York: United Hospital Fund 1992: 59-65.

Bastadjian S, Greifinger RB, Glaser JB. Clinical characteristics of male homosexual/bisexual HIV-infected inmates. J AIDS 1992;5:744-5.

Glaser JB, Greifinger R. Measles antibodies in HIV-infected adults. J Infect Dis. 1992 Mar;165(3):589.

Glaser J, Greifinger RB, Correctional Health Care: A Public Health Opportunity. Annals of Internal Medicine 1993; 118(2): 139-145.

Greifinger RB, Glaser JG and Heywood NJ, Tuberculosis In Prison: Balancing Justice and Public Health, Journal of Law, Medicine and Ethics 1993; 21 (3-4):332-341.

Valway SE, Greifinger RB, Papania M et al, Multidrug Resistant Tuberculosis in the New York State Prison System, 1990-1991, Journal of Infectious Disease 1994; 170(1):151-156.

Wolfe P, Greifinger RB, Prisoners in Service of Public Health: Focus New York State. New York Health Sciences Journal 1994 1(1):35-43.

Valway SE, Richards S, Kovacovich J, Greifinger RB et al, Outbreak of Multidrug-Resistant Tuberculosis in a New York State Prison, 1991. American Journal of Epidemiology 1994 July 15; 140(2):113-22.

Smith HE, Smith LD, Menon A and Greifinger RB, Management of HIV/AIDS in Forensic Settings, in Cournos F(ed), AIDS and People with Severe Mental Illness: A Handbook for Mental Health Professionals. New Haven: Yale Press 1996.

Greifinger RB, La Plus Ca Change . . . ., Public Health Reports 1996 July/August; 111(4):328-9.

Greifinger RB, TB and HIV, Health and Hygiene 1997;18,20-22.

Greifinger RB, Horn M, "Quality Improvement Through Care Management," chapter in Puisis M (ed), Clinical Practice in Correctional Medicine, St. Louis: Mosby 1998.

Greifinger RB, Glaser JM, "Desmoteric Medicine and the Public's Health," chapter in Puisis M (ed), Clinical Practice in Correctional Medicine, St. Louis: Mosby 1998.

Greifinger RB, Commentary: Is It Politic to Limit Our Compassion? Journal of Law, Medicine & Ethics, 27(1999):213-16.

Greifinger RB, Glaser JG and Heywood NJ, "Tuberculosis In Prison: Balancing Justice and Public Health," chapter in Stern V (ed), Sentenced to die? The problem of TB in prisons in Eastern Europe and Central Asia, London: International Centre for Prison Studies, 1999.

Greifinger RB (Principal Investigator). National Commission on Correctional Healthcare. The Health Status of Soon-to-be-Released Inmates, a Report to Congress. August 2002. http://www.ncchc.org/pubs_stbr.html.

Kraut JR, Haddix AC, Carande-Kulis V and Greifinger RB, Cost-effectiveness of Routine Screening for Sexually Transmitted Diseases among inmates in United States Prisons and Jails. National Commission on Correctional Healthcare. The Health Status of Soon-to-be-Released Inmates, a Report to Congress. August 2002. http://www.ncchc.org/stbr/Volume2/Report5_Kraut.pdf.

Hornung CA, Greifinger RB, and Gadre S, A Projection Model of the Prevalence of Selected Chronic Diseases in the Inmate Population. National Commission on Correctional Healthcare. The Health Status of Soon-to-be-Released Inmates, a Report to Congress. August 2002. http://www.ncchc.org/stbr/Volume2/Report3_Hornung.pdf.

Hornung CA, Anno BJ, Greifinger RB, and Gadre S, Health Care for Soon-to-be-Released Inmates: A Survey of State Prison Systems," National Commission on Correctional Healthcare. The Health Status of Soon-to-be-Released Inmates, a Report to Congress. August 2002. http://www.ncchc.org/stbr/Volume2/Report1_Hornung.pdf.

Patterson RF & Greifinger RB, Insiders as Outsiders: Race, Gender and Cultural Considerations Affecting Health Outcome After Release to the Community, Journal of Correctional Health Care 10:3 2003; 399-436.

Howell E & Greifinger RB, What is Known about the Cost-Effectiveness of Health Services for Returning Inmates? Journal of Correctional Health Care 10:3 2003; 437-455.

Kraut JR, Haddix AC, Carande-Kulis V and Greifinger RB, Cost-effectiveness of Routine Screening for Sexually Transmitted Diseases among inmates in United States Prisons and Jails, J Urban Health:

Bulletin of the New York Academy of Medicine 2004: 81(3):453-471. (Finalist, Charles C. Shepard Science Award)

Greifinger RB. Health Status in U.S. and Russian Prisons: More in Common, Less in Contrast. Journal of Public Health Policy 2005 26:60-68. http://www.palgrave-journals.com/cgi-taf/DynaPage.taf?file=/jphp/journal/v26/n1/full/3200003a.html&filetype=pdf

Greifinger RB. Health Care Quality Through Care Management, M. Puisis (ed). Clinical Practice in Correctional Medicine, Second Edition. St. Louis. Mosby 2006: pp. 510-519.

Greifinger RB. Pocket Guide Series on tuberculosis, HIV, MRSA, sexually transmitted disease, viral hepatitis and management of outbreaks. See http://www.achsa.org/displaycommon.cfm?an=1&subarticlenbr=23

Greifinger RB. Inmates are Public Health Sentinels. Washington University Journal of Law and Policy. Volume 22 (2006) 253-64.

Greifinger RB. Disabled Prisoners and "Reasonable Accommodation." Journal of Criminal Justice Ethics. Winter Spring 2006: 2, 53-55.

Mellow J, Greifinger RB. Successful Reentry: The Perspective of Private Health Care Providers. Journal of Urban Health. November 2006 doi:10.1007/s11524-006-9131-9.

Mellow J, Greifinger RB. The Evolving Standard of Decency: Post-Release Planning? Journal of Correctional Health Care January 2008 14(1):21-30.

Williams B, Greifinger RB. Elder Care in Jails and Prisons: Are We Prepared? Journal of Correctional Health Care January 2008 14(1):4-5.

Greifinger RB (editor). Public Health Behind Bars: From Prisons to Communities. Springer. New York 2007.

Greifinger RB. Thirty Years Since Estelle v. Gamble: Looking Forward Not Wayward. Greifinger, RB (ed). Public Health Behind Bars: From Prisons to Communities. Springer. New York 2007.

Patterson RF, Greifinger RB. Treatment of Mental Illness in Correctional Settings. Greifinger, RB (ed). Public Health Behind Bars: From Prisons to Communities. Springer. New York 2007.

MacDonald M, Greifinger RB. and Kane D. Use of electro-muscular disruption devices behind bars: Progress or regress. Editorial',International Journal of Prisoner Health,4:4,169 — 171. 2009.

Hoge SK, Greifinger RB, Lundquist T, Mellow J. Mental Health Performance Measurement in Corrections. International Journal of Offender Therapy and Criminology, 53:6 634-47, 2009. Abstract accessed January 12, 2010 at http://www.ncjrs.gov/App/Publications/abstract.aspx?ID=251100.

Williams BA, Lindquist K . . . Greifinger RB et al. Caregiving Behind Bars: Correctional Officer Reports of Disability in Geriatric Prisoners. J Am Geriatr Soc 57:1286–1292, 2009.

Baillargeon J, Williams B . . . Greifinger RB, et al. Parole Revocation among Prison Inmates with Psychiatric and Substance Use Disorders. Psychiatric Services 60:11: 1516-21, 2009.

Parvez FM, Lobato MN, Greifinger RB. Tuberculosis Control: Lessons for Outbreak Preparedness in Correctional Facilities. Journal of Correctional Health Care OnlineFirst, published on May 12, 2010 as doi:10.1177/1078345810367593.

Stern MF, Greifinger RB, Mellow J. Patient Safety: Moving the Bar in Prison Health Care Standards. Am J Public Health. Nov 2010; 100: 2103 - 2110.

Blair P, Greifinger R, Stone TH, & Somers S. Increasing Access to Health Insurance Coverage for Pre-trial Detainees and Individuals Transitioning from Correctional Facilities Under the Patient

Protection and Affordable Care Act. American Bar Association. Accessed on March 23, 2011 at http://www.cochs.org/files/ABA/aba_final.pdf

Williams BA, Sudore RL, Greifinger R, Morrison RS. Balancing Punishment and Compassion for Seriously Ill Prisoners. Ann Int Med 2011; 155:122-126.

Weilandt C, Greifinger RB , Hariga F. HIV in Prison: New Situation and Risk Assessment Toolkit. Int. J. Prisoner Health 2011; 7(2/3):17-22.

Williams, B., Stern, M., Mellow, J., Safer, M., Greifinger, RB. Aging in correctional custody: Setting a policy agenda for older prisoner health. Am J Public Health. Published online ahead of print June 14, 2012: e1–e7. doi:10.2105/AJPH.2012.300704.

Greifinger, RB. Independent review of clinical health services for prisoners. Int. J. Prisoner Health 2012; 8(3/4):141-150.

Greifinger RB. Facing the facts, Int J Prisoner Health, Vol. 8 (3/4) (editorial).

Greifinger, RB. The Acid Bath of Cynicism. Correctional Law Reporter June/July 2013: 3, 14, 16.

Ahalt C, Trestman RL, Rich JD, Greifinger RB, Williams BA. Paying the price: the pressing need for quality, cost and outcomes data to improve correctional healthcare for older prisoners. J Am Geriatr Soc 61:2013–2019, 2013.

Williams BA, Ahalt C, Greifinger RB. The older prisoner and complex medical care. Chapter in WHO guide Prisons and Health. WHO Copenhagen. 2014: 165-170.

Rich JD, Chandler R . .. . Greifinger RB et al. How health care reform can transform the health of criminal justice-involved individuals. Health Affairs 33, No. 3(2014: -

Allen SA, Greifinger RB. Asserting Control: A Cautionary Tale. International Journal of Prisoner Health 11:3, 2015.

Junod V, Wolff H, Scholten W, Novet B, Greifinger R, Dickson C & Simon O. Methadone versus torture: The perspective of the European Court of Human Rights. Heroin Addict Relat Clin Probl. Heroin Addict Relat Clin Probl 2018; 20(1): 31-36.

Pont J, Enggist S, Stover H, Williams B, Greifinger R, Wolff H. Prison Health Care Governance: Guaranteeing Clinical Independence. Published online ahead of print February 22, 2018.

ABSTRACTS & RESEARCH PRESENTATIONS

Mikl J, Kelley K, Smith P, Greifinger RB, Morse D, Survival Among New York State Prison Inmates With AIDS. Florence: Seventh International Conference on AIDS 1991 (poster session).

Sherman M, Coles B, Buehler J, Greifinger RB, Smith P, The HIV Epidemic in Inmates. Atlanta: Centers for Disease Control. 1991

Mikl J, Kelley K, Smith P, Greifinger RB, Morse D, Survival Among New York State Prison Inmates With AIDS, American Public Health Association. 1991 (poster session)

Mikl J, Smith P, Greifinger RB, Forte A, Foster J, Morse D, HIV Seroprevalence of Male Inmates Entering the New York State Correctional System. American Public Health Association. 1991 (poster session)

Valway SE, Richards S, Kovacovich J, Greifinger R, Crawford J, Dooley SW. Transmission of Multidrug-resistant Tuberculosis in a New York State Prison, 1991. Abstract No 15-15, In: World Congress on TB Program and Abstracts, Washington, D.C., November, 1992.

Mikl J, Smith PF, Greifinger RB, HIV Seroprevalence Among New York State Prison Entrants. Ninth International Conference on AIDS 1993 (Poster Session)

Hornung CA, Greifinger RB, McKinney WP. Projected Prevalence of Diabetes Mellitus in the Incarcerated Population. J Gen Int Med 14 (Supplement 2):40, April 1999.

EXHIBIT 2

DECLARATION OF DEREK CUMMINGS

I, Derek Cummings, hereby declare under the penalty of perjury pursuant to 28 U.S.C. § 1746:

1. I make this declaration based on my personal knowledge except where I have indicated otherwise. If called as a witness, I could and would testify competently and truthfully to these matters.

2. I am a Professor of Biology at the University of Florida and at the Emerging Pathogens Institute. I am a specialist in infectious disease epidemiology. I specialize in influenza, dengue and other mosquito-borne pathogens, and other respiratory illnesses. Before the pandemic of COVID-19, I had worked on multiple aspects of coronaviruses including an outbreak investigation of the first major outbreak of MERS (genetically related to SARS and SARS-CoV-2) in a hospital setting (in Saudi Arabia), efforts to estimate the extent of outbreaks of MERS and work to estimate the natural history of SARS. I have also conducted a large, multisite study of personal protective equipment to protect health care personnel from respiratory viruses including coronaviruses. My work on coronaviruses has been published in the New England Journal of Medicine, the Journal of American Medical Association and the Proceedings of the National Academy of Science.

Presently, I am providing guidance to the US CDC on personal protective equipment policy for the SARS-CoV-2 outbreak and providing input on models of the outbreak as part of a CDC working group.

3. COVID-19 is a disease caused by a novel zoonotic coronavirus, called SARS-CoV-2. It emerged in the Chinese province of Hubei in late 2019 and has since spread to 173 countries. The World Health Organization declared COVID-19 a pandemic on March 11, 2020. As of March 25, 2020, over 468,000 confirmed cases have been reported worldwide, causing over 21,000 deaths. The United States has had local transmission since January 2020, and since March has been experiencing an exponential rise in confirmed cases and widespread transmission across the country.

4. COVID-19 can cause severe symptoms, in particular pneumonia (inflammation of the lungs associated with infection), and can lead to death. Certain populations are at particularly high risk of severe outcomes. The CDC advises that individuals over 65 years old, individuals who are immunocompromised, and individuals with certain comorbidities including lung disease, heart disease, obesity, diabetes are at high risk for severe COVID-19 illness. Various studies have examined the time from symptom onset to hospitalization or severe symptoms, with estimates of the average

currently ranging from 7-9 days.

5. The case fatality rate among individuals presenting with symptoms has been estimated at 1.4% in Wuhan, the capital city of Hubei province, with higher rates in those over 65 and those with comorbidities. Case fatality rates are likely to vary from setting to setting, increasing as the healthcare system in an area becomes overburdened and sick patients are unable to be prioritized. Case fatality rates are also affected by surveillance practices in any setting which affect the number of cases included in the denominator of this rate.

6. Hospitalization with COVID-19 commonly is associated with need for intensive care and a ventilator to assist breathing. There are currently estimated to be ~45,000 ICU beds and ~160,000 ventilators in the USA, many of which are occupied by individuals sick with illnesses other than COVID-19. Uncontrolled spread of the virus would likely result in over 50% of the population becoming infected. Model projections, except under the most strict control measures, predict incidence of patients requiring hospitalization or ventilators rising well above the US capacity.

7. SARS-CoV-2 is a respiratory pathogen, meaning that it is spread through respiratory secretions, for example droplets expelled by an infected individual coughing or sneezing, in which the pathogen can remain viable

for at least 3 hours. Transmission can occur either by direct person-to-person contact, inhalation of these droplets, or by touching surfaces contaminated with these droplets.

8. There are multiple sources of evidence documenting pre-symptomatic transmission (i.e. the ability of an infected individual to infect others before their symptoms appear). A study in Singapore and Tianjin, China, estimated that 50% of transmission is due to pre-symptomatic individuals. Interventions targeting only transmission by sick individuals (such as isolation of those with symptoms) are therefore unlikely to contain transmission.

9. Timely and widespread testing of symptomatic individuals and their contacts is therefore essential to slowing transmission of the virus. The success of massive testing, active contact tracing, and isolation of individuals showing any COVID-19 symptoms has been demonstrated by the case of the Republic of Korea, which appears to have controlled local transmission. The scale and extent of transmission in the United States makes these tactics on their own infeasible, as contact tracing is very resource-intensive. However, without widespread availability of testing for individuals experiencing symptoms, it is impossible to know if local transmission is occurring in a

county or city and impossible to refine interventions in a specific location with the information that accurate surveillance provides.

10. There is no vaccine against SARS-CoV-2 infection, nor are there prophylactic pharmaceutical interventions or treatments that have been shown to reduce infection risk or symptom severity. Experimental treatments are, at a minimum, months from widespread availability due to the need to demonstrate effectiveness and obtain regulatory approval.

11. In the absence of pharmaceutical interventions, the only way to slow the rate of transmission is through a combination of preventive measures, chiefly social distancing, hygiene and isolation of cases. The lockdown in Wuhan, an extreme form of social distancing, was followed by a sustained decrease in transmission, and two months later the daily number of reported cases has dropped to zero, and lockdown restrictions will be lifted on April 8, 2020.

12. The goal of social distancing is to reduce the average number of contacts that individuals in the population have. All individuals should practice social distancing to the extent they can, not just to reduce their own risk of acquiring COVID-19, but to reduce their risk of infecting others. Reduced transmission reduces the growth rate of cases, easing pressure on hospitals and giving institutions more time to prepare.

13. Detained populations, including those in immigration detention facilities, are at high risk for infectious disease compared to the general population. Factors contributing to this excess risk include poor sanitation, lack of access to hygiene precautions, and high population density. In addition, transfer of detained immigrants between facilities complicates efforts to control infection and trace contacts. A recent outbreak of mumps in immigration detention facilities demonstrate the ability of an infectious agent to spread rapidly between centers, infecting at least 900 people from September 2018-August 2019.

14. The ability of SARS-CoV-2 to spread rapidly and widely in a closed population is demonstrated by the experience of cruise ships, including the Diamond Princess, on which around 700 (19%) of passengers and crew on board were infected over the course of three weeks despite the initiation of quarantine protocols. 11 of these individuals subsequently died.

15. Transmission of SARS-CoV-2 in detention facilities in the United States would lead to widespread and severe illness among the detained population, particularly among those considered at high risk.

16. Personal hygiene measures are effective at reducing infection risk, but for a virus as transmissible as SARS-CoV-2 they will be not be sufficient on their

own to curtail its spread. Furthermore, hygiene measures are only effective when there is sufficient access to them, and many individuals in incarcerated populations do not have adequate access to soap and water. Finally, other measures, such as regular disinfecting of surfaces, should supplement these efforts.

17. Due to the substantial amount of pre-symptomatic transmission observed in other settings, it is impossible to prevent intake of infectious individuals through screening for symptoms alone. Moreover, due to inadequate rates of COVID-19 testing in the United States, it is not possible to rule out local transmission because of lack of confirmed cases. Merely asking about travel history to areas with sustained community transmission, or contact with infected individuals, cannot rule out the possibility that an individual is infected with SARS-CoV-2 upon intake into a detention center.

18. Moreover, staff members who may be living in areas with sustained community transmission are able to transmit the disease to detained immigrants. This transmission too could occur while the staff members are asymptomatic, and thus cannot be controlled by screening for symptoms or contact history.

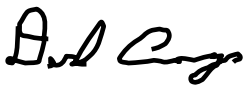
19. These concerns are not hypothetical: a detained immigrant in the Bergen

County Jail, NJ, tested positive for SARS-CoV-2 on March 24, 2020, and that staffers at Elizabeth Detention Center, NJ, and Aurora Detention Center, CO, have also tested positive for SARS-CoV-2

20. Isolation of symptomatic individuals within detention settings similarly will not stop transmission before symptom onset. As there are several modes of transmission other than direct person-to-person contact, it is not possible to identify all individuals who have had contact with a COVID-19 case. Quarantine of suspected contacts will therefore likely reduce the rate of spread of the virus in a facility but will not eliminate transmission.

Pursuant to 28 U.S.C. 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed this 29 day in March, 2020 in Gainesville, Florida.



