# Category Day Presentation: Highlight of Selected Publications by Scientist Officers in 2020

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SciPAC Visibility and Science Subcommittees

# Publications by the Numbers - 2020

Number of Scientist Officers who Published ≥1 Article

174

Number of Articles Including a Scientist as an Author

554

Number of Federal Agencies Represented in Scientist's Publications

10

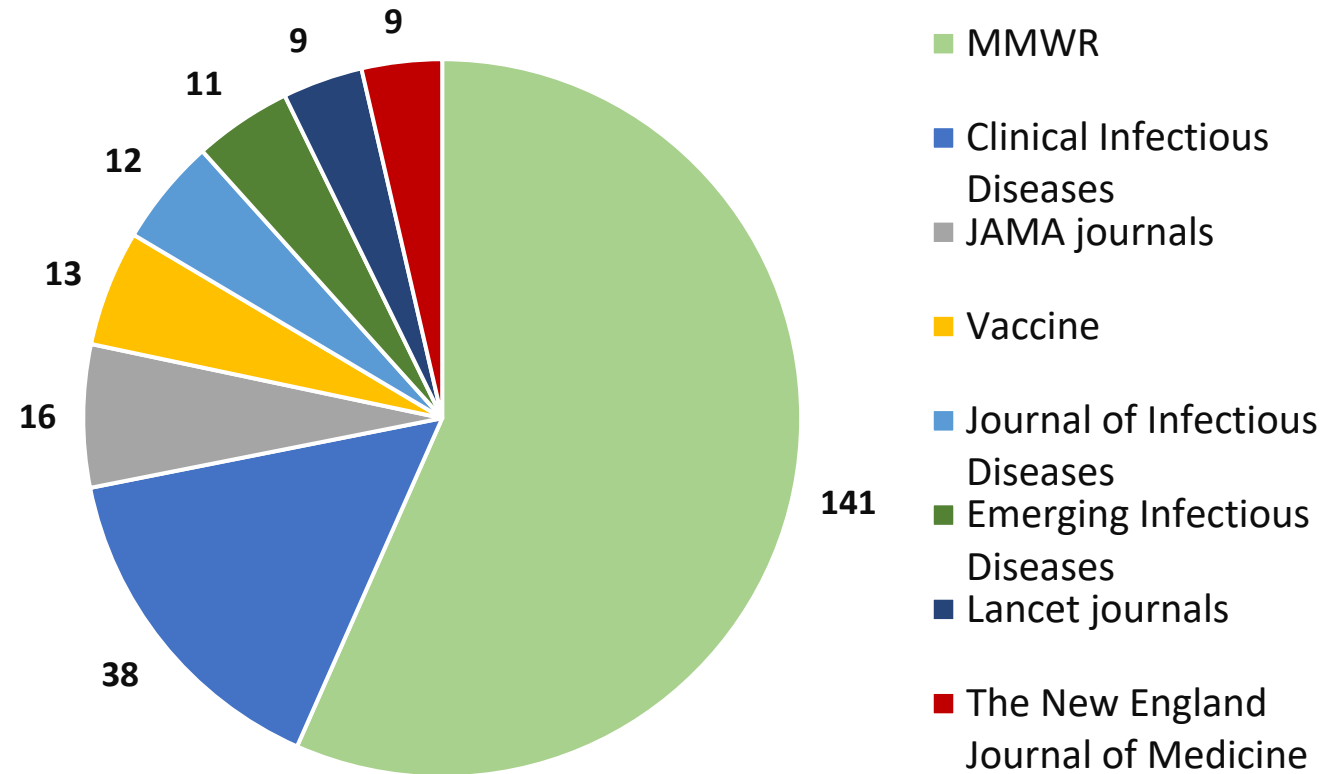Number of Journals in which Scientists' Articles were Published

214

# Publications by the Numbers

## Publications by SG priority area

- COVID-19: 117 (21%)

- Opioids & Addiction: 36 (6%)

- Tobacco & Vaping: 16 (3%)

- Total: 554

**Most Common Journals in which Scientist Officers' Articles Were Published**



Legend:
- MMWR
- Clinical Infectious Diseases
- JAMA journals
- Vaccine
- Journal of Infectious Diseases
- Emerging Infectious Diseases
- Lancet journals
- The New England Journal of Medicine

Pie values: 141, 38, 16, 13, 12, 11, 9, 9

446 publications appeared in 206 additional journals

**Association of Daily Step Count and Step Intensity With Mortality Among U.S. Adults,** *JAMA.*

- Data were from hip-worn accelerometers on 4,840 persons aged ≥40 years in the nationally representative National Health and Nutrition Examination Survey with a mean mortality follow-up of 10 years

- This work showed that compared with taking 4,000 steps/d, taking 8,000 steps/d (HR 0.49 [95%CI 0.44-0.55]) and 12,000 steps/d (HR 0.35 [95%CI 0.28-0.45]) were associated with lower all-cause mortality

- Taking 2,000 steps/d was associated with significantly higher all-cause mortality compared with taking 4,000 steps/d (HR 1.51 [95%CI 1.41-1.62])

- The findings demonstrated that total volume of steps per day was more important than walking speed to predict mortality

- These data will likely be influential for the next update of the Physical Activity Guidelines for Americans to start providing evidence-based step count targets
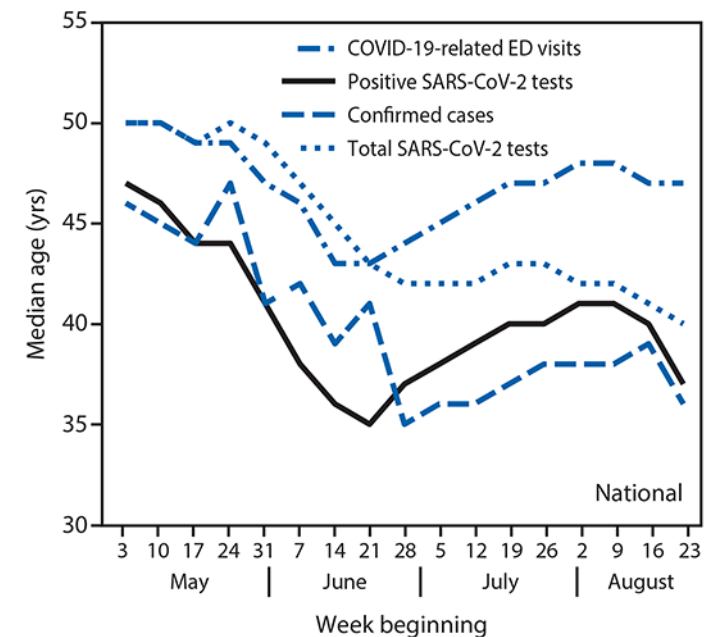
**Changing Age Distribution of the COVID-19 Pandemic – United States, May–August 2020.** *MMWR.*

- This work showed that the COVID-19 pandemic affected a larger proportion of young adults during Jun–Aug 2020 compared with Jan–May 2020 and provided preliminary evidence that younger adults contributed more than older adults to community transmission of COVID-19

- COVID-19 incidence during Jun–Aug 2020 was highest among persons aged 20–29 years, who accounted for >20% of all confirmed cases during that period

- Increases in positive SARS-CoV-2 tests among adults aged 20–39 years preceded increases in cases among adults aged ≥60 years

- Challenges included the need to look across multiple data sources to get a picture of how the pandemic was affecting different age groups

- The study received national media attention from >100 news outlets

# LCDR Michelle Hughes, LCDR Matthew Stuckey, LCDR Matthew Groenewold, LCDR Emily Ussery, LT Kerui Xu

## Update: Characteristics of Health Care Personnel With COVID-19 - United States, February 12–July 16, 2020. *MMWR*.

- This work showed that health care personnel (HCP) with COVID-19 were more likely to die if they were older, male, Asian, Black, or had an underlying medical condition

- HCP with COVID-19 were most likely to work in nursing and residential care facilities and were more likely to be nurses compared to other healthcare professions