Prof. Derek Cummings

EXHIBIT A

CURRICULUM VITAE

DEREK A.T. CUMMINGS

PERSONAL DATA

Business Address: Department of Biology
University of Florida
Bartram Hall
Gainesville, FL 32608

Mobile: (410)-916-1371
Fax: (352)-392-9925
Email: datc@ufl.edu

EDUCATION AND TRAINING

PhD, 2004	Johns Hopkins University, Whiting School of Engineering Geography and Environmental Engineering
MHS, 2004	Johns Hopkins University, Bloomberg School of Public Health International Health
MS, 2001	Johns Hopkins University, Whiting School of Engineering Geography and Environmental Engineering
ScB, 1996	Brown University Chemistry

PROFESSIONAL EXPERIENCE

UF Preeminence Professor	Department of Biology, University of Florida 2015-present
UF Preeminence Professor	Emerging Pathogens Institute 2015-present
Adjunct Professor	Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health 2015-present
Adjunct Professor	Department of International Health, Johns Hopkins Bloomberg School of Public Health 2015-present
Associate Professor	Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health 2013-2015

Adjunct Associate Professor	Department of International Health, Johns Hopkins Bloomberg School of Public Health 2013-2015
Adjunct Associate Professor	Department of Epidemiology, University of Pittsburgh Graduate School of Public Health 2013-2015
Nonresident Fellow	Brookings Institution 2007-present
Assistant Professor	Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health 2007-2013
Adjunct Assistant Professor	Department of International Health, Johns Hopkins Bloomberg School of Public Health 2007-2013
Adjunct Assistant Professor	Department of Epidemiology, University of Pittsburgh Graduate School of Public Health 2007-2013
Visiting Assistant Professor	Department of Epidemiology, University of Pittsburgh Graduate School of Public Health, University of Pittsburgh 2006 – 2007
Visiting Assistant Professor	Department of Biostatistics, Bloomberg School of Public Health, Johns Hopkins University 2006 – 2007
Research Associate	Department of International Health, Bloomberg School of Public Health, Johns Hopkins University 2004 – 2006
Program Coordinator	NIH Modeling Infectious Disease Agents Study (MIDAS) Center, University of Pittsburgh/Johns Hopkins University (pre-2006) 2003 - 2009
Research Assistant	Department of Geography and Environmental Engineering, GWC Whiting School of Engineering, Johns Hopkins University 1999-2004
Case Worker	Coalition for the Homeless, Crisis Intervention Program, NYC 1998

PROFESSIONAL ACTIVITIES

Society Membership

Society for Epidemiological Research
2004-present

American Academy for the Advancement of Science
2004-present

Asia Pacific Society of Medical Virology
2001-present

American Society of Tropical Medicine and Hygiene
2000-present

DIMACS Focus on Computation and Mathematical Epidemiology
2000-2008

Participation on Advisory Panels

WHO Working Group on Dengue Burden Estimation
2014-present

EcoHealthNet
Member of Steering Committee
2015-present

NIH P01 Flavivirus Infections: Pathogenesis and Prevention
Member of External Advisory Committee
2013-present

WHO Disease Reference Group on Dengue and other Emerging Viral Diseases
2010-2011

Member of the WHO Informal Network for Mathematical Modeling, Working Group on Influenza A (H1N1), 2009
2009

U.S. Department of Health and Human Services, Secretary's Advisory Council on Public Health Preparedness, Smallpox Modeling Working Group
2000-2002

Consultations
World Health Organization-Immunization and Vaccine-related Implementation Research (IVIR) Advisory Committee Meeting-Consultation on Dengue Risk Maps
2017

MSF/Epicentre
Design of vaccine trial to assess fractional dose of yellow fever vaccine. Trial to be conducted in Uganda and Kenya
2016-present

MSF/Epicentre
Analysis of vaccine trial data from Rotavirus vaccine trial
2016

World Health Organization
Consultation on Mathematical Modeling of Dengue Intervention Impact
2014

Ministry of Health of Liberia
Ebola Outbreak Epidemiological Investigation
2014-2015

Kingdom of Saudi Arabia MERS-CoV Outbreak Investigation Team
2013-2014

Medimmune
Estimation of Burden of Influenza B
2011-2012

World Health Organization.
Disease Reference Group on Dengue and other Emerging Viral Diseases of Public Health Importance. Scientific Committee.
2009

Epicentre and Medecins Sans Frontieres (MSF)
Outbreak investigation of measles in Maroua, Cameroon
2009

World Health Organization. Center for Vaccine Research.
Preparation of analysis of dengue models to assess future vaccine candidates.
2008

Data Safety and Management Boards (DSMB)
MSF-Epicentre
Randomized, double-blind non-inferiority trial of two antivenoms for the treatment of snakebite with envenoming, Central African Republican
2015-present

MSF-Epicentre
Effect of systematic utilization of antibiotic therapy in the ambulatory treatment of uncomplicated severe acute malnutrition
2013-2014

EDITORIAL ACTIVITIES

Study Sections
Member, NIH Clinical Research and Field Studies of Infectious Disease Study Section
2016-2019

NIH Special Emphasis Panel on International Collaborations in Environmental Health-ad hoc participation

2014, 2015

NIH Clinical Research and Field Studies of Infectious Disease Study Section-ad hoc participation
2013, 2014, 2016

NIH Director's Independence Award-ad hoc participation
2014, 2015, 2016

NIH Modeling and Analysis of Biological Systems-ad hoc participation
2013

NIH Infectious Disease, Reproductive Health, and Asthma/Pulmonary Conditions-ad hoc participation
2012, 2013

NSF/NIH Ecology and Evolution of Infectious Diseases-ad hoc participation
2012

Peer Review Activities

Associate Editor:
American Journal of Epidemiology, 2010-2014

Academic Editor:
PLoS Medicine, 2011, 2012, 2013, 2014, 2015
PLoS Computational Biology, 2009-2010, 2014

Referee:
Nature, New England Journal of Medicine, Science, PLoS Biology, PLoS Medicine, Epidemiologic Reviews, American Journal of Epidemiology, Biostatistics, Emerging Infectious Diseases, Mathematical and Computer Modeling, PLoS Neglected Tropical Diseases, PLoS One, Biosecurity and Bioterrorism, Journal of Theoretical Biology, American Journal of Tropical Medicine and Hygiene, Journal of the Royal Society Interface, Proceedings of the Royal Society B, Physics Review A, Lancet, Proceedings of the National Academy of Science, Science, eLife

HONORS AND AWARDS

Awards

KAVLI Frontiers in Science	2017
University of Florida Term Professorship	2017
International Society for Disease Surveillance Outstanding Research in Biosurveillance	2015
JHBSPH Teaching Excellence Award	2015
Advising, Mentoring, and Teaching Recognition Award (AMTRA)	2012
Burroughs Wellcome Career Award at the Scientific Interface	2007
UTRA Fellow, Brown University	1996
Meikeljohn Fellow, Brown University	1994
Rotary Scholarship	1992
National Merit Scholar	1992

PUBLICATIONS (*served as advisor/mentor)
127 peer-reviewed papers, cited 12334 times (Google Scholar), 21 papers have been cited more than 100 times, H-index of 44 (44 papers have been cited more than 44 times)

Journal Articles

1. **Cummings DA**, McMaster J, Rieger AL, Rieger PH. EPR spectroscopic and theoretical study chromium(I) carbonyl phosphine and phosphonite complexes. *Organometallics* 1997;16:4362-4368.

2. Epstein JM, **Cummings DAT**, Chakravarthy S, Singa RM, Burke DS. Toward a containment strategy for smallpox bioterror: An individual based computational approach. *Brookings Monographs* 2004.

3. **Cummings DAT**, Irizarry RA, Huang NE, Endy TP, Nisalak A, Ungchusak K, Burke DS. Travelling waves in the occurrence of dengue haemorrhagic fever in Thailand. *Nature* 2004;427:344-347.

4. Longini IM, Jr., Nizam A, Xu S, Ungchusak K, Hanshaoworakul W, **Cummings DAT**, Halloran ME. Containing pandemic influenza at the source. *Science* 2005;309:1083-7.

5. Ferguson NM, **Cummings DAT**, Cauchemez S, Fraser C, Riley S, Meeyai A, Iamsirithaworn S, Burke DS. Strategies for containing an emerging influenza pandemic in Southeast Asia. *Nature* 2005;437:209-214.

6. **Cummings DAT**, Schwartz IB, Billings L, Shaw LB, Burke DS. Dynamic effects of antibody-dependent enhancement on the fitness of viruses. *Proceedings of the National Academy of Sciences* 2005;102:15259-64.

7. Schwartz IB, Shaw LB, **Cummings DAT**, Billings L, McCrary M, and Burke DS. Chaotic desynchronization of multistrain diseases. *Physical Review E*. 2005;72:066201.

8. **Cummings DAT**, Moss WJ, Long K, Wiysonge CS, Muluh TJ, Kollo B, Nomo E, Wolfe ND and Burke DS. Improved measles surveillance in Cameroon reveals two major dynamic patterns of incidence. *International Journal of Infectious Diseases* 2006;10:148-155.

9. Ferguson NM, **Cummings DAT**, Fraser C, Cajka JC, Cooley PC, Burke DS. Strategies for mitigating an influenza pandemic. *Nature* 2006;442:448-452.

10. Burke DS, Epstein JM, **Cummings DAT**, Parker JI, Cline KC, Singa RM, Chakravarty S. Individual-based computational modeling of smallpox epidemic control strategies. *Academic Emergency Medicine* 2006;13:1142-1149.

11. Longini, IM, Halloran ME, Nizam A, Yang Y, Xu S, Burke DS, **Cummings DAT**, Epstein JM. Containing a Large Bioterrorist Smallpox Attack: A Computer Simulation. *International Journal of Infectious Diseases* 2007;11:98-108.

12. Billings L, Schwartz IB, Shaw LB, McCrary M, Burke DS, **Cummings DAT.** Instabilities in multiserotype disease models with antibody-dependent enhancement. *Journal of Theoretical Biology* 2007;246:18-27.

13. Lessler J, **Cummings DAT**, Fishman S, Vora A, Burke DS. Transmissibility of Swine Flu at Fort Dix, 1976. *Journal of the Royal Society Interfaces* 2007;4:755-762.

*14. Vora A, Burke DS, **Cummings DAT**. The impact of a physical geographic barrier on the dynamics of measles. *Epidemiology and Infection* 2008;136:713-720.

15. Halloran, M.E., Ferguson N.M., Eubank, S., Longini, I.M., **Cummings, D.A.T.**, Lewis, B., Xu, S., Fraser, C., Vullikanti, A., Germann, T.C., Wagener, D., Beckman, R., Kadau, K., Barrett, C., Macken, C., Burke, D.S., Cooley, P. Modeling targeted layered containment of an influenza pandemic in the United States. *Proceedings of the National Academy of Sciences* 2008;105:4639-4644.

16. Epstein, JM, Parker J, **Cummings DAT**, Hammond RA. Coupled Contagion Dynamics of Fear and Disease: Mathematical and Computational Explorations. *PLoS ONE* 2008;3:e3955.

*17. Lessler, J, Reich, NG, Brookmeyer R, Perl TM, Nelson KE, **Cummings DAT**. A systematic review of the incubation periods of acute respiratory viral infections. *Lancet Infectious Diseases* 2009;9:291-300.

18. Reich NG, Lessler J, **Cummings DAT**, Brookmeyer R. Estimating incubation period distributions with coarse data. *Statistics in Medicine* 2009;28:2769-84

19. **Cummings DAT**, Iamsirithaworn S, Lessler JT, McDermott A, Prasanthong R, Nisalak A, Jarman RG, Burke DS, Gibbons RV. The impact of the demographic transition on dengue in Thailand: insights from a statistical analysis and mathematical modeling. *PLoS Medicine* 2009;6:e1000139.

20. **Cummings DAT**. Temporal and Spatial Dynamics of Dengue Virus Transmission. *Frontiers in Dengue Virus Research.* 2009:173-181.

*21. Johansson M, **Cummings DAT**, Glass G. Multi-year climate variability and dengue: El Niño Southern Oscillation, Weather, and Dengue Incidence in Puerto Rico, Mexico, and Thailand. *PLoS Medicine* 2009;6:e1000168.

*22. Lessler J, Reich N, **Cummings DAT**, NYC DOHMH Swine Influenza Investigation Team. Outbreak of 2009 pandemic influenza A (H1N1) at a New York City High School. *New England Journal of Medicine.* 2009 Dec 31;361(27):2628-36.

23. Solomon BD, Lacbawan F, Mercier S, Clegg NJ, Delgado MR, Rosenbaum K, Dubourg C, David V, Olney AH, Wehner LE, Hehr U, Bale S, Paulussen A, Smeets HJ, Hardisty E, Tylki-Szymanska A, Pronicka E, Clemens M, McPherson E, Hennekam RCM, Hahn J, Stashinko E, Levey E, Wieczorek D, Roeder E, Schell-Apacik CC, Booth CW, Thomas RL, Kenwrick S, **Cummings DAT**, Bous SM, Keaton A, Balog JZ, Hadley D, Zhou N, Long R, Vélez JI, Pineda-Alvarez DE, Odent S, Roessler E, Muenke M. Mutations in ZIC2 in Human Holoprosencephaly: Description of a Novel ZIC2-Specific Phenotype and Comprehensive Analysis of 157 Individuals. *Journal of Medical Genetics* 2010;47:513-24.

*24. Abbott III GH, Word DP, **Cummings, DAT**, Laird, CD. Estimating Seasonal Drivers in Childhood Infectious Diseases with Continuous Time and Discrete-Time Models. *Proceedings of the American Control Conference.* 2010:5137-5142.

*25. Word DP, Young JK, **Cummings DAT**, Laird CD. Estimation of seasonal transmission parameters in childhood infectious disease using a stochastic continuous time model. *Proceedings of the 20th European Symposium on Computer Aided Process Engineering* 2010:229-234.

*26. Fried J, Gibbons RV, Kalayanarooj S, Thomas S, Srikiatkhachorn A, Yoon IK, Jarman RG, Greene S, **Cummings DAT**. Serotype specific differences in the risk of dengue hemorrhagic fever in hospitalized cases in Bangkok, Thailand, 1994-2006. *PLoS Neglected Tropical Diseases* 2010;4:e617.

27. Solomon, BD, Pineda-Alvarez DE, Raam MS, **Cummings DAT**. Evidence for inheritance in patients with VACTERL association. *Human Genetics* 2010;127:731-3.

*28. Lessler J, Brookmeyer R, Reich NG, Nelson KE, **Cummings DAT**, Perl TM. Identifying probable sources of infection for respiratory viruses. *Infection Control and Hospital Epidemiology* 2010;31:809-15.

*29. van Panhuis WG, Gibbons RV, Endy TP, Rothman AL, Nisalak A, Burke DS, **Cummings DAT**. Inferring the serotype of dengue virus infections based on pre- and post-infection neutralizing antibody titers. *Journal of Infectious Diseases.* 2010;202:1002-10.

30. Solomon BD, Pineda-Alvarez DE, Raam MS, Bous SM, Keaton AA, Vélez JI, **Cummings DAT**. Analysis of component findings in 79 patients diagnosed with VACTERL association. *American Journal of Medical Genetics part A* 2010;152A:2236-44.

*31. Lessler J, dos Santos T, Aguilera X, Brookmeyer R. PAHO Influenza Technical Working Group, **Cummings, DAT**. H1N1pdm in the Americas. *Epidemics* 2010;2:132-138.

*32. Lessler J, Moss WJ, Lowther SA, **Cummings DAT**. Maintaining high rates of measles immunization in Africa. *Epidemiology and Infection* 2010;5:1-11.

33. Yang Y, Halloran ME, Daniel MJ, Longini IM, Jr., Burke DS, **Cummings DAT**. Modeling competing infectious pathogens from a Bayesian perspective: application to influenza studies with incomplete laboratory results. *Journal of the American Statistical Association* 2011;105:1310-1322.

34. Stebbins S, Stark JH, Prasad RK, Thompson WW, Mitruka K, Rinaldo C, Vukotich, CJ Jr., Burke DS, **Cummings DAT**. Sensitivity and specificity of rapid influenza testing of children in a community setting. *Influenza and Other Respiratory Viruses* 2011;5:104-9.

*35. Rodriguez-Barraquer I, Cordiero MT, Braga C, de Souza WV, Marques ET, **Cummings DAT**. From re-emergence to hyperendemicity: the natural history of the dengue epidemic in Brazil. *PLoS Neglected Tropical Diseases* 2011;5:e935.

36. Stebbins S, **Cummings DAT**, Stark J, Vukotich C, Mitruka K, Thompson W, Rinaldo C, Roth L, Wagner M, Wisniewski SR, Dato V, Eng H, Burke DS. Reduction in the incidence of influenza A but not influenza B associated with use of hand sanitizer and cough hygiene in schools: a randomized controlled trial. *Pediatric Infectious Disease Journal* 2011;30:921-926.

*37. Lessler J, Reich N, Perl TM, **Cummings DAT**. Visualizing clinical evidence: citation networks for the incubation periods of respiratory viral infections. *PLoS One* 2011;6:e19496.

38. Fraser C, **Cummings DAT**, Klinkenberg D, Burke DS, Ferguson NM. Influenza transmission in households during the 1918 pandemic. *American Journal of Epidemiology* 2011;174:505-14.

39. Lee BY, Connor D, Kitchen S, Bacon K, Shah M, Brown S, Bailey R, Laosiritaworn Y, Burke DS, **Cummings DAT**. Economic value of dengue vaccine in Thailand. *American Journal of Tropical Medicine and Hygiene* 2011;84:764-72.

*40. Van Panhuis W, Luxemburger C, Pengsaa K, Limkittikul K, Sabchareon A, Lang J, Durbin A, **Cummings DAT**. Decay and persistence of maternal dengue antibodies among infants in Bangkok. *American Journal of Tropical Medicine and Hygiene* 2011;85:355-62.

41. Lessler J, **Cummings DAT**, Read J, Wang S, Zhu H, Smith G, Guan Y, Jiang C, Riley S. Location-specific patterns of exposure to recent pre-pandemic strains of influenza A in southern China. *Nature Communications* 2011;2:423.

42. Johansson M, Hombach J, **Cummings DAT**. Models of the impact of dengue vaccines: a review of current research and potential approaches. *Vaccine* 2011;29:5860-8.

43. Luquero FJ, Pham-Orsetti H, **Cummings DAT**, Ngaunji PE, Nimpa M, Fermon F, Ngoe N, Sosler S, Strebel P, Grais RF. A long-lasting measles epidemic in Maroua, Cameroon 2008-2009: mass vaccination as response to the epidemic. *Journal of Infectious Diseases*. 2011;204 Suppl 1:S243-51.

*44. Althouse BM, Ng YY, **Cummings DAT**. Prediction of dengue incidence using search query surveillance. *PLoS Neglected Tropical Diseases*. 2011;5:e1258.

45. Lessler JT, Metcalf CJE, Grais RF, Luquero F, **Cummings DAT**, Grenfell BT. Measuring the performance of vaccination programs using cross-sectional surveys: a likelihood framework and retrospective analysis. *PLoS Medicine* 2011;8:e1001110.

46. Chaninan Sonthichai, Iamsirithaworn S, **Cummings DAT**, Shokekird P, Niramitsantipong A, Khumket S, Chittaganpitch M, Lessler J. Effectiveness of non-pharmaceutical interventions in controlling an Influenza A outbreak in a school, Thailand, November 2007. *Outbreak, Surveillance and Investigation Report* 2011;4:6-11.

*47. Word DP, **Cummings DAT**, Burke DS, Iamsirithaworn S, Laird CD. A nonlinear programming approach for estimation of transmission parameters in childhood infectious disease using a continuous time model. *Journal of the Royal Society Interface*. 2012 Feb 15. [Epub ahead of print].

*48. Reich NG, Lessler J, **Cummings DAT**, Brookmeyer R. Estimating absolute and relative case fatality ratios from infectious disease surveillance data. *Biometrics.* 2012. doi: 10.1111/j.1541-0420.2011.01709.x. [Epub ahead of print]

49. **Cummings DAT**, Boni M, WHO-VMI Dengue Vaccine Modeling Group. Assessing the potential of a candidate dengue vaccine with mathematical modeling. *PLoS Neglected Tropical Diseases.* 2012 Mar;6(3):e1450.

*50. Stark JH, Sharma R, Ostroff S, **Cummings DAT**, Stebbins S, Ermentrout B, Burke DS, Wisniewski S. Local Spatial and Temporal Processes of Influenza in Pennsylvania, USA: 2003-2009, *PLoS One*, 2012;7(3):e34245.

51. Burton J, **Cummings DAT**, Schwartz I, Billings L. Disease Persistence in Epidemiological Models: The Interplay between Vaccination and Migration. *Mathematical Biosciences*. 2012:239(1):91-6.

52. Read JM, Edmunds WJ, Riley S, Lessler JT, **Cummings DAT**. Close encounters of the infectious kind: a review of methods to measure social mixing behavior. *Epidemiology and Infection.* 2012 Jun 12:1-14..

*53. Salje H, Lessler J, Endy TP, Curriero F, Gibbons RV, Nisalak A, Nimmannitya S, Kalayanarooj S, Jarman RG, Thomas S, Burke DS, **Cummings DAT**. Revealing the micro-scale spatial signature of dengue transmission and immunity in an urban population. *Proceedings of the National Academy of Sciences.* 2012 Jun 12;109(24):9535-8.

54. Blackwood JC, **Cummings DAT**, Broutin H, Iamsirithaworn S, Rohani P. The population ecology of infectious diseases with pertussis as a case study. *Parasitology*. 2012 Apr 13:1-11.

55. Lessler J, Riley S, Read JM, Wang S, Zhu H, Smith GJD, Guan Y, Jiang CQ, **Cummings DAT**. Evidence for Antigenic Seniority in Influenza A (H3N2) Antibody Responses in Southern China. *PLoS Pathogens*. 2012 8(7): e1002802. doi:10.1371/journal.ppat.1002802

*56. Stark JH, **Cummings DAT**, Ermentrout B, Ostroff S, Sharma R, Stebbins S, Burke DS, Wisniewski S. Local variations in spatial synchrony of influenza epidemics. *PLoS One.* 2012;7(8):e43528. Epub 2012 Aug 16.

*57. Rainwater-Lovett K, Rodriguez-Barraquer I, **Cummings DAT**, Lessler J. Variation in dengue virus plaque reduction neutralization testing: systematic review and pooled analysis. *BMC Infectious Diseases.* 2012 Sep 28;12(1):233. [Epub ahead of print]

*58. Althouse BM, Lessler J, Sall A, Diallo M, Hanley K, Watts D, Weaver S, **Cummings DAT**. Synchrony of Sylvatic Dengue Isolations: A Multi-host, Multi-vector SIR Model of Dengue Virus Transmission in Senegal. *PLoS Neglected Tropical Diseases.* 2012 Nov;6(11):e1928.

*59. Azman A, Rudolph K, **Cummings DAT**, Lessler J. The incubation period of cholera: a systematic review. *Journal of Infection.* 2012 Nov 29. doi:pii: S0163-4453(12)00347-7.

60. Meltzer A, Pierce R, **Cummings DAT**, Pines JM, May L, Smith M, Marcotte J, McCarthy M. Rapid (13)C Urea breath test to identify Helicobacter Pylori infection in Emergency Department patients with upper abdominal pain. *Western Journal of Emergency Medicine.* 2013 May;14(3):278-82. doi: 10.5811/westjem.2012.12.15173.

61. Reiner RC, Perkins TA, Barker CM, Niu T, Fernando Chaves L, Ellis AM, George DB, Le Menarch A, Pulliam J, Bisanzio D, Buckee C, Chiyaka C, **Cummings DAT**, Garcia A, Gatton M, Gething PW, Hartley DM, Johnston G, Klein E, Michael E, Linsday SW, Lloyd AL, Pigott D, Reisen WK, Ruktanonchai N, Singh B, Tatem AJ, Kitron U, Hay SI, Scott TW, Smith DL. A systematic review of mathematical models of mosquito-borne pathogen transmission: 1970-2010. *Journal of the Royal Society Interface.* 2013 Feb 13;10(81):20120921. doi: 10.1098/rsif.2012.0921. Print 2013 Apr 6. Review.

62. Blackwood J, **Cummings DAT**, Broutin H, Iamsirithaworn S, Rohani P. Deciphering the impacts of vaccination, demographic transition and immunity on pertussis epidemiology in Thailand. *Proceedings National Academy of Sciences USA*. 2013 Jun 4;110(23):9595-600. doi: 10.1073/pnas.1220908110. Epub 2013 May 20.

*63. Mier-y-Teran-Romero L, Schwartz IB, **Cummings DAT**. Breaking the symmetry: Differences among serotypical transmission rates enhance persistence in dengue fever models. *Journal of Theoretical Biology*. 2013 Sep 7;332:203-10. doi: 10.1016/j.jtbi.2013.04.036. Epub 2013 May 7.

*64. Reich NG, Shrestha S, King AA, Rohani P, Lessler J, Kalayanarooj S, Yoon IK, Gibbons RV,

Burke DS, **Cummings DAT**. Interactions between serotypes of dengue highlight epidemiological impact of cross-immunity. *Journal of the Royal Society Interface*. 2013 Jul 3;10(86):20130414. doi: 10.1098/rsif.2013.0414. Print 2013.

65. Assiri A, McGeer A, Perl TM, Price CS, Al Rabeeah AA, **Cummings DAT**, Alabdullatif ZN, Assad M, Almulhim A, Makhdoom H, Madani H, Alhakeem R, Al-Tawfiq JA, Cotten M, Watson SJ, Kellam P, Zumla AI, Memish ZA; the KSA MERS-CoV Investigation Team. Hospital outbreak of Middle East Respiratory Syndrome Coronavirus. *New England Journal of Medicine.* 2013. Jun 19. Epub ahead of Print.

66. Liu SH, Brotman RM, Zenilman JM, Gravitt PE, **Cummings DAT**. Menstrual cycle and detectable human papillomavirus in reproductive women: a time series study. *Journal of Infectious Diseases.* 2013 Jul 24. Epub ahead of Print.

*67. Rodriguez-Barraquer IB, Mier-y-Teran-Romero L, Burke DS, **Cummings DAT**. Challenges in the interpretation of dengue vaccine trial results. *PLoS Neglected Tropical Diseases*. 2013 Aug 29;7(8):e2126

68. Anderson KB, Gibbons RV, **Cummings DAT**, Nisalak A, Green S, Libraty DH, Jarman RG, Srikiatkhachorn A, Mammen MP, Darunee B, Yoon IK, Endy TP. A shorter time interval between first and second dengue infections is associated with protection from clinical illness in a school-based cohort in Thailand. *Journal of Infectious Diseases*. 2013 Aug 20. [Epub ahead of print]

69. Lee RM, Lessler JT, Lee RA, Rudolph K, Reich NG, Perl TM, **Cummings DAT**. Incubation periods of viral gastroenteritis: a systematic review. *BMC Infectious Disease*. 2013. 13(1):446.

70. Word DP, Young JK, **Cummings DAT**, Iamsirithaworn S, Laird CD. Interior-Point Methods for Estimating Seasonal Parameters in Discrete-Time Infectious Disease Models. *PLoS One*. 2013. 8(10):e74208.

*71. Liu SH, **Cummings DAT**, Zenilman JM, Gravitt PE, Brotman RM. Characterizing the Temporal Dynamics of Human Papillomavirus DNA Detectability Using Short-Interval Sampling. *Cancer Epidemiology, Biomarkers and Prevention*. 2013. Oct. 15. Epub ahead of print.

72. Live Dengue Vaccines Technical Consultation Reporting Group (including **Cummings DAT**), Bentsi-Enchill AD, Schmitz J, Edelman R, Durbin A, Roehrig JT, Smith PG, Hombach J, Farrar J. Long-term safety assessment of live attenuated tetravalent dengue vaccines: deliberations from a WHO technical consultation. *Vaccine*. 2013:31(23):2603-9.

*73. Rodriguez-Barraquer I, Buathong R, Iamsirithaworn S, Nisalak A, Lessler JT, Jarman RG, Gibbons RV, **Cummings DAT**. Revisiting Rayong: Shifting seroprofiles of dengue in Thailand and their implications for transmission and control. *American Journal of Epidemiology*. doi:10.1093/aje/kwt256.

*74. Rodriguez-Barraquer I, Mier-y-Teran-Romero L, Schwartz IB, Burke DS, **Cummings DAT**. Potential opportunities and perils of imperfect dengue vaccines. *Vaccine.* 2013. doi:pii: S0264-410X(13)01537-5.

75. van Panhuis WG, Grefenstette J, Jung SY, Chock NS, Cross A, Eng H, Lee BY, Zadorozhny V, Brown S, **Cummings DAT**, Burke DS. Contagious diseases in the United States from 1888 to the present. *New England Journal of Medicine*. 2013. Nov. 28 369(22):2152-8.

*76. Azman AS, Stark JH, Althouse BM, Vukotich CJ Jr., Stebbins S, Burke DS, **Cummings DAT**. Household transmission of influenza A and B in a school-based study of non-pharmaceutical interventions. *Epidemics*. 2013. 5(4): 181-6.

77. Smith DL, Perkins TA, Reiner RC, Barker CM, Niu T, Fernando Chaves L, Ellis AM, George DB, Le Menach A, Pulliam JRC, Bisanzio D, Buckee C, Chiyaka C, **Cummings DAT**, Garcia AJ, Gatton ML, Gething PW, Hartley DM, Johnston G, Klein EY, Michael E, Lloyd AL, Pigott DM, Reisen WK, Ruktanonchai N, Singh BK, Stoller J, Tatem AJ, Kitron U, Godfray HCJ, Cohen JM, Hay SI, Scott TW. Recasting the theory of mosquito-borne pathogen transmission dynamics and control. *Trans R Soc Trop Med Hyg.* 2014 April; 108(4): 185–197.

78. Grabowski MK, Lessler J, Redd AD, Kagaayi J, Laeyendecker O, Ndyanabo A, Nelson MI, **Cummings DAT**, Bwanika JB, Mueller AC, Reynolds SJ, Munshaw S, Ray SC, Lutalo T, Manucci J, Tobian AAR, Chang LW, Beyrer C, Jennings JM, Nalugoda F, Serwadda D, Wawer MJ, Quinn TC, Gray RH, and the Rakai Health Sciences Program. The role of viral introductions in sustaining community-based HIV epidemics in rural Uganda: evidence from spatial clustering, phylogenetics, and egocentric transmission models. *PLoS Medicine.* 2014 Mar 4;11(3):e1001610.

79. Rudolph K, Lessler J, Moloney R, Kmush B, **Cummings DAT**. Incubation periods of mosquito-borne viral infections: a systematic review. *American Journal of Tropical Medicine and Hygiene.* 2014. May 90(5):882-91.

*80. Althouse BA, Durbin AP, Hanley KA, Halstead SB, Weaver SC, **Cummings DAT**. Viral kinetics of primary dengue virus infection in non-human primates: a systematic review and individual pooled analysis. *Virology*. 2014 Mar;452-453:237-46.

81. Bhoomiboonchoo P, Gibbons RV, Huang A, Yoon IK, Buddhari D, Nisalak A, Chansatiporn N, Thipayamongkolgul M, Kalanarooj S, Endy T, Rothman AL, Srikiatkhachorn A, Green S, Mammen MP, **Cummings DAT**, Salje H. The spatial dynamics of dengue virus in Kamphaeng Phet, Thailand. *PLoS Neglected Tropical Diseases*. 2014. Sep 11;8(9); e3138

*82. Salje H, Rodriguez-Barraquer I, Rainwater-Lovett K, Nisalak A, Thaisomboonsuk, Thomas SJ, Fernandez S, Jarman RG, Yoon IK, **Cummings DAT**. Variability in Dengue Titer Estimates from Plaque Reduction Neutralization Tests Poses a Challenge to Epidemiological Studies and Vaccine Development. *PLoS Neglected Tropical Diseases*. 2014. Jun 4;8(6).

82. Ferguson NM, **Cummings DAT**. How season and serotype determine dengue transmissibility. *Proceedings of the National Academy of Science USA*. 2014. Jun 19. pii: 201407648.

83. Read JM, Lessler J, Riley S, Wang S, Tan LJ, Kwok KO, Guan Y, Jiang CQ, **Cummings DAT**. Social mixing patterns in rural and urban areas of southern China. *Proceedings of the Royal Society B*. 2014 Apr 30;281(1785)20140268.

84. Kucharski AJ, Kwok KO, Wei VW, Cowling BJ, Read JM, Lessler J, **Cummings DAT**, Riley S. The contribution of social behavior to the transmission of influenza A in a human population. *PLoS Pathogens*. 2014 Jun;10(6):e1004206.

85. Velasco JMS, Alera MTP, Ypil-Cardenas CA, Dimaano EM, Jarman RG, Chinnawirotpisan P, Thaisomboonsuk B, Yoon IK, **Cummings DAT**, Mammen P Mammen Jr. Demographic, clinical and

laboratory findings among adult and pediatric patients hospitalized with dengue in the Philippines. *Southeast Asian Journal of Tropical Medicine and Public Health*. 2014 45(2); 337-345.

*86. Reich NG, **Cummings DAT**, Lauer SA, Zorn M, Robinson C, Nyquist AC, Price CS, Simberkoff M, Radonovich LJ, Perl TM. Triggering Interventions for Influenza: The ALERT Algorithm. *Clinical Infectious Diseases.* 2014 doi: 10.1093/cid/ciu749

87. Kwok KO, Cowling BJ, Wei VW, Wu KM, Read JM, Lessler J, **Cummings DAT**, Malik Peiris JS, Riley S. Social contacts and the locations in which they occur as risk factors for influenza infection. *Proc. R. Soc. B* 2014 Aug; 281(1789); 20140709.

88. Kwok KO, Jiang C, Tan L, Justin L, Read JM, Zhu H, Guan Y, **Cummings DAT**, Riley S. [An international collaborative study on influenza viruses antibody titers and contact patterns of individuals in rural and urban household of Guangzhou]. *Zhonghua liu zing bing xue za zhi.* 2014 April; 35(4); 433-436. In Chinese.

*89. Althouse BA Hanley KA, Diallo M, Sall A, Ba Y, Faye O, Watts D, Weaver SC, **Cummings DAT**. Impact of climate and mosquito vector abundance on sylvatic arbovirus circulation dynamics in Senegal. *Am J Trop Med Hyg*. 2014 Nov. 13-0617.

90. Lessler JT, Rodriguez-Barraquer I, **Cummings DAT**, Garske T, Van Kerkhove M, Mills H, Truelove S, Hakeem A, Albarrak A, Ferguson NM. Estimating potential incidence of MERS-CoV associated with Hajj pilgrims to Saudi Arabia, 2014. *PLoS Currents Outbreaks*. OBK-14-0048.

91. Jiang CQ, Lessler J, Kim L, Kwok KO, Read JM, Wang S, Tan L, Zhu H, Guan Y, Riley S, **Cummings DAT**. A study of influenza immunity in urban and rural Guangzhou region of China, the Fluscape Study. *Chinese Journal of Preventive Medicine.* 2014 Apr;35(4):433-6.

92. Kucharski A, Lessler JT, Read J, Zhu H, Jiang CQ, Guan Y, **Cummings DAT**, Riley SR. Estimating the life course of influenza A(H3N2) antibody responses from cross-sectional data. 2015. *PLoS Biology.* 13(3):e1002082.

93. Mazet J, Daszak P, Wei Q, Zhao G, **Cummings DAT**, Desmond JS, Sung N, Rosenthal J, Zhang S, Xiao X, Xu J, Zhu G, Shi Z, Cao W, Feng F, Liu X, Pan W, Zuo L. A Joint China – US Call for an Interdisciplinary Approach to Emerging Infectious Diseases. *EcoHealth.* 2015 Dec;12(4):555-9. doi: 10.1007/s10393-015-1060-1.

*94. Van Panhuis W, Choisy M, Xiong X, Chok NS, Akarasewi P, Iamsirithaworn S, Lam SK, Chong CK, Lam FK, Phommasak B, Vongphrachanh P, Bouaphanh K, Rekol H, Hien NT, Thai PQ, Duong TN, Chuang JH, Liu YL, Ng LC, Shi Y, Tayag EA, Roque Jr. VG, Lee Suy LL, Jarman RG, Gibbons RV, Velasco JMS, Yoon IK, Burke DS, **Cummings DAT**. Synoptic epidemiology of dengue across eight countries in Southeast Asia reveals region-wide synchrony and traveling waves. *Proceedings of the National Academy of Sciences*. Proc Natl Acad Sci U S A. 2015 Oct 20;112(42):13069-74.

*95. Rodríguez-Barraquer I, Solomon SS, Kuganantham P, Srikrishnan AK, Vasudevan CK, Iqbal SH, Balakrishnan P, Solomon S, Mehta SH, **Cummings DAT**. The hidden/unseen burden of dengue and chikungunya in Chennai, India. *PLoS Neglected Tropical Diseases*. 2015. Jul 16;9(7):e0003906. doi: 10.1371/journal.pntd.0003906.

96. Lessler JT, Salje H, Van Kerkhove MD, Ferguson NM, Cauchemez S, Rodriquez-Barraquer I,

Hakeem R, Jombart T, Aguas R, Al-Barrak A, **Cummings DAT** and the MERS-CoV Scenario and Modeling Working Group. Estimating the Severity and Subclinical Burden of MERS-CoV Infection in the Kingdom Saudi Arabia. *American Journal of Epidemiology*. Apr 1;183(7):657-63.

97. Blackwood J, **Cummings DAT**, Iamsirithaworn S, Rohani P. Does pertussis vaccination reduce transmission or symptomatic disease only? An example using age-structured data from Thailand. *Epidemics*. 16. 1-7.

*98. Clapham H, **Cummings DAT**, Nisalak A, Kalayanarooj S, Thaisomboonsuk B, Klungthong C, Fernandez S, Srikiatkhachorn A, Macareo LR, Lessler J, Reiser J, Yoon IK. Epidemiology of Infant Dengue Cases Illuminates Serotype-Specificity in the Interaction between Immunity and Disease, and Changes in Transmission Dynamics. PLoS Negl Trop Dis. 2015 Dec 11;9(12):e0004262.

99. Kraemer MU, Perkins TA, **Cummings DAT**, Zakar R, Hay SI, Smith DL, Reiner RC Jr. Big city, small world: density, contact rates, and transmission of dengue across Pakistan. J R Soc Interface. 2015 Oct 6;12(111):20150468

100. Jiang CQ, Lessler J, Kim L, Kwok KO, Read JM, Wang S, Tan L, Hast M, Zhu H, Guan Y, Riley S, **Cummings DAT**. Cohort Profile: A study of influenza immunity in the urban and rural Guangzhou region of China: the Fluscape Study. Int J Epidemiol. 2016 Feb 14.

101. Nisalak A, Clapham HE, Kalayanarooj S, Klungthong C, Thaisomboonsuk B, Fernandez S, Reiser J, Srikiatkhachorn A, Macareo LR, Lessler JT, **Cummings DAT**, Yoon IK. Forty Years of Dengue Surveillance at a Tertiary Pediatric Hospital in Bangkok, Thailand, 1973-2012. Am J Trop Med Hyg. 2016 Mar 28. pii: 15-0337.

102. Guclu H, Read J, Vukotich CJ Jr, Galloway DD, Gao H, Rainey JJ, Uzicanin A, Zimmer SM, **Cummings DAT**. Social Contact Networks and Mixing among Students in K-12 Schools in Pittsburgh, PA. *PLoS One*. 2016 Mar 15;11(3):e0151139

103. Lessler J, **Cummings DAT**.Mechanistic Models of Infectious Disease and Their Impact on Public Health. *Am J Epidemiol*. 2016 Mar 1;183(5):415-22.

*104. Chadsuthi S, Iamsirithaworn S, Triampo W, **Cummings DAT**. The impact of rainfall and temperature on the spatial progression of cases during the chikungunya re-emergence in Thailand in 2008-2009. *Trans R Soc Trop Med Hyg*. 2016 Feb;110(2):125-33.

*105. Clapham HE, Rodriguez-Barraquer I, Azman AS, Althouse BM, Salje H, Gibbons RV, Rothman AL, Jarman RG, Nisalak A, Thaisomboonsuk B, Kalayanarooj S, Nimmannitya S, Vaughn DW, Green S, Yoon IK, **Cummings DAT**. Dengue Virus (DENV) Neutralizing Antibody Kinetics in Children After Symptomatic Primary and Postprimary DENV Infection. *J Infect Dis*. 2016 May 1;213(9):1428-35.

106. Lessler J, Ott C, Carcelen A, Konikoff J, Williamson J, Bi Q, Kucirka LM, **Cummings DAT**, Reich NG, Chaisson LH. Times to key events in the course of Zika infection and their implications: a systematic review and pooled analysis. *Bulletin of the World Health Organization.* 2016. Nov. 1;94(11):841-849.

107. Rodriguez-Barraquer I, Salje H, Lessler J, **Cummings DAT**. Predicting intensities of Zika infection and microcephaly using transmission intensities of other arboviruses. *bioRxiv*, 041095

108. Reich NG, Lessler JT, Sakrejda K, Lauer SA, Iamsirithaworn S, **Cummings DAT**. Evaluating time-series prediction models using a generalization of the Mean Absolute Scaled Error. *American Statistician*. 2016;70(3):285-292.

109. Radonovich L, Bessesen MT, **Cummings DAT**, Gaydos C, Nyquist C, Price C, Gilbert CL, Gorse G, Reich NG, Rodriguez-Barradas M, Simberkoff M, Perl TM. The Respiratory Protection Effectiveness Clinical Trial (ResPECT): A cluster-randomized clinical trial to compare the effectiveness of respirator and medical mask effectiveness against respiratory infection and illness in healthcare workers. *BMC Infectious Diseases*. 2016 Jun 2;16:243.

110. Cauchemez S, Novellet P, Cori A, Thibaut J, Garske T, Clapham H, Moore S, Mills HL, Salje H, Collins C, Rodriguez-Barraquer I, Riley S, Truelove S, Algarni H, Alhakeem R, AlHarbi K, Turkistani A, Aguas RJ, Cummings DAT, Van Kerkhove MD, Donnelly CA, Lessler J, Fraser C, Al-Barrak A, Ferguson NM. Unraveling the drivers of MERS-CoV Transmission. *PNAS*. 2016 Aug.113(32):9081-6.

*111. Truelove S, Zhu H, Lessler J, Riley S, Read JM, Wang S, Kwok KO, Guan Y, Jiang CQ, Cummings DAT. A comparison of hemagglutination inhibition and neutralization assays for characterizing immunity to seasonal influenza A. *Influenza and other Respiratory Infections*. 2016 Jun 15;10(6):e00047

112. Salje H, Lessler J, Paul K, Azman AS, Rahman MW, Rahman M, **Cummings DAT**, Gurley E, Cauchemez S. How behaviors, social structures and space shape the spread of infectious diseases: chikungunya as a case study. *PNAS*. 2016. Nov. 22;113(47):13420-13425.

113. Grantz KH , Rane MS, Salje H, Glass GE, Schachterle SE, **Cummings DAT**. Disparities in influenza mortality and transmission related to socio-demographic factors within Chicago in the pandemic of 1918. *PNAS*. 2016. Nov. 29;113(48):13839-13844.

114. Salje H, **Cummings DAT**, Lessler JT. Estimating infectious disease transmission distances using the overall distribution of cases. *Epidemics*. 2016 Dec;17:10-18.

115. Hoang QC, Salje H, Rodriguez-Barraquer I, Yoon IK, Chau NVV, Hung NT, Tuan HM, Lan PT, Willis B, Nisalak A, Kalayanarooj S, **Cummings DAT**, Simmons CP. Synchrony of dengue incidence in Ho Chi Minh City and Bangkok. *PLoS Neglected Tropical Diseases*. 2016. Dec. 10(12):e0005188.

116. Neil Ferguson, Isabel Rodriguez-Barraquer, Luis Mier-y-Teran-Romero, Cummings DAT. Modelling the optimal use of the first licensed dengue vaccine: balancing benefit against potential risks. *Science*. 2016 Sep 2;353(6303):1033-1036.

117. Flasche S, Jit M, Rodríguez-Barraquer I, Coudeville L, Recker M, Koelle K, Milne G, Hladish TJ, Perkins TA, **Cummings DAT**, Dorigatti I, Laydon DJ, España G, Kelso J, Longini I, Lourenco J, Pearson CA, Reiner RC, Mier-Y-Terán-Romero L, Vannice K, Ferguson N. The long-term safety, public health impact and cost-effectiveness of routine vaccination with a recombinant, live-attenuated dengue vaccine (Dengvaxia): A model comparison study. *PLoS Med*. 2016 Nov 29;13(11):e1002181.

118. Salje J, Lessler J, Berry IM, Melendrez MC, Endy T, Kalayanarooj S, Atchareeya A, Chanama S, Sangkijporn S, Klungthong C, Thaisomboonsuk B, Nisalak A, Gibbons RV, Iamsirithaworn S, Macareo LR, Yoon IK, Sangarsang A, Jarman RG, **Cummings DAT**. Dengue diversity across spatial and temporal scales: Local structure and the effect of host population size. *Science*. 355(6331), 1302-1306.

119. Kirsch TD, Moseson H, Massaquoi M, Nyenswah TG, Goodermote R, Rodriguez-Barraquer I, Lessler J, **Cummings DAT**, Peters DH. Impact of interventions and the incidence of ebola virus disease in Liberia-implications for future epidemics. *Health Policy and Planning*. 2017 Mar 1;32(2):205-214

120. Grubaugh ND, Ladner JT, Kraemer MUG, Dudas G, Tan AL, Gangavarapu K, Wiley MR, White S, Theze J, Magnani DM, Preito K, Reyes D, Bingham A, Paul LM, Robles-Sikisaka R, Oliveira G, Pronty D, Metsky HC, Baniecki ML, Barnes KG, Chak B, Freije CA, Gladden-Young A, Gnirke A, Luo C, MacInnis B, Matranga CB, Park DJ, Qu J, Schaffner SF, Tomkins-Tinch C, West KL, Winnicki SM, Wohl S, Yozwiak NL, Quick J, Fauver JR, Khan K, Brent SE, Reiner RC, Lictenberger PN, Ricciardi M, Bailey VK, Watkins DI, Cone MR, Kopp EW, Hogan KN, Cannons AC, Jean R, Garry RF, Loman NJ, Faria NR, Porcelli MC, Vasquez C, Nagle ER, **Cummings DAT**, Stanek D, Rambaut A, Sanchez-Lockhart M, Sabeti PC, Gillis LD, Michael SF, Bedford T, Pybus OG, Isem S, Palacios G, Andersen KG. Multiple introductions of Zika virus into the United States revealed through genomic epidemiology. *Nature*. 2017. 546(7658):401.

*121. Clapham HE, **Cummings DAT**, Johansson MA. Immune status alters the probability of apparent illness due to dengue virus infection: Evidence from a pooled analysis across multiple cohort and cluster studies. *PLoS Negl Trop Dis*. 2017 Sep 27;11(9):e0005926. doi: 10.1371/journal.pntd.0005926. eCollection 2017 Sep.

*122. Althouse BM, Guerbois M, **Cummings DAT**, Diop OM, Faye O, Faye A, Diallo D, Sadio BD, Sow A, Faye O, Sall AA, Diallo M, Benefit B, Simons E, Watts DM, Weaver SC, Hanley KA. Role of monkeys in the sylvatic cycle of chikungunya virus in Senegal. *Nature Communications*. 2018 Mar 13;9(1):1046. doi: 10.1038/s41467-018-03332-7.