- This paper helped advocate for continued surveillance of COVID-19 in health care settings and to ensure HCP have access to appropriate personal protective equipment and infection control trainings

- These findings were used by the Advisory Committee on Immunization Practices for their first recommendation on allocating limited COVID-19 vaccine to HCP and have been cited >315 times
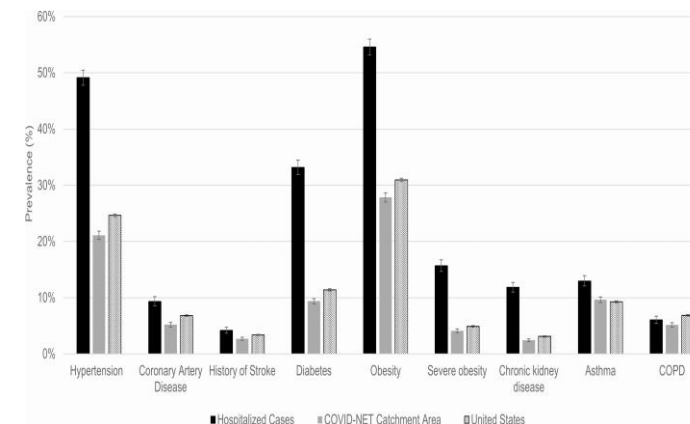
# CDR Jean Ko

**Risk Factors for COVID-19-Associated Hospitalization: COVID-19-Associated Hospitalization Surveillance Network and Behavioral Risk Factor Surveillance System. *Clinical Infectious Diseases.***

- This work showed that adults 45-64 years and 65+ years (vs. 18-44 years), non-Hispanic Black and other race/ethnicity (vs. non-Hispanic white) adults, and those with underlying conditions were at higher risk for COVID-19-associated hospitalization

- CDR Ko and colleagues quantified that risk for COVID-19-associated hospitalizations increased with an individual's number of underlying medical conditions

- Findings were presented on August 26, 2020, to the Advisory Committee on Immunization Practices (ACIP) and contributed to ACIP's recommendations for a phased approach to COVID-19 vaccine distribution

- Included in a presentation to the European Tech Advisory Group of Experts on Immunization and used by the French Ministry of Health to inform their COVID-19 vaccination distribution plans
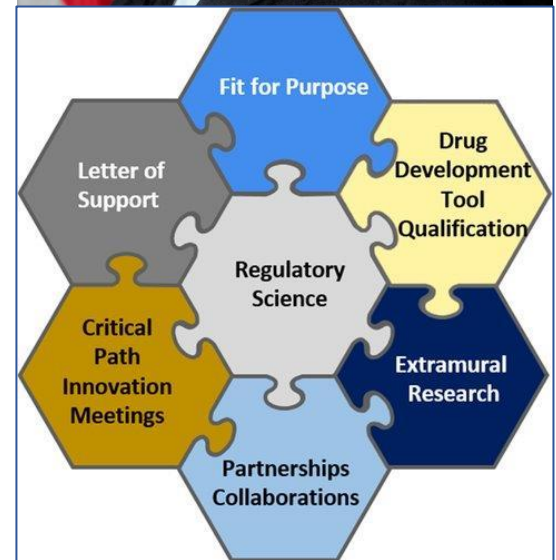
# CDR Chekesha Clingman

**FDA Experience With Regulation of Naloxone Products to Address the Opioid Crisis and Opportunities for Leveraging Scientific Engagement.** *Clinical Pharmacology and Therapeutics*.