123. Frederick J, Brown AC, **Cummings DAT**, Gaydos CA, Gibert CL, Gorse GJ, Los JG, Nyquist AC, Perl TM, Price CS, Radonovich LJ, Reich NG, Rodriguez-Barradas MC, Bessesen MT, Simberkoff MS. Protecting Healthcare Personnel in Outpatient Settings: The Influence of Mandatory Versus Nonmandatory Influenza Vaccination Policies on Workplace Absenteeism During Multiple Respiratory Virus Seasons. *Infection Control and Hospital Epidemiology*. 2018 Apr;39(4):452-461. doi: 10.1017/ice.2018.9. Epub 2018 Mar 8.

124. Lauer SA, Sakrejda K, Ray EL, Keegan LT, Bi Q, Suangtho P, Hinjoy S, Iamsirithaworn S, Suthachana S, Laosiritaworn Y, **Cummings DAT**, Lessler J, Reich NG. Prospective forecasts of annual dengue hemorrhagic fever incidence in Thailand, 2010-2014. *Proc Natl Acad Sci USA*. 2018 Mar 6;115(10):E2175-E2182. doi: 10.1073/pnas.1714457115. Epub 2018 Feb 20.

*125. Katzelnick LC, Harris E, Baric R, Coller BA, Coloma J, Crowe Jr JE, **Cummings DAT** et al. Immune correlates of protection for dengue: State of the art and research agenda. *Vaccine* 35, no. 36 (2017): 4659-4669.

126. Wesolowski A, Winter A, Tatem AJ, Qureshi T, Engø-Monsen K, Buckee CO, **Cummings DAT**, Metcalf CJE. Measles outbreak risk in Pakistan: exploring the potential of combining health system data with novel data-streams to strengthen control. *Epidemiology and Infection*. In press.

127. Salje H, **Cummings DAT**, Rodriguez-Barraquer I, Katzelnick LC, Lessler J, Klungthong C, Thaisomboonsuk B, Nisalak A, Weg A, Ellison D, Macareo L, Yoo IK, Jarman R, Thomas S, Rothman AL, Endy T, Cauchemez S. Reconstruction of dengue antibody titers and infection histories to characterize individual and population risk. *Nature*. 2018. May 23. Doi:10.1038/s41586-018-0157-4.

128. Ball JD, Prosperi MA, Brown A, Chen X, Kenah E, Yang Y, Cummings DAT, Rivers CM. The role of benzathine penicillin G in predicting and preventing all-cause acute respiratory disease in military recruits: 1991-2017. *Epidemiology and Infection*. 2018. Jul 5:1-7.

129. Chadsuthi S, Althouse BM, Iamsirithaworn S, Triampo W, Grantz KH, Cummings DAT. Travel distance and human movement predict paths of emergence of spatial spread of Chikungunya. *Epidemiology and Infection*. 2018. Jul. 9:1-9.

130. Smith MK, Solomon SS, Cummings DAT, Srikrishnan AK, Kumar MS, Vasudevan CK, McFall AM, Lucas GM, Celentano DD, Mehta SH. Overlap between harm reduction and HIV service utilization among people who inject drugs in India: Implications for HIV combination prevention. *International Journal of Drug Policy*. 2018. Jul;57:111-118.

131. Pollett S, Melendrez MC, Maljkovic Berry I, Duchene S, Salje H, Cummings DAT, Jarman RG. Understanding dengue virus evolution to support epidemic surveillance and counter-measure development. *Infection, Genetics and Evolution*. 2018. Apr. 25;62:279-295.

132. Smith MK, Graham M, Latkin CA, Mehta SH, Cummings DAT. Quantifying potentially infectious sharing patterns among people who inject drugs in Baltimore, USA. Epidemiology and Infection. 2018. Aug. 2:1-9.

133. Kucharski AJ, Lessler J, Cummings DAT, Riley S. Timescales of influenza A/H3N2 antibody dynamics. PLoS Biology. 2018. Aug. 20; 16(8): e2004974.

Articles and Editorials not peer reviewed

1. Epstein JM, **Cummings DA**, Chakravarthy S, Singa RM, Burke DS. Toward a containment strategy for smallpox bioterror: an individual-based computational approach. Brookings Institution Center on Social and Economic Dynamics, 2002. Working Paper 31.

2. Epstein, JM, Parker J, **Cummings DAT.**, Hammond R. Coupled Contagion Dynamics of Fear and Disease: Mathematical and Computational Explorations. Brookings Institution Center on Social and Economic Dynamics, 2007. Working Paper 50.

3. Yin Y, **Cummings DAT**, Burke, D.S., Louis, T.A. Bayesian analysis of infectious disease time series data. Technical report. Johns Hopkins Bloomberg School of Public Health Department of Biostatistics. 2007.

4. Johansson, M., Hombach, J. **Cummings DAT**. Models of the impact of dengue vaccines: a review of current research and potential approaches. WHO Report. Initiative for Vaccine Research. 2008.

5. **Cummings DAT**, Lessler J. Design and Analysis of Vaccine Studies by M. Elizabeth Halloran, Ira M. Longini, Jr., and Claudio J. Struchiner. *Am J Epidemiol* 2011;174:872-3.

6. **Cummings DAT**. Jumping Germs. *Ecohealth*. July. 2013. 1-2. Epub ahead of publication.

Letters

1. Bhandari A, Schaefer A, **Cummings DAT.** Comment on "Simple models of influenza progression with a heterogeneous population" by Richard Larson. *Operations Research Forum*. 2007. 55:3.

2. Solomon B, Raam MS, Pineda-Alvarez DE, **Cummings DAT**. Patients with VACTERL association deserve careful scrutiny: Response to Jenetzky et al. *American Journal of Medical Genetics Part A* 2011;155:2042-3.

3. Rodriguez-Barraquer I, Mier-y-Teran-Romero L, Ferguson NM, Burke DS, **Cummings DAT**. Differential efficacy of dengue vaccine by immune status. *Lancet*. May 2;385(9979):1726. doi: 10.1016/S0140-6736(15)60889-3.

4. Rodriguez-Barraquer I, Salje H, **Cummings DAT**. Dengue Vaccine in Regions of Endemic Disease. *N Engl J Med*. 2016 Apr 7;374(14):1388.

5. Grantz KH, Rane MS, Salje H, Glass GE, Schachterle SE, **Cummings DAT**. Reply to Shanks and Brundage: Many plausible mechanisms of pandemic mortality disparities. *Proceedings of the National Academy of Sciences (PNAS)*. 2017 Apr 6.

Chapters

1. **Cummings DAT**, Lessler J. Infectious Disease Dynamics. In Infectious Disease Dynamics: Theory and Practice. Third Edition. 2016.

2. Perkins TA, Reiner, Jr., RC, Rodriguez-Barraquer I, Smith DL, Scott TW, **Cummings DAT**. A review of transmission models of dengue: a quantitative and qualitative analysis of model features. In Dengue and Dengue Hemorrhagic Fever. Second Edition. 2014/8/29. CABI Publishing.

Meeting abstracts and presentations

*served as advisor/mentor; presenting author)

1. AL Roberts, **Cummings DA**, Totten LA, Leckta T. Computational methods for predicting heats of formation of halogenated methyl and ethyl radicals. National Meeting of the American Chemical Society, 2000, San Francisco, CA

2. **Cummings DAT**, Burke DS. Spatial Synchrony and Phase Coherency of Seasonal Variation in Temperature, Rainfall and Dengue in Thailand. *GEOMED, 2003, Baltimore, MD*

3. **Cummings DAT**, Huang NE, Nisalak A, Endy TP, Burke DS. Periodic traveling waves in dengue hemorrhagic fever incidence in Thailand. *American Society of Tropical Medicine and Hygiene, 2003, Philadelphia, PA*

4. **Cummings DAT**, Huang NE, Nisalak A, Endy TP, Burke DS. Traveling waves in dengue hemorrhagic fever incidence in Thailand.*6th Asia Pacific Congress of Medical Virology. 2003, Kuala Lumpur, Malaysia*

5. **Cummings DAT**, Huang NE, Nisalak A, Endy TP, Burke DS. Spatial coherence and association of temperature, rainfall and the incidence of dengue hemorrhagic fever in Thailand. *53rd Annual Meeting of the American Society of Tropical Medicine and Hygiene, 2004, Miami, FL*

6. **Cummings DAT**, Schwartz IB, Shaw L, Billings L, Burke DS. Simulation of the Population Effects of Dengue Vaccination. *First Asian Regional Dengue Research Network Meeting, 2004, Bangkok. Thailand*

7. **Cummings DAT**, Schwartz IB, Shaw L, Billings L, Burke DS. Dynamic effects of antibody-dependent enhancement on the fitness of dengue viruses. *National Institutes of Allergy and Infectious Disease Modeling Immunity for Biodefense Annual Meeting, 2006, Boston, MA*

*8. **Cummings DAT,** Rabaa MA. The relative timing of seasonal weather patterns and dengue incidence across the Southeast Asian region. 55th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Atlanda, G, 2006. [Am J Trop Med Hyg 2005;75:S137-138].

*9. Fichtenberg CM, **Cummings DAT**, Glass TA, Ellen JM. The impact of differential mixing by sexual activity on racial/ethnic STI disparities: A simulation study. 2nd North American Congress of Epidemiology, Seattle, WA, 2006.

10. **Cummings DAT**, Schwartz I, Burke DS, Gibbons RV. Spatial heterogeneity in the force of infection of dengue in Thailand and the spatial structure of phase relationships in multiannual oscillations. 57th Annual Meeting of the American Society of Tropical Medicine and Hygiene, New Orleans, LA, 2008.

11. **Cummings DAT**, Imsirithaworn S, Lessler J, Prasanthong R, Jarman RG, Burke DS, Gibbons RV. Dengue and the demographic transition. 57th Annual Meeting of the American Society of Tropical Medicine and Hygiene, New Orleans, LA, 2008.

*12. Rodriguez-Barraquer I, Marques E, **Cummings DAT**. Age shifts of DHF in Brazil: insight from a serological survey in Recife. 58th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Washington, DC, 2009.

*13. Benenson JD, Gibbons RV, Nisalak A, Kalayanarooj S, **Cummings DAT**. Susceptible reconstruction and serotype specific estimates of the transmissibility and seasonality of transmission of dengue viruses in Thailand. 58th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Washington, DC, 2009.

*14. Van Panhuis WG, Gibbons RV, Endy T, Burke DS, **Cummings DAT**. Assessing the accuracy of inferring the serotype of dengue virus infections based on pre- and post-infection neutralizing antibody titers. 58th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Washington, DC, 2009.

15. **Cummings DAT**, Iamsirithaworn S, Lessler JT, McDermott A, Prasanthong R, Nisalak A, Jarman RG, Burke DS, Gibbons RV. The impact of changes in human demography on cycles of dengue hemorrhagic fever incidence in Thailand. 42nd Annual Meeting of the Society for Epidemiologic Research, Anaheim, CA, 2009.

*16. Lessler J, Read JM, Riley SR, **Cummings DAT**. The use of satellite imagery in contact/travel questionnaires. 42nd Annual Meeting of the Society for Epidemiologic Research, Anaheim, CA, 2009.

*17. Lessler J, **Cummings DAT**, Read JM, Wang S, Zhu H, Smith GJD, Guan Y, Jiang CQ, Riley S. Location-specific patterns of exposure to recent pre-pandemic strains of Influenza A in Southern China. 3rd North American Congress of Epidemiology, Montreal, Canada, 2010.

18. Lessler J, Reich NG, Iamsirithaworn S, **Cummings DAT**. Predicition and imputation of spatio-temporal data: dengue surveillance in Thailand. 3rd North American Congress of Epidemiology, Montreal, Canada, 2010.

*19. Althouse B, Sall A, Hanley K, Diallo M, Watts D, Weaver S, **Cummings DAT**. A multi-host, multi-vector SIR model of Dengue-2 virus in Senegal. 59th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Atlanta, GA, 2010.

*20. Van Panhuis WG, Luxemburger C, Pengsaa K, Limkittkil K, Sabchareon A, **Cummings DAT**, Lang J, Durbin AP. A longitudinal analysis of maternal dengue antibody kinetics among infants in Bangkok. 59th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Atlanta, GA, 2010.

*21. Reich NG, Shrestha S, King AA, Rohani P Gibbons RV, **Cummings DAT**. Using a discrete-time state-space model to estimate the degree of cross-protection between serotypes of dengue virus due to infection. 3rd International Conference on Infectious Disease Dynamics, Boston, MA, 2011.

*22. Lessler J, Metcalf CM, **Cummings DA**, Grenfell BT. The coverage of measles vaccinations activities in Africa. 3rd International Conference on Infectious Disease Dynamics, Boston, MA, 2011.

*23. Chadsuthi S, Althouse B, Iamsirithaworn S, Wannapong T, **Cummings DAT.** Climate, land use and travel times predict the spatial advance of cases of chikungunya during an outbreak in Southern Thailand. 60th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Philadelphia, PA 2011.

*24. Rainwater-Lovett K, Rodriguez-Barraquer I, **Cummings DAT**, Lessler J. Variation in dengue virus plaque reduction neutralization testing: systematic review and pooled analysis. 60th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Philadelphia, PA 2011.

*25. Althouse BM, Ng YY, **Cummings DAT**. Prediction of dengue incidence using search query surveillance. 60th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Philadelphia, PA 2011.

26. **Cummings DAT**, Reich NG, Burke DS, Nisalak A, Jarman R, Gibbons RV. Estimates of the degree of length of cross-protection between dengue serotypes from time series models. 60th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Philadelphia, PA 2011.

*27. Rodriguez-Barraquer I, Buathong R, Iasirithaworn S, Lessler JT, Jarman RG, **Cummings DAT**. The changing epidemiology of dengue in Thailand: insights from serological studies conducted in the same location, 30 years apart. 60th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Philadelphia, PA 2011.

*28. Buathong R, Rodriguez-Barraquer I, Iasirithaworn S, Lessler JT, Jarman RG, Gibbons RV, **Cummings DAT.** Serological survey of dengue infections among individuals in Rayong, Thailand. 60th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Philadelphia, PA 2011.

*29. Azman A, Salje J, Rodriguez-Barraquer I, Althouse BM, Endy TP, Nisalak A, Jarman R, Gibbons RV, **Cummings DAT**. Longitudinal characterization of antibody response to dengue virus in Bangkok, Thailand. 60th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Philadelphia, PA 2011.

*30. Salje H, Lessler J, Endy T, Curriero F, Gibbons RV, Nisalak A, Nimmannitya S, Jarman R, Burke DS, **Cummings DAT**. Evidence for spatially and temporally clustered transmission and immunity of dengue virus from hostpial-based surveillance. 60th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Philadelphia, PA 2011.

31. Building models of school-based interventions to control influenza and other respiratory pathogens: the role of proximity detectors and contact surveys to describe the social mixing of school aged children. **Cummings DAT**, Cousins JH, Creppage K, Galloway D, Guclu H, Li K, Noble E, Brown S, Rainey J, Read J, Gao H, Uzicanin A, Vukotich CJ Sr., Zimmer SM. Dynamics of Preparedness. University of Pittsburgh.

32. Seroprevalence of dengue immunity among multiple species of non-human primates in Senegal. American Society of Tropical Medicine and Hygiene. **Cummings DAT**, Althouse BA, Cummings DAT, Guerbois M, Althouse BM, Sall AA, Diallo M, Diallo D, Diop O, Benefit B, Simons E, Watts DM, Weaver SC, Hanley KA. *American Society of Tropical Medicine and Hygiene. 2013.*

*33. Potential opportunities and perils of imperfect dengue vaccines: Direct vs. indirect vaccine effects Rodriguez-Barraquer I, Mier-y-Terán-Romero L, Schwartz IB, Burke DS, **Cummings DAT**. *Epidemics. Amsterdam, 2013.*

34. Recreating Historic Patterns of Influenza Incidence from Cross-Sectional Serologic Data. Lessler J, Riley S, Read JM, Zhu H, Jiang CQ, Guan Y, **Derek AT Cummings.** *Epidemics. Amsterdam, 2013.*

35. Social behavior and influenza infection. Kucharski AJ, Kwok KO, Wei VWI, Cowling BJ, Read JM, Lessler JT, Cummings DAT, Riley S, *Epidemics. Amsterdam, 2013.*

36. Social connectivity along a population density gradient in southern China. Read JM, Lessler J, Riley S, Wang S, Tan LJ, Kwok KO, Guan Y, Jiang CQ, **Cummings DAT**. *Epidemics. Amsterdam, 2013.*

37. Nonlinear Programming Techniques for Efficient Estimation of Large Spatio-Temporal Infectious Disease Models. **Cummings DAT**, Laird CD, Word D, Burke DS. *MIDAS Annual meeting*. 2014

38. Adjusting underreported real time case data for prediction of Dengue in Thailand. Sakrejda K, Reich NG, **Cummings DAT**, Suangtho P, Hinjoy S, Iamsirithaworn S, Clapham HE, Salje H. *American Society of Tropical Medicine and Hygiene.* 2014

*39. Characterizing global and local trends in dengue transmission: insight from age-specific surveillance data. Rodriguez Barraquer I, **Cummings DAT.** *American Society of Tropical Medicine and Hygiene.* 2014

*40. Estimating cross-enhancement and cross-protection of dengue viruses using time series data from Thailand. Clapham HE, Reich NG, Yoon IK, Jarman RG, Sakrejda K, Fernandez S, Nisalak A, Kalayanarooj S, **Cummings DAT.** *American Society of Tropical Medicine and Hygiene.* 2014

*41. Evidence for the recent emergence of dengue in Bangladesh: results from a seroprevalence study. Salje H, Naser AM, Rahman M, Rahman MZ, Lessler J, **Cummings DAT**, Luby SP, Gurley E. *American Society of Tropical Medicine and Hygiene.* 2014

*42. Mechanisms of traveling waves and periodic spatial synchronization of dengue hemorrhagic fever incidence in Thailand. Mier-y-Teran Luis, Grabowski K, Lessler J, Salje H, Rodriguez-Barraquer I, Burke D, Anantapreecha S, A-Nuegoonpipat A, Jarman R, Iamsirithaworn S, Bianco Si, Shaw LB, Schwartz IB, **Cummings DAT**. *American Society of Tropical Medicine and Hygiene.* 2014

43. Real-time forecasting of the 2014 dengue fever season in Thailand. Reich NG, Sakrejda K, **Cummings DAT**, Suarngtho P, Hinjoy S, Iamsiithaworn S, Clapham HE, Salje H, Lessler J. *American Society of Tropical Medicine and Hygiene.* 2014

*44. Variability in dengue titer estimates from plaque reduction neutralization tests poses a challenge to epidemiological studies and vaccine development. Salje H, Rodriguez-Barraquer I, Rainwater-Lovett K, Nisalak A, Thaisomboonsuk B, Thomas SJ, Fernandez S, Jarman RG, Yoon IK, **Cummings DAT.** *American Society of Tropical Medicine and Hygiene.* 2014

*45. What proportion of dengue virus infections result in no apparent disease? Clapham HE, **Cummings DAT**, Johansson MA. *American Society of Tropical Medicine and Hygiene.* 2014

46. Reconstructing transmission chains of influenza among school children using deep sequencing and multiple sources of contact information. *US NIH MIDAS Annual meeting.* Washington, DC. May. 2016.

47. Dengue cohort comparison project. American Society of Tropical Medicine and Hygiene. Atlanta, GA.Nov. 2016.

48. Correlation of Corrective Eyewear to Acute Respiratory Infection (ARI) Among Outpatient Healthcare Personnel (HCP). ID Week. New Orleans, LA. Oct. 2016.

49. Predicting county-level influenza activity using school absenteeism data in Allegheny County, PA from 2010-2015. ID Week. New Orleans, LA. Oct. 2016.

50. Influenza and Other Respiratory Viral Infections Among School Children in Pittsburgh, Pennsylvania. ID Week. New Orleans, LA. Oct. 2016.

51. Ventilator-Associated Staphylococcus aureus and Pseudomonas aeruginosa Infections Among Intensive Care Unit (ICU) Patients in Six Healthcare Systems: Temporal Trends and Risk Factors. ID Week. New Orleans, LA. Oct. 2016.

52. Acute Respiratory Infections (ARIs) Among Outpatient Healthcare Personnel (HCP). ID Week. New Orleans, LA. Oct. 2016.

53. Predicting county-level influenza activity using school absenteeism data in Allegheny County, PA from 2010-2015. International Society for Disease Surveillance. Annual Meeting. Atlanta, Dec. 2016.

54. Utility of Nontraditional Data Sources for Early Detection of Influenza. International Society for Disease Surveillance. Annual Meeting. Atlanta, Dec. 2016.

Scientific Presentations (without abstracts)

1. Time-series decomposition methods for infectious disease epidemiology. *North American Congress of Epidemiology, 2006, Seattle, WA.*

2. Spatial coherence and association of temperature, rainfall and the incidence of dengue hemorrhagic fever in Thailand. *DIMACS Workshop on Facing the Challenge of Infectious Diseases in Africa: The Role of Mathematical Modeling, 2006, Johannesburg, South Africa*

3. Modeling new vaccines for measles. *DIMACS Workshop on Facing the Challenge of Infectious Diseases in Africa: The Role of Mathematical Modeling, 2006, Johannesburg, South Africa*

4. Strategies for looking for pattern in spatio-temporal data. *DIMACS Workshop on Spatio-temporal and network models of disease spread, 2007, Edinburgh, Scotland*

5. Dengue and the demographic transition. *2nd International Conference on Dengue and Dengue Hemorrhagic Fever, 2008, Phuket, Thailand*

6. Influenza transmission in households in 1918. *Epidemics Conference on Infectious Disease Dynamics, 2008, Asilomar, CA*

7. Immune landscapes of human influenza in southern China. *Ecology and Evolution of Infectious Diseases, National Institutes of Health and National Science Foundation, 2010, Snowbird, UT*

8. Location-specific patterns of exposure to recent pre-pandemic strains of influenza A in southern China: the Fluscape project. *Ecology and Evolution of Infectious Diseases, National Institutes of Health and National Science Foundation, 2011, Madison, WI*

9. The role of modeling epidemics. What do we learn? *Infectious Disease Society of America, 2011, Washington, DC*

10. Location-specific patterns of exposure to recent pre-pandemic strains of influenza A in southern China: the Fluscape project. *Ecohealth, 2011, Baltimore, MD*

11. Dengue Work of the VMI. *Vaccine Modeling Initiative, 2011, Princeton, NJ.*

12. Estimates of the degree and length of cross-protection between dengue serotypes from time series models. *American Society of Tropical Medicine and Hygiene, 2011, Philadelphia, PA*

13. Immunological landscapes of influenza in southern China: the Fluscape project. *NIH MIDAS annual meeting, 2012, Boston, MA.*

14. Estimates of the degree and length of cross-protection between dengue serotypes from time series models. *NIMBioS Dengue Workshop, 2012, Knoxville, TN.*

15. Interactions between serotypes of dengue highlight epidemiological impact of cross-immunity. *Dynamical Systems Applied to Biology and Natural Sciences, 2013, Lisbon, Portugal.*

16. Models of the impact of partially effective dengue vaccines. *Gates Foundation Mathematical Modeling Summit. 2013. Seattle, WA.*

17. Integrated dengue control strategies. *Gates Foundation Mathematical Modeling Summit. 2013. Seattle, WA.*

18. Mechanistic models of transmission utilizing contact data. *Society for Epidemiologic Research. 2013*, *Boston, MA*.

19. Natural History and Transmissibility of the MERS-CoV. American Society of Microbiology. Annual Meeting. 2014. *Washington, DC.*

20. Spatiotemporal patterns of Dengue and Chikungunya virus. NIH RAPIDD Annual Meeting. 2014. *Bethesda, MD.*

21. Dengue modeling consortium: Analysis of CYD23 data. Sanofi. 2014. *Lyon, France.*

22. Spatiotemporal patterns of Dengue and Chikungunya virus. MIDAS Annual meeting. 2014. *Atlanta, GA*.

23. Middle Eastern Respiratory Syndrome (MERS): Investigating a Novel Coronavirus. MIDAS Annual meeting. 2014. *Atlanta, GA*.