- This work was written following the trans-agency scientific meeting "Developing Medical Countermeasures to Rescue Opioid-Induced Respiratory Depression" held in August 2019

- The goal was to discuss mechanisms of opioid-induced toxicities and advance development of novel therapeutic strategies and medical countermeasures to prevent/reverse opioid-induced respiratory depression and mortality

- In the meeting and the publication, the importance of scientific collaboration with external stakeholders was highlighted, including alignment of resources, expertise, and partners, to address the opioid crisis and other public health threats

- Since publication of this work, the FDA Center for Drug Evaluation and Research has entered into partnerships with 8 research organizations to assess opioid misuse and develop abuse deterrence methods

**Primary Indicators to Systematically Monitor COVID-19 Mitigation and Response - Kentucky, May 19-July 15, 2020.** *MMWR.*

- A five-component Key Indicator was developed to monitor changes in the COVID-19 pandemic in Kentucky: case burden, mortality burden, syndromic surveillance, healthcare capacity burden, and public health capacity burden

- This Key Indicator provided situational awareness to public health state and local leadership on the severity of COVID-19 situation in Kentucky and informed the timing for community intervention measures

- Kentucky's governor regularly used the Key Indicator to assess the severity of the pandemic; each of the five components were useful to identify where critical needs were arising for local and state health department leadership as well

- Challenges of implementing the indicator included making adjustments as the pandemic proceeded and more was learned about the dynamics of the indicators
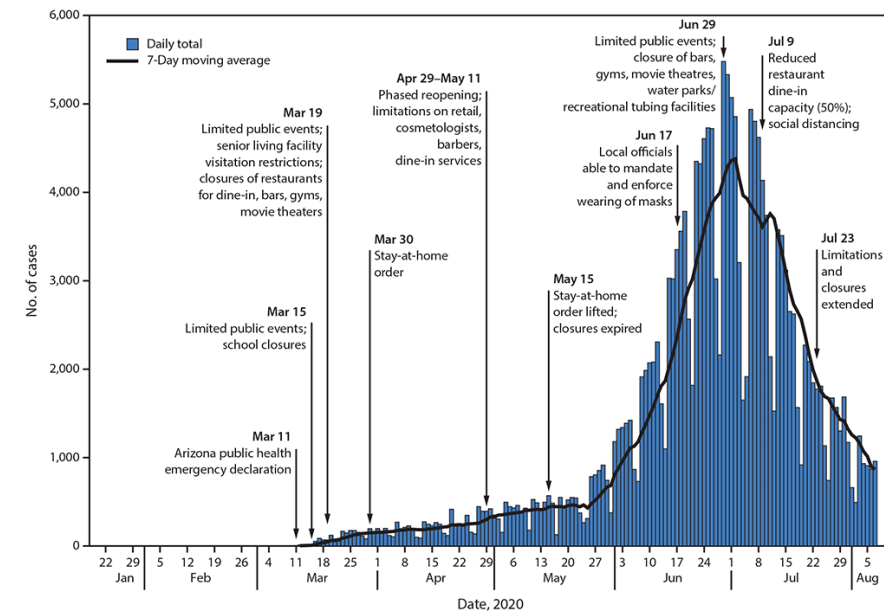
**Trends in COVID-19 Incidence Following Implementation of Mitigation Measures— Arizona, January 22-August 7, 2020. *MMWR*.**

- This work describes how COVID-19 cases in Arizona stabilized and then decreased by 75% after multiple statewide and local prevention measures were implemented, including mask mandates

- COVID-19 mitigation measures determined to be effective by this investigation were extended beyond legislative mandates and further decreased the spread of COVID-19 in Arizona

- These findings were referenced during public discussions among President and President-elect staffs about a coordinated national strategy for imposing mask mandates to prevent the cumulative loss of more than half a million lives, including among those with pre-existing comorbidities