24. Spatial dynamics of dengue at multiple scales. Gates Grand Challenges Meeting. 2014. *Seattle, WA.*

25. Transmission dynamics of dengue at multiple scales. WHO Consultation on Dengue Burden. 2014. *Atlanta, GA.*

26. Reporting requirements. Specific requirements for dengue intervention models. WHO Consultation on the impact of dengue vaccines. 2014. *Geneva, Switzerland.*

27. Transmission dynamics of dengue and immunization impact at multiple scales. WHO Consultation on the impact of dengue vaccines. 2014. *Geneva, Switzerland.*

28. Characterizing Ebola Transmission and Surveillance in West Africa. Society for Epidemiologic Research. June, 2015. *Denver, CO*.

29. Immunological landscapes of influenza in China. NIH RAPIDD Meeting on Landscape theory in infectious disease dynamics. September, 2015. *Bethesda, MD.*

30. Trends in cases of dengue in infants: insights into serotype differences in disease in naive and non-naive individuals and population transmission dynamics. Clapham HE, Nisalak A, Kalayanarooj S, Thaisomboonsuk B, Klungthong C, Fernandez S, Srikiatkhachorn A, Macareo LR, Lessler J, Cummings DAT, Yoon IK. American Society of Tropical Medicine and Hygiene. 2016. *New Orleans, LA.*

31. Treatment as prevention strategies for HCV will require massive scale up to see benefits in prevention. Luis Mier-y-Teran-Romero, Derek Cummings, David Thomas, Carl Latkin, John Wong, Greg Kirk, David Thomas, Shruti Mehta. CROI, February, 2016. *Boston, MA*.

32. Age Sharing Patterns in People who Inject Drugs in Baltimore: Implications for HCV Treatment as Prevention Strategies. M. Kumi Smith, Matt Graham, Shruti Mehta, Luis Mier-y-Teran-Romero, Carl Latkin, Derek A.T. Cummings. Epidemics. 2016. *Clearwater, FL.*

Invited Seminars

1. Recurring spatial temporal traveling waves in dengue hemorrhagic fever incidence in Thailand.
Capitol Area Dengue Research Meeting, 2004, Silver Spring, MD

2. Modeling outbreaks for public health response.
Emerging Respiratory Infections Conference, Delaware Health and Social Services, 2004, Dover, DE

3. Spatial patterns of dengue hemorrhagic fever in Thailand.
Department of Geography, University of Maryland, 2004, College Park, MD

4. Periodic Traveling Waves in Dengue Hemorrhagic Fever Incidence in Thailand.
Virginia Bioinformatics Institute, 2004, Blacksburg, VA

5. Processes impacting the incidence of dengue hemorrhagic fever on multiple temporal and spatial scales.
53rd Annual Meeting of the American Society of Tropical Medicine and Hygiene, 2004, Miami, FL

6. Dynamic effects of antibody dependent enhancement on the fitness of dengue viruses.
Fogarty International Center, 2005, Washington, DC

7. Spatial synchrony of the waves of incidence of influenza in 1918.
Influenza Modeling Workshop, Global Health Security Action Group, G8, 2005, London, UK.

8. Can pandemic influenza be contained with antivirals?
Global Emerging Infections Surveillance and Response System, U.S. Department of Defense, 2005, Linthicum, MD

9. Dynamic effects of antibody dependent enhancement on the fitness of dengue viruses.
Center for Infectious Disease Dynamics, Penn State University, 2005, State College, PA

10. Strategies for containing an emerging influenza pandemic in Southeast Asia.
Modeling Working Group. Johns Hopkins Department of Biostatistics, 2005, Baltimore, MD

11. Simulating Pandemic Influenza.
Global Pandemic Initiative. IBM Industry Solutions Laboratory, 2005, Hawthorne, NY

12. Containing Pandemic Influenza.
Pandemic Influenza Preparedness Training, Johns Hopkins Center for Preparedness, 2006, Cumberland, MD

13. Dengue dynamics in Thailand over the last 20 years.
Thailand Centers for Disease Control, 2006, Bangkok, Thailand

14. Containing Pandemic Influenza.
Infectious Disease Informatics. Surveillance, Modeling and Response. National Center for Supercomputing Applications, 2006, Urbana-Champaign, IL

15. Dengue viruses: periodic traveling waves and serotype cycling in Thailand.
Five decades of discovery: A symposium to honor the contributions of Monto Ho, 2006, Pittsburgh, PA

16. Shifts in the epidemiology of dengue in Thailand.
University of Pittsburgh. Department of Epidemiology, 2007, Pittsburgh, PA

17. Dengue and the demographic transition.
NIH Fogarty Center, 2008, Bethesda, MD

18. Open questions in dengue research.
Penn State University: Research and Policy for Infectious Diseases Dynamics, 2008, University Park, PA

19. Shifts in the age of dengue hemorrhagic fever cases in Thailand.
CDC Branch, 2008, Puerto Rico

20. Models of the impact of dengue vaccines: a review of current research and potential approaches.
WHO Scientific Consultation of Dengue Vaccines, 2008, Belem, Brazil

21. Swine H1N1 influenza A: transmissibility, natural history and the potential impact of non-pharmaceutical interventions.
Johns Hopkins University, 2009, Baltimore, MD

22. Recent findings of transmission dynamics of dengue.
WHO Dengue Reference Group, 2009, Havana, Cuba

23. Dynamics and natural history of H1N1 influenza.
Grand Rounds, Welch Center, Johns Hopkins University, 2010, Baltimore, MD

24. The impact of spatial heterogeneity in the transmission of dengue on the synchrony of incidence.
University of Michigan MAC-EPID Annual Seminar, Ann Arbor, MI 2010.

25. Spatial variation in the transmission of dengue in Thailand: the role of demography and density.
Harvard School of Public Health, 2010, Boston, MA

26. Dengue Virus: Global trends, cycles and waves.
University of Michigan, 2010, Ann Arbor, MI

27. Spatial heterogeneity in the transmission of dengue at multiple spatial scales.
National Center for Medical Intelligence, 2011, Frederick, MD

28. Modeling approaches in long-term safety assessment of live attenuated dengue vaccines. Technical consultation on long term safety assessment of live attenuated dengue vaccines.
WHO, 2011, Geneva

29. Immune landscapes of human influenza in southern China: The Fluscape Project.
Harbin School of Public Health, 2011, Harbin, China

30. Modeling approaches in long-term safety assessment of live attenuated dengue vaccines. Technical Consultation on a Framework for Dengue Vaccine Safety Assessment.
WHO, 2011, Geneva

31. Dengue modeling work at Johns Hopkins and the Vaccine Modeling Initiative.
Secretaría de Salud (Ministry of Health), 2011, México

32. Spatial heterogeneity of influenza immunity and infection: the effect of population density and effective neighborhood size. *University of Massachusetts Amherst, 2012, Amherst, MA*

33. Models of the impact of partially effective dengue vaccines. *2013. Sanofi Pasteur. Lyon, France.*

34. Spatial heterogeneity of influenza immunity and infection: the Fluscape study. *Ecology and Evolution of Infectious Disease Meeting. 2013. State College, PA.*

35. Techniques and Opportunities in Infectious Disease Modeling. *Center for AIDS Research Seminar. Johns Hopkins Bloomberg School of Public Health. 2013. Baltimore, MD.*

36. The Fluscape study. Guangzhou Centers for Disease Control. *2013. Guangzhou, China.*

37. Social Mixing and Respiratory Transmission in Schools Study. *US Centers for Disease Control. 2013. Atlanta, GA.*

38. Middle Eastern Respiratory Syndrome (MERS): Investigating a Novel Coronavirus. Johns Hopkins Health Advisory Board. 2013. *Baltimore, MD.*

39. Social Mixing and Respiratory Transmission in Schools. US Centers for Disease Control. 2013. *Atlanta, GA.*

40. Opportunities and challenges to treatment as prevention approaches for Hepatitis C virus control. Johns Hopkins University Center for AIDS Research. 2014. *Baltimore, MD.*

41. Review of Dengue Models. White House Office of Science and Technology Policy meeting on Integrating Prediction and Forecasting Models for Decision-making: Dengue Epidemic Prediction. 2014. *Washington, DC.*

42. Potential opportunities and peril of imperfect dengue vaccines. Johns Hopkins Medical School. 2014. *Baltimore, MD.*

43. Ventilator Associated Pneumonia among ICU patients: S. aureus and Pseudomonas spp. Medimmune. 2014. *Gaithersburg, MD.*

44. Assessing local transmission of Ebola virus in Liberia. Imperial College. 2014. *London, UK.*

45. Spatial dynamics of dengue and vaccine models. Royal Society. 2014. *London, UK.*

46. Spatial scales of influenza immunity: Results from the Fluscape project. RAPIDD Group. 2015. *Washington, DC.*

47. Prediction of dengue incidence in Thailand. Disease Forecasting Group. White House. 2015. *Washington, DC.*

48. Temporal variation in dengue case numbers and relation to climate and using age to map hazards of infection. WHO Dengue Global Burden Meeting. 2015. *Geneva, Switzerland.*

49. Immunological landscapes of influenza in China. NIH RAPIDD Meeting on Landscape theory in infectious disease dynamics. September, 2015. *Bethesda, MD.*

50. Hospital acquired infections among ICU and individuals undergoing Surgery in 6 Hospital systems: S. aureus and Pseudomonas spp. Derek Cummings, Rebecca Pierce, Eili Klein, and Trish Perl. Medimmune. October, 2015. *Rockville, MD*.

51. Temporal variation in dengue case numbers and relation to climate and using age to map hazards of infection. World Health Organization. Dec. 2015. *Geneva, Switzerland*.

52. Potential opportunities and perils of dengue vaccines. EpiCentre. June 2016. *Paris, France.*

53. Estimation of transmission processes using data augmentation. Institut Pasteur. Seminar. June 2016. *Paris, France.*

54. Interactions of dengue viruses at multiple spatial and temporal scales. Harvard School of Public Health. February, 2016. *Cambridge, MA.*

55. An engineer's experience in epidemiology. Plenary Speaker. Johns Hopkins Bloomberg School of Public Health Department of Environmental Health and Engineering Inaugural Research Retreat. Jan. 2017. *Baltimore, MD.*

56. Comparative modelling of dengue vaccine impact and Global estimates of the dengue transmissibility and seropositivity. WHO Immunization and vaccines related implementation research-Advisory Committee meeting. 2017. *Annecy, France.*

57. Spatial dynamics of dengue transmission. University of Florida Emerging Pathogens Institute External Advisory Committee Meeting. 2017. *Gainesville, FL.*

58. Characterizing the genetic and antigenic diversity of dengue at multiple spatial and temporal scales. University of Florida Veterinary Medicine Seminar. 2017. *Gainesville, FL.*

CURRICULUM VITAE

DEREK A. T. CUMMINGS

PART II

TEACHING

Advisees

Current Advisees

Post-doctoral

Leah Katzelnick	Biology/joint with UC Berkeley	2016-present
Rebecca Borchering	Biology	2017-present
Bingyi Yang	Biology	2017-present
Alex Kirpich	Biology	2017-present
Bernardo Garcia-Carreras	Biology	2017-present
Diana Rojas-Alvarez	Biology/joint with UF Biostats	2017-present

PhD

Angkana Huang	Biology	2017-present
Diana Rojas-Araya	Entomology	2017-present

Undergraduate (undergraduates doing research with me)

Carlos Moreno	Applied Physiology and Kinesiology	2015-present
Silvio Martinez-Daniel	Biomedical Engineering	2017-present
Francesca Maurici	Biology	2016-2017
Chastity Perry	Biology	2017

Past Advisees

Post-doctoral

Hannah Clapham 2013-2016
Current Position: Mathematical Epidemiologist
Oxford University Clinical Research Unit

Henrik Salje 2014-2016
Current Position: Faculty, Institut Pasteur

Luis Mier-y-Teran-Romero 2010-2014
Current Position: US CDC Staff Scientist

Isabel Rodriguez-Barraquer 2012-2014
Current Position: Assistant Professor, University of California San Francisco

Kaitlin Rainwater-Lovett 2012-2013
Current Position: Research Associate, Johns Hopkins School of Medicine

Nicholas Reich 2010-2011
Current Position: Associate Professor, University of Massachusetts, Biostatistics

Justin Lessler 2008-2011
Current position: Associate Professor, Johns Hopkins Bloomberg School of Public Health

Carl Laird 2007-2008
Current Position: Associate Professor, Texas A&M University, Department of Chemical Engineering

PhD

Stephanie Cinkovich Biology 2015-2018
Thesis title:
The role of host composition and asymptomatic infection on the transmission dynamics of zoonotic diseases

Jacob Ball Epidemiology 2015-2018
(co with Xinguang Chen)
Thesis title:
Epidemiological models of infectious diseases for clinical and public health decision support

Talia Quandelacy Epidemiology 2013-2017
Thesis title:
Characterizing micro-scale transmission dynamics of influenza

Henrik Salje Epidemiology 2009-2014
Thesis title:
Insights into the microscale spatial dynamics of dengue and chikungunya in Southeast Asia

Andrew Azman Epidemiology 2009-2014
(co with Justin Lessler)
Thesis title: Heterogeneities in Cholera Transmission

Ben Althouse Epidemiology 2009-2013
Thesis title: Mechanistic Modeling of Sylvatic Arboviruses in Senegal

Su-Hsun Liu Epidemiology 2008-2012
Thesis title: Detectable Human Papillomavirus DNA: Prevalent vs. Incident Infection

Isabel Rodriguez-Barraquer Epidemiology 2007-2012
Thesis title: The Shifting Epidemiology Of Dengue: Insight From Serological Surveys

Justin Lessler Epidemiology 2004-2008
Thesis title: Detection and characterization of respiratory pathogens in institutions

Masters

Jordan Johnson MS in Epidemiology 2013-2015
Thesis title: Co-infections with multiple respiratory viruses in children in 9 Pittsburgh area schools in the

winter of 2012-2013

Jacob Carey MS in Epidemiology 2014-2016
Quantifying proximal contacts between school children during school, outside of school and during school closures

Yanjie Huang MS in Epidemiology 2013-2014
Thesis title: Quantifying Human Mobility Using The Longest Disease Traveled

Rome Buathong MS in Tropical Medicine 2010-2014
Royal Tropical Institute, Amsterdam, Netherlands
Thesis title: Risk and protective factors for primary and secondary dengue infections among school-aged children in Meuang district, Rayong province, Thailand

Madhura Rane MS in Epidemiology 2012-2013
Socioeconomic determinants of mortality and disease transmission at census tract level during the 1918 H1N1 Influenza pandemic in Chicago

Katrina Mott MS in Epidemiology 2010-2012
The Effect Of Age And Syndrome On Serotype Prevalence In Invasive Pneumococcal Disease: A Sub-Analysis Of The Pneumococcal Global Serotype Project

Paul Maurizio MS in Molecular Microbiology and Immunology 2009-2011
Thesis Title: Detection And Vertical Transmission Of Culex Flavivirus In Culex Quinquefasciatus (Diptera: Culicidae) Mosquitoes From Zambia, Africa

Ben Althouse MS in Biostatistics 2009-2010
Thesis Title: A Multi-Host Multi-Vector SIR Model of Dengue Fever in Senegal

Ripa Chakravorty MS in Epidemiology 2009-2010
Thesis Title: Modeling the incubation period of Escherichia coli

Jon Benenson MS in Biostatistics 2008-2010
Thesis Title: Susceptible reconstruction and serotype specific estimates of seasonality of transmission of dengue viruses in Thailand using a Time-Series-Susceptible-Infected-Recovered model

Jodi Udd MPH 2009-2010

Eileen Obe MPH 2009-2010

Yih Yng Ng MPH 2008-2009
Thesis title: Prediction of Influenza-Like Illness trends in Singapore using Internet search data

Hannah Lee MPH 2008-2009

Katherine Lin MHS in Epidemiology 2007-2008
Thesis Title: A Method to Geocode Rural Addresses and Post Office Boxes: Application to a Study of Drinking Water Nitrate Exposure and Cancer Incidence

Duza Baba, MHS in International Health 2006

Heidi Hallman	MHS in International Health	2006
Kristin Kelling	MHS in International Health	2005
Alex Ruan	Undergraduate in Public Health	2012

*Preliminary Oral Participation (*alternate)*
Departmental

Name		Date
Talia Quandelacy	PhD	2015
Rebecca Pierce*	PhD	2014
Andrew Azman	PhD	2012
Henrik Salje	PhD	2011
Isabel Rodriguez-Barraquer	PhD	2011
Benjamin Althouse	PhD	2010
Su-Hsun Liu	PhD	2009
Amanda Latimore	PhD	2007
Bridget Ambrose	PhD	2006

Schoolwide

Sheldon Waugh	PhD	Epidemiology	2017
Punam Amratia	PhD	Forest Resources and Conservation	2017
Stephanie Cinkovich	PhD	Biology	2017
Jacob Ball	PhD	Epidemiology	2016
Talia Quandelacy	PhD	Epidemiology	2015
Mariam Fofana	PhD	Epidemiology	2014
Holly Schuh	PhD	International Health	2014
Kristen Little	PhD	Epidemiology	2014
Huitong Qui	PhD	Biostatistics	2014
Mufaro Kanyangarara	PhD	International Health	2014
Ian Craig	PhD	International Health	2013
Jessica Atwell	PhD	International Health	2013
Ricardo Castillo	PhD	Epidemiology	2012
Andrew Azman	PhD	Epidemiology	2012
Benjamin Althouse	PhD	Epidemiology	2012
Genevieve Wojcik	PhD	Epidemiology	2011
Michelle Mergier*	PhD	International Health	2011
Alison Turnbull*	PhD	Epidemiology	2011
Emily Gurley	PhD	Epidemiology	2011
Henrik Salje	PhD	Epidemiology	2011
Su-Hsun Liu	PhD	Epidemiology	2011
Amanda Latimore	PhD	Epidemiology	2010
James Stark	PhD	Epidemiology, University of Pittsburgh	2010
Isabel Rodriguez-Barraquer	PhD	Epidemiology	2010
Nikolas Wada*	PhD	Epidemiology	2010
Adrienne Shapiro	PhD	Epidemiology	2009
Bridget Ambrose	PhD	Epidemiology	2008
Willem van Panhuis	PhD	International Health	2008

Nicholas Reich	PhD	Biostatistics	2008
Kathryn Anderson	PhD	Epidemiology, Emory University	2008
Tassanee Silawan	PhD	Epidemiology, Mahidol University	2007

Final Oral Participation

Henrik Salje	PhD	Epidemiology	2014
Andrew Azman	PhD	Epidemiology	2014
Kara Randolph*	PhD	Epidemiology	2014
Ben Althouse	PhD	Epidemiology	2013
Hannah Clapham	PhD	Infectious Disease Epidemiology Imperial College	2013
Melinda Munos*	PhD	International Health	2012
Alison Liu	PhD	Epidemiology	2012
Isabel Rodriguez-Barraquer	PhD	Epidemiology	2012
Kaitlin Rainwater Lovett	PhD	Epidemiology	2012
Johns Ayers*	PhD	Health, Behavior and Society	2011
Kathryn Anderson	PhD	Epidemiology, Emory University	2010
James Stark	PhD	Epidemiology, University of Pittsburgh	2010
Nicholas Reich	PhD	Biostatistics	2010
Emily Henkle*	PhD	Epidemiology	2010
Willem van Panhuis	PhD	International Health	2009
Justin Lessler	PhD	Epidemiology	2008
Michael Johansson	PhD	Molecular Microbiology & Immunology	2008
Christina Schumaker	PhD	Epidemiology	2008
David Dowdy	PhD	Epidemiology	2008
Tassanee Silawan	PhD	Epidemiology, Mahidol University	2008

Thesis Committee Participation

Mark Kartzinel (UF)	The impact of the larval environment on post-emergence fitness of aedes aegypti
Punam Amratia (UF)	Fine-scale mapping of malaria in Ghana: use of Bayesian models
Jacob Ball (UF)	The ecology and epidemiology of respiratory diseases in high-risk populations
Stephanie Cinkovich (UF)	The Role of Host Composition and Asymptomatic Infection on the Transmission Dynamics of Zoonotic Diseases
Andrew Azman (JHU)	Heterogeneities in Cholera Transmission
Mary Grabowski (JHU)	Patterns and predictors of the epidemiological and evolutionary dynamics of HIV-1 infection in Rakai, Uganda
Ben Althouse (JHU)	Studies of Sylvatic Dengue in Senegal
Henrik Salje (JHU)	Combining surveillance data with genetic analysis in the characterization of spatiotemporal clustering of dengue cases in Bangkok
Isabel Rodriguez-Barraquer	Towards a better estimation of the force of infection and basic reproductive number of dengue virus
Su-Hsun Liu (JHU)	Mathematical modeling to inform likelihood of second peak HPV prevalence in older women
Kaitlin Lovett (JHU)	The Impact of Immune Reconstitution and Revaccination on Measles Immunity in HIV-infected Zambian Children initiating Antiretroviral Therapy

Genevieve Wojcik (JHU)	A Genome-Wide Association Study of Oral Polio Vaccine Failure in Infants from Bangladesh (MAL-ED Study):Gene-, and Pathway-Level Analyses
Emily Gurley (JHU)	Exposure to Indoor Air Pollution and Pneumonia in Dhaka, Bangladesh
Justin Lessler (JHU)	The Detection and Characterization of Respiratory Virus Transmission in Institutions
Willem van Panhuis (JHU)	Dynamics of Dengue Antibodies : Transplacental Transfer, Decline after Birth and the Serotype Specific Response to Infection among Infants and Children in Thailand
Christina Schumacher (JHU)	Identifying, Chracterizing and Predicting the Role of Core Groups in Syphilis Epidemics
Nicholas Reich (JHU)	Statistical Methods for Incomplete Data from Infectious Disease Outbreaks
Michael Johansson (JHU)	The Influence of Climate on Dengue Transmission in Puerto Rico
David Dowdy (JHU)	Impact and Cost-Effectiveness of Improved Diagnostics for Tuberculosis in Developing Countries

Classroom Instruction

2017
Principal Instructor (and course developer)
Department of Biology
University of Florida
Outbreaks
Enrollment: 25
I developed a course called “Outbreaks” ZOO4926 which is an undergraduate course that teaches quantitative concepts in characterizing epidemics and dynamics of emerging infectious diseases in multiple hosts including humans, animals and plants. Development included creation of lectures, 5 labs (in class quantitative assignments), final projects and final exam.

2009-2015
Principal Instructor (and course developer) (with Dr. William Moss and Dr. Justin Lessler)
Department of Epidemiology
Bloomberg School of Public Health
Johns Hopkins University
Concepts and Methods in Infectious Disease Epidemiology
Enrollment: 10, 35, 35, 35, 32, 27

2007-2008, 2009-2015
Principal Instructor (and course developer)
Department of Epidemiology
Bloomberg School of Public Health
Johns Hopkins University
Infectious Disease Dynamics: Theoretical and Computational Approaches
Enrollment: 18, 25, 20, 30, 20, 22, 24, 20

2014
Principal Instructor (with Dr. Kenrad Nelson, Dr. Shruti Mehta, and Dr. Isabel Rodriguez-Barraquer)
Department of Epidemiology
Bloomberg School of Public Health

Johns Hopkins University
Epidemiology of Infectious Diseases
Enrollment: 42

2011
Guest Lecturer “Modeling and prediction of DHF”, “Models of dengue transmission and dengue vaccines”
PAHO/Instituto Pedro Kouri Dengue Institute
Havana, Cuba
Enrollment: 210

2010
Principal Instructor (and course developer)
Infectious Disease Dynamics: Theoretical and Computational Approaches
Johns Hopkins Bloomberg School of Public Health Fall Institute
Barcelona, Spain
Enrollment: 20

2007-2013
Instructor
Department of Epidemiology
Bloomberg School of Public Health
Johns Hopkins University
Epidemiologic Methods 3
Enrollment: 220 on average in class total each year, 60 in lab section each year.

2007-2013
Faculty Advisor
Department of Epidemiology
Bloomberg School of Public Health
Johns Hopkins University
Modeling of Spatial and Temporal Disease Epidemiology Forum-Student Group

2005-2006
Principal Instructor (and course developer)
Department of International Health
Bloomberg School of Public Health
Johns Hopkins University
Infectious Disease Dynamics: Theoretical and Computational Approaches
Enrollment: 19, 15

2005-2013 (12 separate lectures)
Guest Lecturer “Introduction to mathematical modeling of infectious diseases”, “Influenza"
Department of Epidemiology
Bloomberg School of Public Health
Johns Hopkins University
Infectious Disease Epidemiology

2012-2014 (5 separate lectures)
Guest Lecturer “MERS Coronavirus”, “Dengue", “SARS Coronavirus”

Department of Epidemiology
Bloomberg School of Public Health
Johns Hopkins University
Emerging Infectious Disease

2008-2010
Guest Lecturer "Host demographics and infectious disease dynamics"
Department of Molecular Microbiology and Immunology
Bloomberg School of Public Health
Johns Hopkins University
Ecology of Infectious Disease

2007-2008
Co-organizer
Departments of Epidemiology and Biostatistics
Bloomberg School of Public Health
Johns Hopkins University
Epi/Biostats Working Group on Infectious Disease

2014, 2015
Guest Lecturer "Infectious Disease Epidemiology"
Global Institute of Public Health
New York University

2006-2008
Guest Lecturer
University of Pittsburgh Graduate School of Public Health
Department of Epidemiology
Infectious Disease Epidemiology

2012
Guest Lecturer "A Practical Short Course in Infectious Disease Modeling"
Harvard University/Mahidol University
Bangkok

2006-2014
Guest Lecturer "Models of infectious disease dynamics"
United States Uniformed Services University
Bethesda, MD
Infectious Disease Epidemiology

2006-2011
Instructor
Field Epidemiology Training Program
Thailand Ministry of Public Health
Bangkok, Thailand
Infectious Disease Dynamics

2003-2004
Guest Lecturer

Department of Earth and Planetary Sciences
Zanvyl Krieger School of Arts and Sciences
Johns Hopkins University
Climate Change and Global Health

2001
Tutorial Instructor
GEOMED 2001
Université Pierre et Marie Curie, Paris
Time-Series Analysis, Pre-conference Tutorial

1996
Teaching Assistant
Inorganic Chemistry, Brown University

RESEARCH GRANT PARTICIPATION

Active Support
Linking antigenic and genetic variation of dengue to individual and population risk
02/01/15-1/31/2020, NIH R01 Total award: $3,800,000
Principal Investigator: Derek Cummings
Primary Goal: Characterize the genetic and antigenic variability of dengue viruses circulating over the last twenty years using a large repository of viral samples and build population models of ecological interactions between dengue viruses and its impact on human health.

Southeast Regional Center of Excellence in Vector-Borne Diseases: the Gateway Program.
12/31/2016-12/30/2021, US Centers for Disease Control Total award: $9,999,628.
Principal Investigator: co-PI's Derek Cummings, Greg Glass, John Beier (University of Miami), Tom Unnasch (University of South Florida), Rhoel Dinglasan, Program Director.
Primary Goal: Conduct research to enhance our understanding of the transmission dynamics of arthropod-borne disease transmission in order to effectively respond to detect and control outbreaks.

Monitoring cause-specific school absences to estimate influenza transmission in Western PA
09/01/13-08/31/16, CDC U01 Total award: $1,500,000
Principal Investigator: Derek Cummings
Primary Goal: To refine surveillance in communities for influenza and other respiratory disease incidence using cause-specific absenteeism in school-children in western Pennsylvania.
Role: Principal Investigator

Methods for Reducing Spatial Uncertainty and Bias in Disease Surveillance
02/01/2013-01/31/2018, NIH R01 NIAID Total award to UF subcontract: $226,469
Principal Investigator: Justin Lessler
The goal of this research is to develop methods that can improve forecasting and current estimates of the incidence of dengue and other infectious diseases. The project uses multiple approaches including mechanistic models and models that traverse multiple temporal and spatial scales to produce estimates of incidence.
Role: Investigator

Influenza Immunity and Survival in Aging Populations
09/01/15-08/31/2017, US NIH R56 Total award to UF subcontract: $26,395
Principal Investigator: Justin Lessler, Derek Cummings (local PI)
Primary Goal: This study aims to understand how and why this increase in antibody titers occurs, and what role survival effects, patterns of infection and the biology of the immune response over multiple infections play in its development.
Role: Investigator

University of Pittsburgh MIDAS Center of Excellence: Data and Statistical Inference Project
07/01/14-08/31/19, NIH U01 Total award to UF subcontract: $217,409
Principal Investigators: Derek Cummings (local PI), Donald Burke (overall PI)
Primary Goal: Computational modeling for science and policy is driven by availability of data to estimate model parameters. Insights for disease transmission dynamics are derived from statistical inference using these models. This project will capitalize on new opportunities provided by large scale genetic and epidemiological data created during MIDAS-II to study infectious disease transmission dynamics at the micro- and macro level using innovative statistical approaches and parameter estimation methods.
Role: Investigator

Modeling interactions between HIV interventions in key populations in India
7/1/2015-6/30/2017, US NIH R21 Total award: $448,573
Principal Investigators: Derek Cummings
Primary Goal: The proposed study will use a novel modeling approach to help to disentangle multiple dynamic effects of combination interventions in order to inform future large-scale implementation of such combination interventions.

Completed Support
Staphylococcus aureus and Pseudomonas Hospital Acquired Infections
01/01/13-12/31/16, MedImmune
Principal Investigator: Derek Cummings (co) with Trish Perl
Funding Level: 0.6 months
Primary Goal: Identify risk factors for hospital acquired infections of staphylococcus aureus and pseudomonas in 7 hospital centers and assist in trial design for new intervention products.
Role: Principal Investigator

From Ebola Response to Sustainable Public Health Systems in Liberia
7/1/2015-6/30/2016, US CDC
Principal Investigator: David Peters, Derek Cummings (co-PI's)
Funding Level: 2.4 calendar months
Primary Goal: The goal of this project is to support the Ministry of Health of Liberia in building an integrated disease surveillance system to conduct surveillance for a number of infectious diseases as well as build general capacity to analyze infectious disease surveillance data.
Role: co-Principal Investigator

Inference for interacting pathogens with mechanistic and phenomenological models

09/01/14-08/31/16, NIH
Principal Investigators: Derek Cummings (local PI), Nick Reich (overall PI)
Funding Level: 1.56 calendar months
Primary Goal: Develop inference framework to estimate interactions of multiple pathogens that co-circulate and induce immune responses that might create competitive and/or enhancing relationships.
Role: Investigator

Modeling of infectious disease; A study of repeat influenza vaccination, and how population based immunity impacts the genetic makeup of dengue viruses.
04/01/14-9/30/2016, WRAIR
Principal Investigator: Derek Cummings
Funding Level: 0.12 calendar months
Primary Goal: Two part project to determine the impact of successive influenza vaccine on immunity and risk and 2) dengue population immunity and how this shapes the dengue viral evolution.
Role: Principal Investigator

09/01/10-08/31/15, CDC/VA
Principal Investigators: Trish Perl, Lew Radonovich (co-PI's)
Funding Level: 1.2 calendar months
Primary Goal: The goal of this research is to compare the efficacy of surgical masks to N95 respirators in protecting health care workers from respiratory viruses including influenza.
Role: Investigator

Analytic Support for the Ebola Outbreaks and Strengthening Primary Health Care in West Africa and Democratic Republic of Congo
10/15/14-01/31/15, Unicef
Principal Investigators: David Peters (PI)
Funding Level: 0.12 calendar months
Primary Goal: The goal of this project is to conduct analyses and simulations to support UNICEF's response to the Ebola virus outbreak in West Africa.
Role: Investigator

VMI II: Application of Computational Models to Guide and Evaluate Global
07/01/13-06/30/15, University of Pittsburgh, Bill and Melinda Gates Foundation
Principal Investigator: Derek Cummings
Funding Level: 0.60 calendar months
Primary Goal: To use theoretical models to evaluate multiple vaccination strategies and vaccine candidates to control dengue and other vector-borne diseases
Role: Principal Investigator

Quantifying Contact Rates and Mixing Patterns in School Aged Children
08/31/11 - 08/30/14, CDC
Principal Investigator: Derek Cummings (co) with Shanta Zimmer
Funding Level: 1.2 calendar months
Primary Goal: The goal of this work is to use multiple methods to quantify the contacts that school children make that could potentially transmit influenza including survey,

	proximity detectors and GPS devices in order to evaluate each of these methods. We will also link measures of social contact to the risk of acquisition of influenza.
Role:	co-Principal Investigator

Immune Landscapes of Human Influenza in Households, Towns and Cities in Southern China
10/01/08-8/31/14, NIH

Principal Investigator:	Derek Cummings
Funding Level:	1.8 calendar months
Primary Goal:	The goal of this work is to characterize immunological profiles to human influenza in space and time among individuals living in Guangzhou province, China, and to build computational models that capture the transmission dynamics that could create the specific distributions observed.
Role:	Principal Investigator

Career Award at the Scientific Interface
07/01/07 - 07/31/15, Burroughs Wellcome

Principal Investigator:	Derek Cummings
Funding Level:	0.12 calendar months
Primary Goal:	To study natural and vaccine-induced immunity and spatial-temporal dynamics of epidemic dengue
Role:	Principal Investigator

Using Viral Sequences to Characterize the Micro-scale Dispersal Dynamics of Dengue in Bangkok
2/1/2012-12/31/2014, Johns Hopkins Center for Global Health

Principal Investigator:	Derek Cummings
Funding level:	$50,000 research funds (0 months)
Primary Goal:	Describe the micro-scale transmission of dengue in an urban environment using genetic and geographic information on the occurrence of cases.
Role:	Principal Investigator

Computational Models of Infectious Disease Threats Center for Excellence
04/01/09 – 04/01/14, NIH-NIGMS

Principal Investigator:	Don Burke
Funding Level:	3.0 calendar months
Primary Goal:	Integrate the most advanced and powerful techniques of epidemiological data analysis with those of computer simulation to produce a unified computational epidemiology.
Role:	Investigator

Vaccine Modeling Initiative
04/1/08-04/31/13, Bill and Melinda Gates Foundation

Principal Investigator:	Don Burke
Funding Level:	1.0 calendar months
Primary Goal:	Evaluation of candidate vaccine technologies using computational models.
Role:	Investigator

Temporal and Spatial Dynamics of Sylvatic Arbovirus Transmission and Emergence

10/1/08-09/31/13, NIH
Principal Investigator: Scott Weaver
Funding Level: 1.8 calendar months
Primary Goal: The goal of this project is to study the dynamics of transmission of dengue and chikungunya virus among non-human primate species in Senegal and determine which species support transmission of these viruses endemically and which ones appear to be only spillover species.
Role: Investigator

Multi-Scale Modeling of Infectious Diseases in Fluctuating Environments
09/01/09 – 08/31/13, NIH
Principal Investigator: Derek Cummings, Lora Billings (co)
Funding Level: 0.6 calendar months
Primary Goal: The objective of this proposal is to develop new mathematical models of infectious disease transmission that effectively, capture the impact of stochasticity on dynamics and lead to more effective control. The group will study the dynamics of disease spread in fluctuating environments modeled at various population scales.
Role: Co-Principal Investigator

Preparedness and Catastrophic Event Response (PACER)
06/01/09 – 05/31/12, US department of Homeland Security
Principal Investigator: Gabe Kelen
Funding Level: 0.12 calendar months
Primary Goal: PACER is a consortium of research institutions studying how the nation can best prepare for and respond to potential large-scale incidents and disasters. My work on this project is on model development for pandemic influenza models particularly, methods for parameter estimation for individual based simulations.
Role: Investigator

Immune Reconstitution of HIV-1 Infected Zambian Children Initiating Antiretroviral Therapy 03/01/07 – 02/28/12, NIH
Principal Investigator: William Moss
Funding Level: 0.6 calendar months
Primary Goal: This project will study measles and measles vaccination in HIV-1-infected children in Lusaka, Zambia to characterize measles virus-specific immune reconstitution and immunologic memory in Zambian children initiating ART.
Role: Investigator

Planning for Avian Influenza Outbreaks and Potential Pandemics
9/14/05 – 3/31/10, NIH-Fogarty International Center
Principal Investigator: Don Burke
Funding Level: 0.6 calendar months
Primary Goal: Develop capacity among epidemiologists at the Thai Ministry of Public Health to utilize new theoretical and computational tools in concert with traditional epidemiologic approaches to address issues surrounding avian influenza and potential influenza pandemics.
Role: Investigator

Computational Models of Infectious Disease Threats

04/01/04 – 04/01/09, NIH-NIGMS
Principal Investigator: Don Burke
Funding Level: 4.2 calendar months
Primary Goal: Integrate the most advanced and powerful techniques of epidemiological data analysis with those of computer simulation to produce a unified computational epidemiology.
Role: Program Coordinator and Investigator

Pittsburgh Influenza Prevention Program
10/01/06 - 09/31/08, CDC
Principal Investigator: Don Burke
Funding Level: 0.6 calendar months
Primary Goal: Study the transmission dynamics of influenza in Pittsburgh elementary schools and conduct trials of non-pharmaceutical interventions targeting influenza transmission.
Role: Investigator

Harmonic Decomposition and Compartmental Models in the Analysis of Epidemiologic and Climatic Data: An Analysis of Dengue in Southeast Asia
07/01/04 - 06/31/07, NOAA
Principal Investigator: Don Burke
Funding Level: 2.4 calendar months
Primary Goal: Apply methods developed under previous funding cycle to data from Southeast Asia on dengue hemorrhagic fever.
Role: Investigator

Ethical Issues in Influenza Pandemic Preparedness and Response
04/01/06 - 10/01/06, Rockefeller Foundation
Principal Investigators: Ruth Faden and Ruth Karron (co-PI's)
Funding Level: 0.12 calendar months
Primary Goal: Identify current and potential responses to the threat of pandemic influenza that profoundly affect the world's disadvantaged and to undertake concrete action to prevent or at least to mitigate those responses that are the most unjust. Simulate the impact of pandemic mitigation responses in resource poor settings.
Role: Investigator

Computational Modeling of Vaccination Strategies against Smallpox
08/01/02 - 07/31/04, Alfred P. Sloan Foundation
Principal Investigator: Joshua Epstein
Funding Level: 2.4 calendar months
Primary Goal: Develop computer simulations of the introduction and spread of a bio-terrorist agent such as smallpox in human populations, and evaluate possible response strategies.
Role: Investigator

Research to Guide Allocation of Public Resources in the Event of an Intentional Introduction of Smallpox
12/01/02 – 05/31/04, FIC / NIH / DHHS
Principal Investigator: Don Burke
Funding Level: 2.4 calendar months
Primary Goal: Develop, evaluate, and utilize computational models of smallpox

	introduction into the USA, and of public health strategies to contain smallpox epidemics.
Role:	Investigator

Harmonic Deconstruction in the Analysis of Epidemiologic and Climatic Data.
08/01/02 – 07/31/03, NOAA

Principal Investigator:	Don Burke
Funding Level:	2.4 calendar months
Primary Goal:	Develop and evaluate new computational methods for correlating dengue epidemiologic data and weather data, such as wavelet transforms and Empiric Mode Decomposition.
Role:	Investigator

ACADEMIC SERVICE

Department of Biology

Advisory Committee	2015-present
Strategic Planning Committee	2016-present

Department of Epidemiology

Lead, Department of Epidemiology Self-study	2013-present
Chair of Faculty Executive Committee	2013-present
Faculty Executive Committee	2012-present
Infectious Disease Journal Club, Faculty Coordinator	2009-2012
Admissions and Credentialing Committee, Member	2009-2012

Department of International Health

Steering Committee, Member	2005-2006

School-wide

Technology Transfer Committee, Member	2010-2015

ADDITIONAL INFORMATION

Personal statement of research and research objectives

I am interested in developing effective strategies for the control infectious diseases. My approach in doing this is to develop temporally or spatially targeted administration of vaccines or other interventions to produce the largest reduction in morbidity and mortality. I utilize a mix of field study and theoretical models of infectious disease in order to understand the transmission dynamics of dengue, influenza, measles, hepatitis C and chikungunya and to estimate the impact of specific interventions.

Keywords

Infectious disease, dynamics, influenza, dengue, measles, hepatitis C, ebola, social dynamics, vaccine-preventable, mathematical models, ecology

EXHIBIT 3

DECLARATION OF AMY ZEIDAN, MD

I, Amy J. Zeidan, MD, hereby declare under the penalty of perjury pursuant to 28 U.S.C. § 1746:

1. I make this declaration based on my personal knowledge except where I have indicated otherwise. If called as a witness, I could and would testify competently and truthfully to these matters.

2. I am an assistant professor in the Department of Emergency Medicine at Emory University School of Medicine in Atlanta, Georgia. I am also an attending physician in the Emergency Department at Grady Hospital in Atlanta. I have held these positions since July 2019. Previously, I was a clinical instructor in the Department of Emergency Medicine at the University of Kentucky. I am Board-Certified in Emergency Medicine.

3. I received my MD at George Washington University and completed my residency in Emergency Medicine at the University of Pennsylvania, where I was chief resident from 2017-2018. I completed an Emergency Ultrasound Fellowship at the University of Kentucky.

4. In addition to my practice as an emergency room physician and my professorship at Emory Medical School, I completed training on Forensic Medical Evaluations for Asylum Seekers through Physicians for Human Rights in 2015 and 2016. I was the Executive Director of Education at the Philadelphia Human Rights

Clinic from 2016-2018 and am currently co-Director of the Human Rights Clinic at Emory. I have conducted over 50 evaluations of asylum seekers throughout Pennsylvania and Georgia, including individuals detained in Stewart ICE Detention Center in Lumpkin, Georgia ("Stewart"). As part of that work, I have visited Stewart to evaluate individuals and reviewed medical records for nine individuals, including records of medical care provided during their time in ICE detention. I have published on best practices of forensic medical evaluations and my research focuses on barriers to acute care for refugees, asylees, and other immigrant populations.

5. As an Emergency Medicine physician at Grady Hospital, I evaluate and treat patients with COVID-19 on a daily basis. Since early March 2020 when the first COVID-19 cases were identified in Metro Atlanta, I estimate that I have treated over 50 patients who screened positive for symptoms consistent with COVID-19. I have treated patients with varying severity of symptoms, ranging from mild symptoms to severe symptoms requiring emergent intubation and prolonged stays in the intensive care unit. While many critically ill patients are older than 65 or people with multiple comorbidities including underlying lung disease and/or immunocompromised, I have also treated healthy patients as young as their late 20's requiring intubation and admission to the Intensive Care Unit (ICU).

6. Based on my experience treating COVID-19 patients, and daily research and review of emerging and rapidly evolving literature, it is my opinion that ICE detention facilities in Georgia create conditions ripe for an alarming and rapid spread of COVID-19. Based on my review of ICE's Guidance on COVID-19,[1] it is my opinion that the measures described to mitigate the spread of COVID-19 in detention centers are inadequate to protect detained individuals for the reasons outlined below. When COVID-19 disease spread occurs within ICE detention centers, there are few options to contain the spread. The first concern is that many individuals with COVID-19 may be asymptomatic but nonetheless contagious. Similarly, they may have very mild symptoms or symptoms that are less common with COVID-19, including gastrointestinal symptoms like diarrhea. Symptoms can present anywhere from 2 to 14 days after exposure/infection. As such, they can expose other detained individuals, as well as staff of the facility, to the virus before anyone is aware of their symptoms.