- The officer completed this investigation while deployed to the CDC EOC and was aided through his established trusted relationships with the Arizona Department of Health
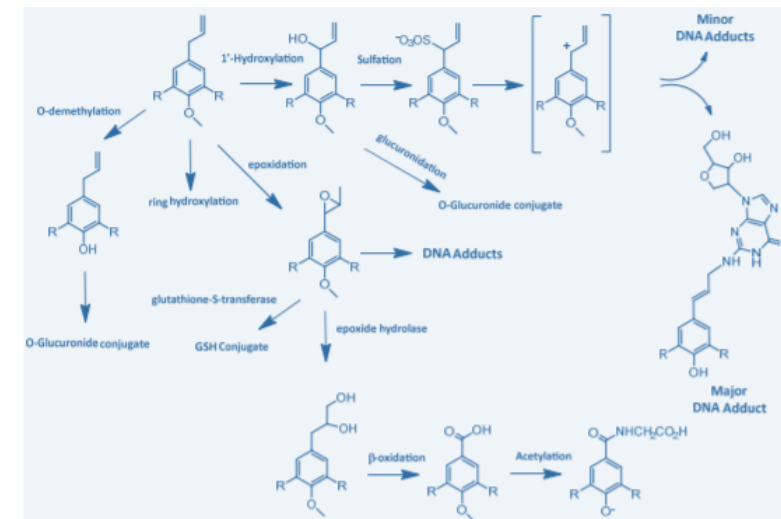
**Investigating DNA Adduct Formation by Flavor Chemicals and Tobacco Byproducts in Electronic Nicotine Delivery Systems (ENDS) Using In Silico Approaches.** *Toxicology and Applied Pharmacology*.

- Two flavor chemical groups found in ENDS can induce DNA adduct formation and carcinogenesis

- This work used in silico (computational) approaches to identify structural analogs, conduct structural similarity analysis, and generate predictions for genotoxicity, mutagenicity, carcinogenicity, and skin sensitization for these two flavor chemical groups

- Results showed that some computational prediction models (e.g., L5178Y and skin sensitization) strongly correlated with DNA adduct formation (80-100%)

- This indicates that in silico toxicology can be used in research and screening to assist in acquiring scientific knowledge for regulatory decision-making

## Clinical and Virologic Characteristics of the First 12 Patients With Coronavirus Disease 2019 (COVID-19) in the United States.
### *Nature Medicine*.

- Provided one of the first descriptions of the clinical and virological characteristics of COVID-19 patients in the US.

- CDC and WHO used these findings to inform interim US and global guidance on when isolation for COVID-19 patients could end, independent of PCR results.

- Results showed that among the first 12 US patients with confirmed COVID-19, viral load was highest in the first week of illness and severity of illness increased in the second week.

- Findings indicated that all 12 cases had SARS-CoV-2 RNA detected in respiratory specimens, typically for 2–3 weeks after illness onset.

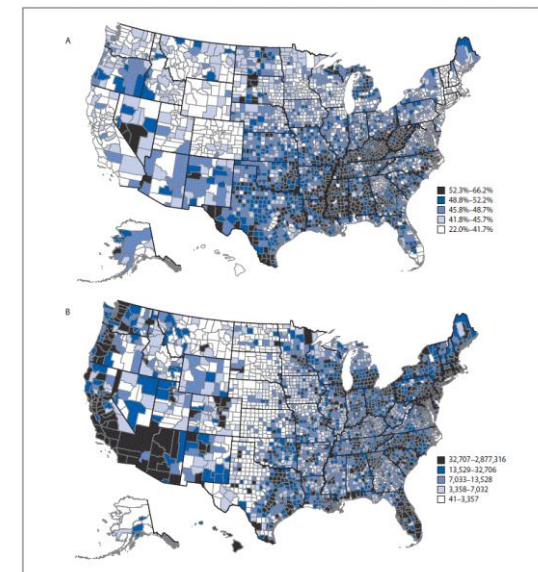- Article was viewed 46,000 times, cited 126 times, and tweeted 223 times

**Estimated County-Level Prevalence of Selected Underlying Medical Conditions Associated With Increased Risk for Severe COVID-19 Illness - United States, 2018.** *MMWR.*

- This work showed that, across 3,142 U.S. counties, median model-based estimates of the prevalence of any of five underlying medical conditions associated with increased risk for severe COVID-19–associated illness among U.S. adults was 47.2%; with obesity having the highest prevalence (35.4%)

- The estimated median prevalence of any condition increased with increasing rurality, ranging from 39.4% in large central metro counties to 48.8% in non-core counties

- First report in U.S. to provide an estimate of underlying medical conditions at county level

- Many states used data from this MMWR for resource allocation early in the pandemic