7. In fact, a number of patients I have treated in the Emergency Department presented with non-COVID-19 related symptoms but were found to have imaging findings (chest X-ray or CT scans of their chests) highly consistent with COVID-19. Others have presented with gastrointestinal symptoms only,

[1] https://www.ice.gov/coronavirus

including vomiting or diarrhea, rather than the classic symptoms of fever and respiratory symptoms. A small percentage of patients have presented with hypoxia requiring oxygen/intubation despite having no respiratory symptoms. Only half of the patients with COVID-19 had a fever at the time of admission. Thus, assessing individuals who are detained for fever and respiratory symptoms only will exclude many individuals who have COVID-19. Finally, as community spread is highly prevalent now, assessing individuals for travel to high risk areas is no longer as helpful or clinically relevant.

8. From my work with individuals detained by ICE, I am aware that many detained immigrants with medical conditions are placed in medical isolation, which is equivalent to solitary confinement. In the context of COVID-19, this practice is unsafe. Placing an individual with significant medical needs in isolation exacerbates underlying medical conditions and places them at additional risk of being unable to call for help. This is an unacceptable and potentially deadly form of quarantine given the rapid and severe progression of COVID-19 in affected individuals. I have treated COVID-19 patients who have gone from stable, not requiring oxygen, to needing intubation and subsequent care in an ICU on a ventilator within 24 hours. Individuals with concerning or confirmed symptoms must be watched closely, with adequate access to medical care that is simply not available in ICE detention facilities.

9. Moreover, the disease can progress over a period of 14 days, and patients can have symptoms for more than 14 days. This requires close observation and safe isolation for over 14 days in many cases. Safe isolation in this case would require continuous monitoring of an individual in isolation with vital sign monitoring every 2-4 hours depending on their condition, consisting of evaluation of temperature, blood pressure, heart rate, and oxygen levels at these intervals. Conditions of the room would consist of continuous access to hydration, three nutritionally adequate meals, and access to medications for specific symptoms (ex. Tylenol for temperature control and analgesia). Most detention facilities do not have the space or staff to safely isolate all patients with symptoms for this period of time.

10. I am also concerned that the Georgia ICE detention centers lack sufficient Personal Protective Equipment (PPE) to adequately protect personnel against the spread of COVID-19 and contain the spread of the disease. Indeed, it has been difficult for the top trauma centers and busiest hospitals in the state—including Grady Hospital—to obtain sufficient supplies, as there are national shortages. Appropriate protection requires all individuals in contact with suspected COVID-19 patients to be trained in appropriate donning and doffing of PPE. When I am caring for COVID-19 patients, for my safety, I have been instructed to wear a head covering, N95 mask with a surgical mask covering the N95 mask, goggles, a

gown, shoe coverings, and two sets of gloves. I have gone through specific training on how to apply and remove PPE to avoid contamination of other sources. All individuals working with suspected COVID-19 individuals should be following this protocol to protect themselves and others.

11. It does not appear that ICE facilities are following similar protocols and are thus placing their employees and all detained individuals in danger. In addition, all employees and detained individuals should have regular access to appropriate hygiene products, including hand sanitizer, and should follow social distancing mandates by staying at least 6 feet apart. Based on reports of conditions in the Georgia ICE detention centers, Stewart, Irwin County Detention Center ("Irwin"), and Folkston ICE Processing Center ("Folkston"), I have serious concerns about the availability of hygiene products.

12. In addition, the Georgia ICE detention centers are geographically isolated from appropriate levels of medical care. Individuals with severe diseases like COVID-19 require an intensive care unit with appropriate medical equipment and staff. Stewart is at least one hour away from a facility where this level of care could be provided—Piedmont Columbus Regional Midtown Hospital in Columbus, Georgia (40 miles from Stewart) or Phoebe Putney Memorial Hospital in Albany, Georgia (53 miles from Stewart). Notably, Phoebe Putney is currently experiencing a Coronavirus outbreak and has severe limitations in caring for

additional COVID-19 patients. Current data indicate that 16 people have died due to COVID-19 at Phoebe Putney alone, and Albany, Georgia, has the highest per capita COVID-19 infection rate in the state. Southwest Georgia Regional Medical Center is located about 22 miles from Stewart in Cuthbert, Georgia; however, this is a critical access hospital with essentially no long term ICU beds. Critical access hospitals are generally located in rural areas where the access to nearby hospitals is extremely limited. They have fewer than 25 beds and are designed to care for patients who will require fewer than 96 hours of care; importantly, even if some have ICU-type beds, those are designed for short term treatment and do not provide capacity for the type of long term treatment required for COVID-19 patients. Critical access hospitals provide excellent quality care, but are not designed to care for critically ill patients; they are designed to stabilize and transfer critically ill patients. For reference, Grady Hospital has 961 hospital beds including approximately 60 ICU beds.

13. The nearest hospital to Irwin with ICU capabilities is Tift Regional Medical Center, approximately 18 miles away. Tift Medical Center has 181 hospital beds, including 20 ICU beds. As a regional hospital, it serves 12 counties. A coronavirus outbreak in any of these counties would overwhelm the hospital and its ICU beds, as we have seen at Phoebe Putney. Even more concerning, the nearest hospital to Folkston detention center with ICU capabilities is Southeast

Georgia Health System in Camden with only 40 beds, including 5 ICU beds, approximately 26 miles away. Patients would likely require initial transport or transfer to Southeast Georgia Health System – Brunswick with 300 beds, including 24 ICU beds, which is about 45 miles away.

14. It cannot be overstated that critical access and regional hospitals provide high quality care to all patients. However, critical access hospitals are not designed for high volumes of sick patients. Regional hospitals do not have as many specialty services necessary to treat COVID-19 patients as urban hospitals and serve such a large number of patients that they may quickly reach capacity. A coronavirus outbreak would overwhelm these systems, and many critically ill patients would require transfer to tertiary/quaternary hospitals.

15. It is important to remember that the nature of community spread means that without appropriate measures, just one person with COVID-19 can spread the disease to an entire community. An outbreak in one of the Georgia immigration detention centers would overwhelm the capacity of local hospitals. With the worsening shortage of PPE, providers, hospital capacity, and ICU resources like ventilators, it is impossible to know when specific hospitals in Georgia will run out of any of these necessary resources. However, predictions in Georgia suggest all hospital resources will be used by April 22, 2020, and that we currently have an ICU bed shortage of 755 beds and 1,075 ventilators.

16. Additionally, the distance and time required to transfer individuals from one of the three Georgia detention centers to any of these hospitals can be significant. First, a call is made to local/regional Emergency Medical Service (EMS) providers. An available unit must be contacted and directed to the location. Upon arrival, they must stabilize the patient and transfer them to the closest facility with appropriate resources (i.e. an ICU) that is not on diversion, meaning that they are so full that they can no longer take additional patients from ambulance crews. The CDC recommendations for transport of patients suspected of having COVID-19 by EMS are appropriately robust, and aim to protect the EMS providers, the patient, and all transfers thereafter. As a result, appropriate cleaning time and protective equipment will severely increase the transfer time and limit the number of units available for transporting patients to the hospital, and between hospitals. In consideration of all of these measures, the concern is that by the time a detained individual can be transferred appropriately, it may be too late. The danger that this lengthy process presents is compounded when individuals in detention do not have immediate access to adequate medical attention.

17. I have reviewed the declarations of Jaquelinne Murillo Figueroa, Meredyth Yoon, and Alexis Ruiz, attorneys who have visited Stewart, Folkston, and Irwin, respectively. Based on the information set forth in these declarations, the current practices of these detention centers with respect to entry of legal

visitors and for staff personal hygiene measures are inadequate to limit the spread of COVID-19. According to these declarations, legal visitors are not required to engage in recommended hygienic practices such as washing their hands or using hand sanitizer despite the risk of sharing items that might carry COVID-19, such as documents or pens, with detained individuals. Nor are legal visitors provided with or required to wear PPE. Officers at the detention center are also failing to take recommended precautions such as wearing even the bare minimum of PPE such as gloves or masks. Legal visitors and staff are congregating in close quarters with each other and with detained individuals. As community spread is our biggest threat, following appropriate CDC recommendations is paramount. Anything but strict adherence to these guidelines poses a serious threat to all individuals.

18. All three declarants report that they had to have their temperatures taken and answer some questions about exposure risk before entering the facilities. As explained above, COVID-19 can be present and transmitted even when an infected individual is asymptomatic and afebrile, and increasing community spread in the United States renders questions about travel irrelevant. These measures are unlikely to prevent transmission of the virus by a legal visitor and moreover could increase transmission. The only safe mechanism for screening individuals prior to entering a facility is through testing.

19. In addition, I have reviewed the declaration of Laura Rivera, summarizing calls that Southern Poverty Law Center's detainee helpline has received over the last two weeks from all three Georgia facilities and notes from her tours of Stewart and Irwin in 2018. Based on this declaration, the living conditions at Stewart and Irwin are ripe for the spread of disease. The living conditions described are typical congregate environments where detainees sleep in large groups with less than six feet of space between beds. Throughout the day, individuals detained in these facilities must congregate within six feet of each other to access various services and activities. As we know from data in other countries, the only successful mitigation strategy is to self-isolate, and socially distance at least 6 feet apart. These reported conditions will actually increase rather than decrease the spread of disease.

20. Individuals detained at all three facilities reported a lack of information about COVID-19 and how to protect themselves. Especially concerning was the reported remark of an officer at the detention center that the critical protection of social distancing does not apply in detained settings, implying that detainees and employees may be misinformed or lack appropriate information. To the contrary and as stated previously, social distancing is the most effective measure we have found to prevent the rapid spread of COVID-19; the importance of this measure does not diminish in the context of detention.

21. According to Laura Rivera's declaration, callers to SPLC's helpline also reported that individuals who display well-known symptoms of COVID-19 such as a cough are returned to the congregate housing units on the same day that they are taken to receive medical attention. Understandably, almost all facilities, including detention facilities, are not designed to appropriately protect individuals during a pandemic like this. Detainees in this situation have few options other than return to normal housing, or be placed in solitary confinement. Both options are highly unsafe to the individual or community.

22. Finally, I have reviewed ICE guidance on COVID-19 detention policies dated March 27, 2020. The measures described there are impracticable and also fail to effectively mitigate the risk of transmission and spread. As explained above, the only truly effective measure is social distancing and diligent hand hygiene. The March 27 guidance contemplates an amount of PPE for detention center staff that simply does not exist. Even if there was a sufficient supply of PPE, the guidance falls short of the only true way of determining whether an individual has contracted the virus and can therefore spread it: blanket testing. Such measures, though, are impossible as we do not have the number of tests needed to test every individual in detention and every staff member, officer, and visitor upon entry. The only appropriate measure is to release individuals so that they can practice social distancing.

23. Based on the above information, Stewart, Irwin, and Folkston are failing to implement adequate COVID-19 infection control measures. It is my opinion based on review of ICE guidance, the above-referenced declarations, and my treatment of COVID-19 patients, ICE is unable to implement adequate measures to prevent the transmission of COVID-19 to these detention centers and its spread among the populations detained there.

Pursuant to 28 U.S.C. 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed this 2nd day in April, 2020 in Atlanta, Georgia.

Dr. Amy Zeidan, MD

EXHIBIT A

CURRICULUM VITAE
AMY J ZEIDAN

Revised: 2/21/20

1. Name: Amy J Zeidan

2. Office Address: Department of Emergency Medicine
49 Jesse Hill Jr. Drive SE
Atlanta, GA 30303

Tel: 267-324-7326
Fax: 404-688-6531

3. Email: ajzeida@emory.edu

4. Citizenship: United States of America

5. Current Titles and Affiliations:

a. **Academic Appointments:**

i. **Primary Appointment:**

Assistant Professor, Department of Emergency Medicine, Emory University School of Medicine, Atlanta, GA, 07/2019-Present

ii. **Joint and Secondary Appointments:**

b. **Clinical Appointments:**

Attending Physician, Grady Memorial Hospital, Atlanta, GA, 07/2019-Present

c. Administrative Appointments

6. Previous Academic and Professional Appointments:

Clinical Instructor, Department of Emergency Medicine, University of Kentucky, 07/2018-07/2019

7. Previous Administrative and/or Clinical Appointments:

8. Licensures/Boards:

Pennsylvania State Board of Medicine, 2014-2018
Federal Drug Enforcement Agency, 2017-Present

Kentucky Board of Medical Licensure, 2018-2018
Georgia Composite Medical Board (Physician), 2019

9. Specialty Boards:

American Board of Emergency Medicine, 2019-2020

10. Education:

08/04-05/08, BA Biology, Gustavus Adolphus College, St. Peter, MN
06/08-07/10, Fellow, National Institutes of Health Postbaccalaureate Intramural Research Training Award (IRTA), Bethesda, MD
08/10-06/14, MD, George Washington University, Washington, D.C.

11. Postgraduate Training:

07/14-06/18, Emergency Medicine Residency, University of Pennsylvania, Philadelphia, PA, Program Director Dr. Francis DeRoos/Dr. Lauren Conlon
*Chief Resident 04/17-05/18

07/18-06/19, Emergency Ultrasound Fellowship, University of Kentucky, Lexington, KY, Fellowship Director Dr. Jacob Avila

12. Continuing Professional Development Activities:

1. Physicians for Human Rights Asylum Training, NYC, NY, 05/16 & 10/17

2. ARMED Research Course, Society for Academic Emergency Medicine, 08/18-05/19

3. Clinical Teaching Course, University of Kentucky, Lexington, KY, 08/18-05/19

4. IDN Thought Leader Fellowship, The Op Ed Project, Atlanta, GA, 09/19

13. Military or Government Service

14. Committee Memberships:

a. National and International:

1. Member at Large, Hospital of the University of Pennsylvania Housestaff Governing Council, 06/16-06/17

2. Executive Director of Education, Philadelphia Human Rights Clinic, 12/16-06/18

3. Treasurer, Awards Co-Chair, CORD Liaison, Resident Representative, and Member, Academy for Advancement of Academy for Women in Academic Emergency Medicine, SAEM, 09/18-Present

4. Co-Chair Finance, Director FemInEM Forward, FemInEM, 07/17-Present

5. Committee Member Consensus Conference & Population Health Advocacy Group, Social Emergency Medicine Section, SAEM, 6/18-Present

6. Member, Research Committee, North American Society of Refugee Healthcare Providers, 09/19-Present

7. Executive Board Member, Young Physicians Initiative (YPI), Doctor for a Day Leader (2020 Conference), 09/19-Present

8. Member, Georgia State University Prevention Research Center (GSU PRC) Community Advisory Board, 10/19-Present

b. Institutional

Trauma Informed Care Committee, 10/19-Present

15. Peer Review Activities:

a. Grants:

a. **National and International**

AWAEM Internal Research Funding Grant Reviewer, 2/2020

b. **Regional**
c. Institutional

b. Manuscript Reviewer:

Canadian Journal of Emergency Medicine (ad hoc reviewer), 2018
Cureus (ad hoc reviewer), 2018
World Journal of Emergency Medicine, 2019
American Journal of Emergency Medicine (ad hoc reviewer), 2019
Harvard Human Rights (ad hoc reviewer), 2019
JAMA Open (ad hoc reviewer, 2019
Journal of Forensic and Legal medicine, 2020

c. Conference Abstracts:

SAEM 2020 Abstract Reviewer, January 2020

16. Consultantships/Advisory Boards:

1. Author, Quiz for Cause Champion, Rosh Review. Oversee and develop Quiz for Cause Question Banks including Human Trafficking, Sexual Assault, and Firearm Injury Prevention. Co-Developer of Point of Care Ultrasound Question Bank.

2. Co-Founder, Society of Asylum Medicine. Inaugural Society for an emerging field of Asylum Medicine. Goal to establish data driven practice guidelines.

17. Editorships and Editorial boards:

18. Honors and Awards

1. Leonard Tow Humanism in Medicine Award, George Washington University School of Medicine & Health Sciences, 05/14

2. Society for Academic Emergency Medicine Award, George Washington University School of Medicine & Health Sciences, 05/14

3. Chief Residents of the Year, Emergency Medicine Resident Association (EMRA), 04/18

4. Academy of Emergency Ultrasound (AEUS) Resident Educator of the Year, Society of Academic Emergency Medicine (SAEM), 05/18

5. Resident Travel Grant Award, Academy of Women in Academic Emergency Medicine (AWAEM), 05/18

6. Momentum Award, Academy of Women in Academic Emergency Medicine (AWAEM), 05/19

7. Emerging Scholars Award, International Conference on Diversity in Organizations, Communities and Nations, 11/2019

8. Butterfly/Gates Foundation Global Health Program, 10/2020, Support for purchase and ongoing use of Butterfly ultrasound probes in resource limited settings.

19. Society Memberships:

1. Emergency Medicine Residents' Association, 2014-2019

2. ACEP, 2014-Present

3. SAEM, 2014- Present

4. Society for Refugee Health Care Providers, 2016-Present

5. International Society for Traumatic Stress Studies, 2016-2017

20. Organization of Conferences:

FemInEM Conference Planning Committee FIX17, FIX18, FIX19

Doctors Who Create (DWC) Conference Planning Committee, 12/18-4/19

21. Clinical Service Contributions:

Co-Director, Human Rights Clinic at Emory, 9/1/2019-Present

22. Community Service

a. General

Volunteer Physician Evaluator & Executive Director of Education, Philadelphia Human Rights Clinic, >200 service hours, >40 asylum evaluations/affidavits, 6/2014-Present

Volunteer Physician & Clinic-Co Chief, Penn Center for Primary Care Refugee Clinic, 2/month with >200 service hours 12/15-6/18

Volunteer Physician, Puentes de Salud, 1/week with >300 service hours, 12/15-6/18

Volunteer Physician, Salvation Army Clinic & SHARES Clinic, Monthly Clinic, 9/18-5/19

Volunteer Physician, Grace Village Clinic, 7/19-Present

Volunteer Physician, Clarkston Community Clinic, 7/19-Present

b. Media Outreach

23. Formal Teaching

a. Medical Students

Ultrasound Instructor, Ultrasound Guided IV's, Penn Medical School Introduction to Clinical Medicine Bootcamp for MSIII's 2017.

Ultrasound Instructor, Penn Internal Medicine Residency Orientation 2017, Central Line Placement.

Ultrasound Instructor, Introduction to Clinical Ultrasound, >12 sessions (>40 hours) of instructions for pre-clinical students.

Ultrasound Instructor, Hands-on Workshop. Philly Ultrafest at Jefferson University, 2017.

Ultrasound Instructor, MD814 Ultrasound Lab. University of Kentucky, 8 sessions, >40 hours

b. Graduate Programs

i. Residency Programs – Emergency Medicine

Health Care for Refugee, Immigrant and Asylum Populations. University of Pennsylvania Emergency Medicine Conference Grand Rounds, May 2018.

InnovatED Workshop. University of Pennsylvania Emergency Medicine Conference, May 2018.

Mortality & Morbidity. University of Pennsylvania Emergency Medicine Conference, October 2017, February 2018, May 2018.

Ultrasound instructor, Intern Boot Camp, University of Kentucky Emergency Medicine Residency. August & July 2018.

Pelvic Pain. University of Kentucky Emergency Medicine Conference, November 2018.

Ectopic Pregnancy. University of Kentucky Emergency Medicine Conference, November 2018.

ii. Other Residency

Ultrasound Instructor, Internal Medicine Intern Orientation, PIV/CVC insertion, June 2018

ii. Undergraduate Programs

2019 Global Health Case Competition Mentor, University of Kentucky, 2/19

c. Other -Faculty

Ultrasound Instructor, Hands-on Workshop. Resuscitative TEE Conference at University of Pennsylvania, 2018.

Ultrasound Instructor, Hands-on Workshop. Castlefest Ultrasound Education Conference 2018, Lexington KY.

Ultrasound Instructor, TEE Workshop at SAEM, Indianapolis, IN, May 2018

Ultrasound Instructor, TEE workshop, University of Pennsylvania, August 2018

Ultrasound Instructor, TEE workshop, Miami, FL, February 2018.

Ultrasound Faculty, Point-of-Care Ultrasound in Resource-Limited Environments (PURE) East Africa Emergency Medicine Resident Ultrasound Mentorship Program & Bi-weekly Video Review, Monica Akwaso, PGY1 at Mbarara University of Science and Technology, Uganda. June 2018-Present.

24. Supervisory Teaching:

b. Residents

Asylum Mentor to Dr. Sunny Lee, MD, 2017-2018. Oversaw asylum evaluations and affidavits.

Faculty Mentor to Dr. Kristen Bascombe, 2019-Present

c. Graduate Students

d. Medical Students

Advisor to Dr. Vidya Viswanathan, 2016-2018
Pediatric Resident at CHOP, Pennsylvania, PA

Research Advisor to Hannah Bogen, Penn Center for Primary Care Refugee Clinic Research Initiative, 2017-Present. Presented work at North American Refugee Healthcare Conference, publication under review.

Discovery Advisor to Maggie Smith, Emory School of Medicine

e. Undergraduate Students

Pre-Medical Advisor to Maria Ordinola, Puentes de Salud, 2015-2018.

25. Lectureships, Seminar Invitations, and Visiting Professorships:

a. National and International
b. Regional

Barriers to Healthcare for Refugee and Immigrant Patients, Georgia State University Nursing School Workshop, February 3, 2020

c. Institutional

Healthcare Barriers for Refugees, Refugee Health Training Day, Emory School of Medicine, 9/19/2019

Keynote: Trauma Informed Care, Emory Law School Trauma-Informed Legal Services Workshop, 1/25/2020

Trauma Informed Care Approach with Asylum Seekers, Workshop Facilitator, Emory Law School Trauma-Informed Legal Services Workshop, 1/25/2020

Health & Human Rights of Asylum Seekers in the US, Health & Human Rights Public Health Course, Emory School of Public Health, 2/20/2020

26. Invitations to National/International, Regional, and Institutional Conferences:

a. National and International

Women's health screening and mapped community resources for recently resettled refugees in Philadelphia. Oral Presentation at the North American Refugee Health Conference, June 2018

InnovatED Feedback Model. Didactic Presentation at CORD Academic Assembly, April 2019.

The Unrecognized Trauma Assessment: Why Emergency Physicians Should Learn to Perform Medical Asylum Evaluations. Ignite Presentation at the Society for Academic Medicine Annual Meeting, May 2019.

#Shemergency: Recruitment and Retention Strategies for Female Residents. Didactic Presentation at the Society for Academic Medicine Annual Meeting, May 2019.

Resident Led Initiatives, Diversity, Equity and Inclusion, Didactic Presentation at the Society for Academic Medicine Annual Meeting, May 2020

b. Regional

c. Institutional

Refugees & The ER. Plenary Oral Presentation at the University of Pennsylvania Emergency Medicine Annual Research Day, University of Pennsylvania, April 2017.

Feminist Fight Club. University of Kentucky Women's Forum, October 2018.

27. Abstract Presentations at National/International, Regional, and Institutional Conferences:

a. National and International:

Jennifer S. Love, MD, Mira Mamtani MD, Lauren W. Conlon MD, Francis DeRoos MD, **Amy J. Zeidan MD**, Kevin R. Scott MD. Using a Case-Based Blog to Supplement Emergency Medicine Education: One Residency's Experience. Poster at 2017 CORD Academic Assembly Poster Session, April 2017.

Khatri U, **Zeidan AJ**, Frances Schofer, Lauren Conlon, Kevin Scott, Mira Mamtani, Jaya Aysola. Implicit Bias Training in Emergency Medicine Residency: "There's a right answer." Lightning Oral Presentation at the SAEM Annual Conference, May 2018.

Pwinica-Worms, W, Li J, Zahalka R, **Zeidan AJ**, Chan W. SonOlympics: An Innovative Ultrasound Review for Preclinical Medical Students. Oral presentation at AIUM, May 2018.

Khatri, UG, Bilger, A, **Zeidan AJ**, Samuels Kalow M, Meisel Z, Delgado KM, South EG. Facilitators and Barriers to Healthcare Access after Incarceration: Implications for Acute Care. e-Poster presentation at the Society of Academic Emergency Medicine Annual Meeting, May, 2019.

b. Regional

Zeidan AJ, Khatri U, Munyikwa M, Jones E, Barden-Mejia A, Samuels-Kalow M. Refugees & The ER. Lightning Oral Presentation at the SAEM Mid-Atlantic Regional Conference, March 2017.

Khatri U, **Zeidan AJ**, Frances Schofer, Lauren Conlon, Kevin Scott, Mira Mamtani, Jaya Aysola. Implicit Bias Training in Emergency Medicine Residency: "There's a right answer." Lightning Oral Presentation at the SAEM Mid-Atlantic Regional Conference, March 2018.

c. Institutional

Khatri U, **Zeidan AJ**, LaRiviere M, Sanchez S, Lynn J, Weaver L, Shofer F, Todd B, Aysola J. "Implicit Bias Training in Graduate Education: "Dissidence Between Bias and Reality." Poster at The University of Pennsylvania Annual Health Equity Week, April 2018.

Khatri U, **Zeidan AJ**, Frances Schofer, Lauren Conlon, Kevin Scott, Mira Mamtani, Jaya Aysola Implicit Bias Training in Emergency Medicine Residency: "There's a right answer." Poster at The University of Pennsylvania Annual Health Equity Week, April 2018.

Deshpande N, **Zeidan AJ**, Barden A, Truchill R, Salva C. OB/GYN referral service to enhance internal access to care for refugee women. Poster Presentation at Penn Health Equity Week, April, 2019.
**Best Housestaff Abstract*

28. Research Focus

My research currently focuses on healthcare access and barriers for refugees, immigrants, and asylums seekers. I am specifically interested in ED utilization, transitions of care, and collaborations with community based organizations. I am also interested in development of guidelines for asylum evaluation best practices and standards.

29. Grant Support

a. Previous
b. Current

Active

AG2020-0000000042 (Zeidan, PI) 6/1/2020-6/1/2021 0.12 Calendar
SAEMF/Academy for Women in Academic Emergency Medicine (AWAEM) $5000
Barriers to Reporting Incidents of Gender and Sexual Harassment in Training and Practice (BRIGHT)
To understand perceived barriers to reporting sexual and/or gender harassment among emergency department providers. We will perform semi-structured interviews with emergency medicine physicians to understand a range of barriers to reporting sexual and gender harassment.
Overlap: There is no overlap with proposed work.

Pending

Emory University Pilot Grant Program (Yaffee, PI) 5/31/2020-5/31/2021 0.12 Calendar
Bidirectional Global Health Disparities Research $25,000
The EMER/I (Electronic Medical Records for Ethiopian Refugees and Immigrants) Project: Implementation of Emergency Department Triage Screen to Identify and Assess Healthcare Utilization, Outcomes, and Needs of Ethiopian and Other Immigrants in Atlanta, Georgia.
The proposed research will focus on development and evaluation of a method for identifying refuses and immigrants within the Emory/Grady healthcare systems electronic health records in an ethically appropriate manner.
Overlap: There is no overlap with proposed work.

ENAF/EMF/AFFIRM Research Grant (Zeidan, PI) 06/01/2020-05/31/2020 0.4 Calendar
Faculty Research Award in Firearm Injury Research $75,000
Application of a Novel SBIRT Model to Reduce Symptoms of PTSD after Gunshot Injury
This project seeks to assess the feasibility of implementing the SBIRT model to screen and/or treat for PTSD in patient with non self-inflicted gunshot wounds, and to assess the effects of SBIRT on PTSD symptoms among patients admitted after non self-inflicted gunshot wounds.

EMCF Research Grant (Smith, PI) 06/01/2020-05/31/2020 0.4 Calendar
Faculty Research Award $25,000
Application of a Novel SBIRT Model to Reduce Symptoms of PTSD after Gunshot Injury
This project seeks to assess the feasibility of implementing the SBIRT model to screen and/or treat for PTSD in patient with non self-inflicted gunshot wounds, and to assess the effects of SBIRT on PTSD symptoms among patients admitted after non self-inflicted gunshot wounds.

Field Scholars Program (Zeidan, PI)
Emory Global Health Institute
Assessing the Legal Need for Medical Evaluations of Asylum Seekers in Metropolitan Atlanta
The proposed projects seeks to understand the current asylum case demand including case outcomes, explore the challenges faced by legal teams representing asylum clients, and explore medical-legal partnerships with local immigration attorneys to understand how attorneys and clinicians can collaborate to support asylum seekers.

Internal Research Funding (Love, PI)
AWAEM
Women Professional Development Outcome Metrics
The proposed study will determine measurable outcome metrics for women PDGs by establishing expert consensus from a panel of emergency medicine department chairs and gender equity leaders.

Internal Research Funding (Salhi, PI)
AWAEM
Professional Development and Gender Identity Among Women Emergency Medicine Residents
The proposed study will seek to elucidate how gender influences the professional identity of women emergency medicine residents as physicians, and how they negotiate and manage their multiple identities as women, physicians, and residents. Additionally, the study will explore strategies women emergency medicine residents utilize to manage conflicting roles and expectations.

30. Bibliography

a. Published and Accepted Research Articles in Refereed Journals:

Zeidan AJ, Khatri U, Munyikwa M, Jones E, Barden-Mejia A, Samuels-Kalow M. Barriers to accessing acute care for newly arrived refugees. West J Emerg Med. 2019;20(6):842-850.

Zeidan AJ, Woodward M, Tiballi A, Di Bartolo MI. Targeting Implicit Bias in Medicine: Lessons from Art and Archaeology. West J Emerg Med. 2019;21(1)1-3.

Khatri UG, Love J, **Zeidan AJ**, Hsu C, Mills A. #Shemergency Presents: Recruitment & Retention of Female Residents. Academic Medicine. 2020;95(2):216-220.

Ferdowsian H, McKenzie K, **Zeidan AJ**. Asylum Medicine: Standard and Best Practices. *Health and Human Rights Journal*. 2019; 21(1).

Teran F, Dean AJ, Chan W, Panebianco N, Centeno C, **Zeidan AJ**, Abella B. Evaluation of Out-of-Hospital Cardiac Arrest using Transesophageal Echocardiography in the Emergency Department. *Resuscitation.* 2019; 137:140-147.

Zeidan AJ, Khatri UG, Aysola J, Shofer FS, Mamtani M, Scott KR, Conlon LW, Lopez BL. Implicit bias education and emergency medicine training: step one? awareness. *Academic Emergency Medicine Education and Training.* 2018; 3(1):81-85.

Zang RZ, **Zeidan AJ**, Scott K. Man with stridor. *Annals of Emergency Medicine*. 2017;69(2):265-266.

Chen YY, Khoury, P, Ware JM, Holland-Thomas NC, Stoddard JL, Gurprasad S, **Waldner AJ**, Klion AD. Marked and persistent eosinophilia in the absence of clinical manifestations. *The Journal of Allergy & Clinical Immunology.* 2014;133(4):1195-1202.

Moir S, Buckner CM, Ho J, Wang W, Chen J, **Waldner AJ**, Posada JG, Kardava L, O'Shea MA, Kottilil S, Chun TW, Proschan MA, Fauci AS. B Cells in early and chronic HIV infection: evidence for preservation of immune function associated with early initiation of antiretroviral therapy. Blood. 2010;116(25):5571-9.

b. Manuscripts Submitted:

Agrawal P, Madsen T, Lall M, Zeidan AJ. Gender Disparities in Academic Emergency Medicine: Strategies for the Recruitment, Retention and Promotion of Women. *AEM Education in Training.* Accepted, copyediting in progress.

Payton C, Zeidan AJ, Bogen H, Altshuler M. Women's health screening and mapped community resources for refugees resettled in Philadelphia, Pennsylvania. *Journal of Health Care for the Poor and Underserved.* Accepted, copyediting in progress.

Khatri UG, Bilger A, Zeidan AJ, Meisel Z, Delgado MK, Samuels-Kalow, M, South EG. Life after incarceration: A firsthand account of barriers and facilitators to accessing healthcare during re-entry. American Journal of Preventive Medicine. Under Review.

c. Review Articles:

d. Book Chapters:

Asylum Medicine Textbook Chapter, in process

e. Books edited and written
f. Book review:
g. Manuals, Videos, Computer Programs, and Other Teaching Aids:

Teran F, **Zeidan AJ.** TEE Instructional Video: https://www.resuscitativetee.com/lectures/

h. Published Abstracts:

i. Other Publications:

a. Digital Scholarship

Pellet, A., Zeidan, A., Avila, J. Acute Versus Chronic Right Heart Failure, EMResident, November 2019. Accessed at

Zeidan, AJ. Standing AFFIRM: Firearm Access Raises Teen's Risk of Injury, Death. Emergency Medicine News. November 2019;41(11):12. Accessed at https://journals.lww.com/em-news/Fulltext/2019/11000/Standing_AFFIRM__Firearm_Access_Raises_Teen_s_Risk.10.aspx

Khatri U, **Zeidan A**, LaRiviere M, Sanchez S, et al. An evaluation of implicit bias training in graduate medical education. MedEdPublish. 2019; 8(2). https://doi.org/10.15694/mep.2019.000109.1
*post publication peer reviewed

Zeidan, AJ. Teenagers and Firearms. AFFIRM Research Article. February 2019. Accessed at https://affirmresearch.org/learn/teenagers-and-firearms/

Flower A, **Zeidan AJ.** Risk of Clot When Imaging Says Not. February 2019. Accessed at http://www.emdocs.net/risk-of-clot-when-imaging-says-not/

Mohammadie S, **Zeidan AJ.** Hepatic Encephalopathy: Common Precipitants, Sneaky Precipitants and
Clinical Pearls. March 2019. Accessed at http://www.emdocs.net/hepatic-encephalopathy-common-precipitants-sneaky-precipitants-and-clinical-pearls/

Teran F, **Zeidan AJ**. Implementation of a Resuscitative TEE Program in the ED-ICU Interface. ACEP Critical Care Medicine Newsletter. April 2018. Accessed at https://www.acep.org/how-we-serve/sections/critical-care-medicine/news/march-2018/implementation-of-a-resuscitative-tee-program-in-the-ed-icu-interface/

Zeidan, AJ. #Shemergency - The Unstoppable Movement. Published in the AWAEM Awareness Newsletter and on the FemInEM Blog. April 2017. Accessed at https://feminem.org/2017/08/01/shemergency-unstoppable-movement/.

Waldner, Amy. The truth about refugees and healthcare: 5 myths busted. Posted on The Philadelphia Inquirer. January 2017. Accessed at http://www.philly.com/philly/blogs/healthcare/The-truth-about-refugees-and-health-care-5-myths-busted.html.

Waldner A, Raven M, Lazar D, Pines J. Redefining frequent emergency department users. Urgent Matters Issue Brief. April 2014. Accessed at: https://smhs.gwu.edu/urgentmatters/issuebriefs

Waldner, Amy. Viewpoint: Physician Advocates Student-Led Support Groups for Grief and Loss. AAMC Reporter. Accessed at: https://www.aamc.org/newsroom/reporter/julyaugust2014/401384/viewpointphysicianadvocatesstudent-ledsupportgroupsforgriefandl.html

b. Podcasts/Online Media

Lewiss RE, **Zeidan AJ,** Gutman A, Firew, T. An Episode Dedicated to the Letter "A" = Advocacy https://feminem.org/podcast/an-episode-dedicated-to-the-letter-a-advocacy/

Lewiss RE, **Zeidan AJ,** Perrone, JM. The Opioid Crisis and Advocacy https://feminem.org/podcast/dr-jeanmarie-perrone-chats-the-opioid-crisis-and-advocacy/

Lewiss RE, **Zeidan AJ**, Viswanathan. The First Doctors Who Create Conference https://feminem.org/podcast/the-1st-doctorswhocreate-conference-with-vidya-viswanathan/

Kass D, Mody S, Lema P, **Zeidan AJ**, Lewiss RE. #FIX18 is a Wrap! Discussing the Conference with Some of Original Otters https://feminem.org/podcast/fix18-is-a-wrap-discussing-the-conference-with-some-of-original-otters/

Zeidan AJ. Twitter Session Moderator, FemInEM FIX18 Conference, October 2018 & September 2019.

Online Panel Expert, NEJM Resident Expert, Challenges for Women in Medicine, September 2018.

Kass D, **Zeidan AJ,** Naples R, Lewiss RE. Entering the Shemergency Room. https://feminem.org/podcast/entering-the-shemergency-room/ (Podcast panel, March 2018)

31. **Contributions Not Otherwise Noted:**

EXHIBIT 4

DECLARATION OF JOHN SANDWEG

I, John Sandweg, hereby declare under the penalty of perjury pursuant to 28 U.S.C. § 1746:

1. I make this declaration based on my personal knowledge except where I have indicated otherwise. If called as a witness, I could and would testify competently and truthfully to these matters.

2. I am currently a partner at Nixon Peabody LLP, where I lead the Cross-Border Risks team, focusing on complex national security, immigration, and Department of Homeland Security (DHS) compliance matters.

3. Before returning to private practice, I held many leadership positions with U.S. Immigration and Customs Enforcement (ICE) and DHS from 2009-2014. From 2013 to 2014, I served as Acting Director of U.S. Immigration and Customs Enforcement (ICE), where I led 20,000 employees in every state and 47 countries in fulfilling the agency's mission to enhance public safety and border security through the enforcement of federal border control, customs, trade, and immigration laws. As Acting Director of ICE, I served as the chief legal officer for DHS, advising the Secretary and the Department's senior leadership on all significant legal, policy, and operational issues. Prior to my position as the Acting Director of ICE, I held the position of Acting General Counsel of DHS from 2012-2013,

advising the DHS Secretary and the Department's senior leadership on all significant legal, policy, and operational issues. Prior to becoming Acting General Counsel, I server as a Senior Counselor in the Office of the DHS Secretary, where I served as a principal architect of the DHS's immigration, border security, and law enforcement policy. I am an attorney licensed in the District of Columbia and Arizona.

4. The coronavirus pandemic has brought our nation to a standstill. It has strained our public health agencies and promises to overtax the American public health care system in the very near future.

5. ICE currently detains over 35,000 detainees across the country. ICE detention centers are extremely susceptible to outbreaks of infectious diseases. Based on my experience as Acting Director of ICE, I know that preventing the coronavirus from being introduced into these facilities is impossible. The design of these facilities requires inmates to remain in close contact with one another—the opposite of the social distancing now recommended for stopping the spread of the lethal coronavirus.

6. There is no question that ICE detention centers are vulnerable to outbreaks of contagious diseases. These detention centers present the very situation that public health experts around the world are warning against. There are a large

number of people contained in a very small environment. Any outbreak (a single case) will spread like wildfire. The design of ICE detention facilities requires inmates to remain in close contact with one another. There is absolutely no way to prevent the virus from being introduced into these facilities.

7. When an outbreak of COVID-19 occurs in an ICE facility, the detainees will not be the only ones at risk. An outbreak will expose the hundreds of ICE agents and officers, medical personnel, contract workers, and others who work in these facilities to the virus. Once exposed, many of them will unknowingly take the virus home to their families and communities.

8. Moreover, once the virus tears through a detention center, crucial and limited medical resources will need to be diverted to treat those infected. ICE can, and must, reduce the risk a detention center outbreak poses to so many people, and the most effective way to do so is to drastically reduce the number of people it is currently holding.

9. It is my considered opinion, based on my years of experience working in leadership positions at DHS and ICE, that ICE has the operational capacity to quickly and drastically reduce the population of civil immigration detainees while still protecting public health as much as possible. Doing so will avoid an imminent grave public health threat. ICE should continue to detain those who threaten

public safety or national security, but very drastically reducing the detainee population is clearly in the public interest.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 2nd day of April, 2020 in Phoenix, Arizona.

_____

John Sandweg

John R. Sandweg
1401 H Street NW, Suite 875, Washington, DC 20005
202-754-2303

PROFESSIONAL EXPERIENCE

Nixon Peabody LLP, Washington, DC **August 2019 – Present**
Partner

- Leads the firm's Cross-Border Risks practice group, focusing on complex international challenges involving issues related to cross-border business, immigration, and national security.
- Defends individuals and corporations in federal and state criminal and regulatory matters.
- Works with businesses to discreetly conduct internal investigations into allegations or suspicions of misconduct, of potential legal or regulatory risk, and in support of potential or on-going litigation.
- Heads up team that reviews current immigration compliance programs to develop proactive solutions to mitigate the risk of civil and criminal penalties when responding to government inquiries and to implement effective policies to ensure future compliance.
- Advises clients on a variety of topics including general immigration law, general enforcement practices, USCIS policies, FOIA/government record keeping, as well as E-Verify/SAVE verification issues.
- Continue to be called upon as an expert by national media outlets on issues related to immigration enforcement and border security.

Frontier Solutions, Washington, DC **April 2014 – August 2019**
Founding and Managing Partner

- Managed and founded DC-based law firm specializing in complex national security, immigration, and international criminal matters.
- Assembled team of attorneys, legal professionals and former law enforcement officials to provide legal and consulting services to diverse array of clients.
- Established a law firm from the ground up and grew the firm's client base into hundreds of individuals and businesses.
- Served as a frequent commentator in national print and television outlets on issues related to immigration enforcement and border security.

U.S. Immigration and Customs Enforcement, Washington, DC **August 2013 – March 2014**
Director (Acting)

- Appointed by President Obama to serve as the head of the law enforcement agency responsible for enforcing federal criminal and civil laws related to international trade, intellectual property rights, trans-national crime, cyber security and immigration.
- Managed agency's daily activities, overseeing federal criminal investigations into export control violations, intellectual property theft, money laundering, cyber crimes, and unlawful employment
- Developed and implemented comprehensive strategy to enhance the focus of the nation's interior immigration enforcement efforts on individuals who pose the greatest threats to public safety and national security.
- Created new methodologies for the collection and public reporting of statistics related to ICE's immigration enforcement efforts.
- Supervised operations and activities of over 20,000 employees, including over 14,000 federal law enforcement officers, 900 attorneys, 200 international attache officers and administered the agency's $5.9 billion budget.
- Coordinated daily operations with Department of Homeland Security, Department of Justice, the White House and other international, federal, state and local law enforcement agencies.
- Crafted the agency's public relations and legislative affairs strategies, briefing members of Congress, conducting press conferences and interviewing with print and televised media on agency strategy and operations.

U.S. Department of Homeland Security, Washington, DC **August 2012 – August 2013**

John R. Sandweg
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General Counsel (Acting)

- Appointed by President Obama to serve as the chief legal officer of the Department of Homeland Security, supervising the Department's legal operations and managing all legal personnel throughout the Department.
- Served as a member of the Secretary's senior staff, managing the Department's litigation portfolio and coordinating the Department's response to congressional oversight while continuing to serve as the Department's lead policy maker on immigration and border security.
- Led the Department's efforts to enact comprehensive immigration reform, working closely with the Senate on the drafting of S744, briefing members of Congress and their staff on issues related to immigration and border security, coordinating the Department's efforts and serving as the Department's principal liasion with the White House on all immigration issues.
- Worked closely with the Department of Justice, the National Security Staff and interagency partners formulating the Administration's legal positons on issues related to national security.
- Advised the Secretary on terrorism investigations, emergency events and high-profile issues, including the Boston Marathon bombing, border security and criminal investigations.
- Served as the United States' lead negotiator on an international treaty with the United Arab Emirates regarding the establishment of a pre-clearance facility in Abu Dhabi and the exchange of security related information.

U.S. Department of Homeland Security, Washington, DC **January 2010 – August 2012**
Senior Counselor to the Secretary

- One of three critical members of Secretary Napolitano's senior staff, coordinating and developing policy with particular emphasis on immigration and border security, counter-terrorism, cyber-security, transportation security and privacy.
- Managed the Department's responses to congressional oversight and oversaw the daily operations of the Department on a wide array of issues.
- Represented the Department in the policy development process with the White House, Congress and external stakeholders.
- Developed communications strategy and conducted media interviews and briefed Congressional and non-governmental stakeholders on Departmental policy and operations.

U.S. Department of Homeland Security, Washington, DC **March 2009 – January 2010**
Chief of Staff to the General Counsel

- Provided legal and strategic advice to the Secretary of Homeland Security and her senior staff on an array of issues.
- Coordinated the daily operations of the Office of the General Counsel, overseeing the work of attorneys across the department.
- Worked with the White House Counsel's office and the Department of Justice on Homeland Security issues.

Quarles and Brady LLP, Phoenix, AZ **September 2002 – March 2009**
Associate

- Developed a broad-based criminal defense practice, specializing in representing clients in federal and state litigation and regulatory matters.
- Served as lead counsel in over twenty jury trials, and numerous evidentiary hearings, oral arguments and administrative proceedings.
- Authored appellate briefs to both the Arizona Court of Appeals and the Arizona Supreme Court.
- Represented crime victims and assisted law enforcement in criminal investigations as victim's counsel.

John R. Sandweg
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202-754-2303

EDUCATION

Arizona State University College of Law, Tempe, AZ **May 2002**
Juris Doctor, cum laude, Order of the Coif, Pedrick Scholar

Arizona State University, Tempe, AZ **May 1999**
Bachelor of Arts, Political Science