- Over 43,000 views and reported in >38 news outlets, with multiple requests for data from various states and counties
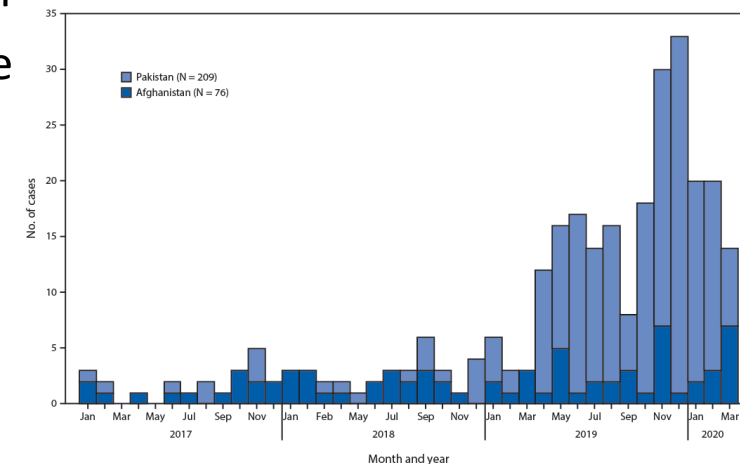
**Progress Toward Polio Eradication — Worldwide, January 2018–March 2020.** *MMWR.*

- This MMWR reported that 2 of 3 wild poliovirus (WPV) serotypes (types two and three) have been eradicated, and transmission of WPV type 1 remains uninterrupted only in Afghanistan and Pakistan

- WPV1 transmission is increasing – in 2019, Afghanistan and Pakistan reported the highest number of WPV1 cases (176) since 2014

- Since the global withdrawal of type 2-containing oral poliovirus vaccine (OPV2) in April 2016, circulating vaccine-derived poliovirus type 2 (cVDPV2) outbreaks have increased in number and geographic extent

- This report is published regularly in CDC's MMWR and WHO's WER and is referenced by Ministries of Health, international organizations, and other stakeholders worldwide on the current status of polio eradication

# LCDR Rachel Slayton

**Clinical Infectious Diseases: Modeling Infectious Diseases in Healthcare Network (MInD-Healthcare) Framework for Describing and Reporting Multidrug-resistant Organism and Healthcare-Associated Infections Agent-based Modeling Methods.** *Clinical Infectious Diseases.*

- LCDR Slayton and colleagues worked to update the Overview, Design concepts, and Details protocol developed by Grimm et al. for describing agent-based models (ABMs) to better align with elements commonly included in healthcare-related ABMs

- This is particularly useful when decision makers want to formally or informally compare models to understand how robust findings are across models or what key components might lead to differences.

- The team hopes to use this framework to improve technical dialogue among scientists using modeling to accelerate the prevention of infections with antimicrobial resistant organisms as a part of the Transatlantic Taskforce on Antimicrobial Resistance
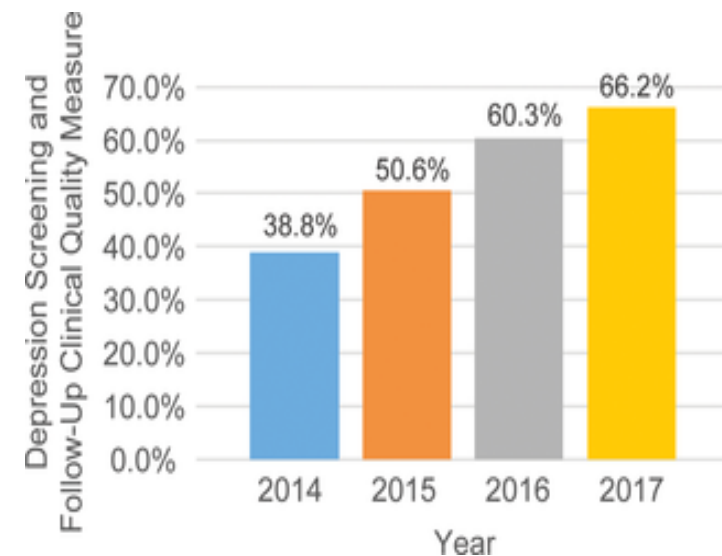
Reference: Grimm V, Berger U, DeAngelis D, Polhill JG, Giske J, Railsback S. The ODD protocol: a review and first update. *Ecol Modell* 2010;2221:2760 -8.

# CDR Nadra Tyus

**Mental health status among women of reproductive age from underserved communities in the United States and the associations between depression and physical health. A cross-sectional study,** *PLoS One.*

- This study found that depression was the most common mental health condition among female, HRSA-funded Health Center (HC) patients; 47.8% of patients with depression reported fair or poor health

- Among female HC patients of reproductive age, the prevalence of serious psychological distress is >300% greater than among the general population

- Female patients with depression exhibited 2-3 times higher odds of co-occurring physical health conditions compared to their counterparts without depression

- The findings provided evidence for HRSA to start working with other federal agencies on funding new training and technical assistance initiatives that specifically developed Communities of Practice for health center providers and staff that focused on innovative prevention and treatment practices for perinatal depression
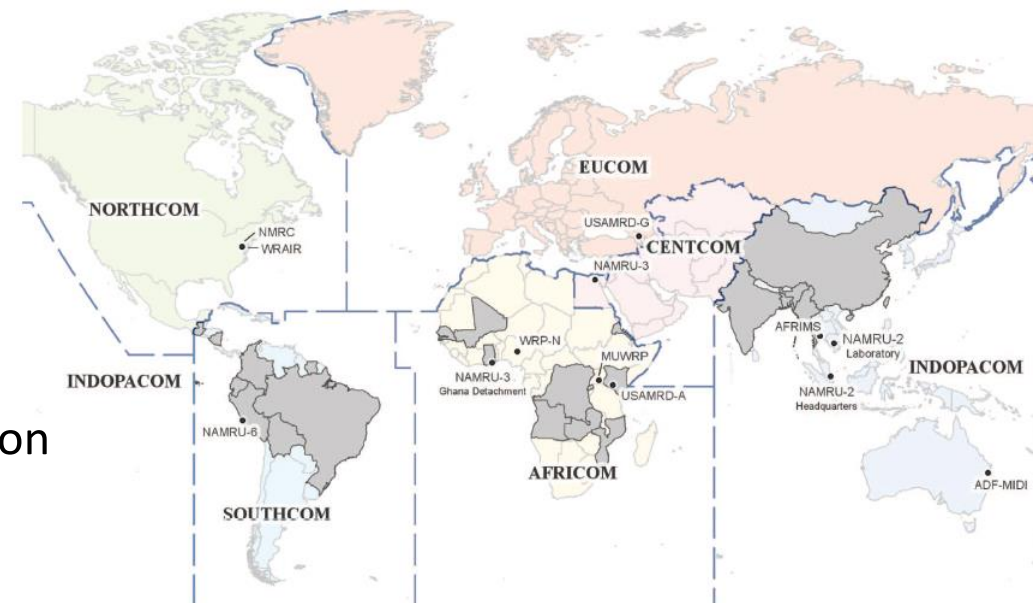


Depression Screening and Follow-Up Clinical Quality Measure

- 2014: 38.8%
- 2015: 50.6%
- 2016: 60.3%
- 2017: 66.2%

# LT Brett Forshey

**_Plasmodium falciparum_ Rapid Test Failures Threaten Diagnosis and Treatment of U.S. Military Personnel, _Military Medicine._**

- Rapid diagnostic tests (RDTs) are important tools for timely detection and treatment of malaria, which is caused by _Plasmodium_ species such as _Plasmodium falciparum_

- This commentary draws attention to the diagnostic challenges caused by _P. falciparum_ variants, which can lead to misdiagnosis of deployed U.S. military personnel

- LT Forshey and colleagues outlined steps needed to address the limitations of the malaria RDT, including education of military healthcare personnel, coordinated surveillance studies, and regulatory approval of new malaria RDTs

- Building upon this commentary, overseas DoD laboratories initiated coordinated malaria surveillance studies, in collaboration with partner military and civilian public health officials

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