Deadliest Enemy: Our War Against Killer Germs

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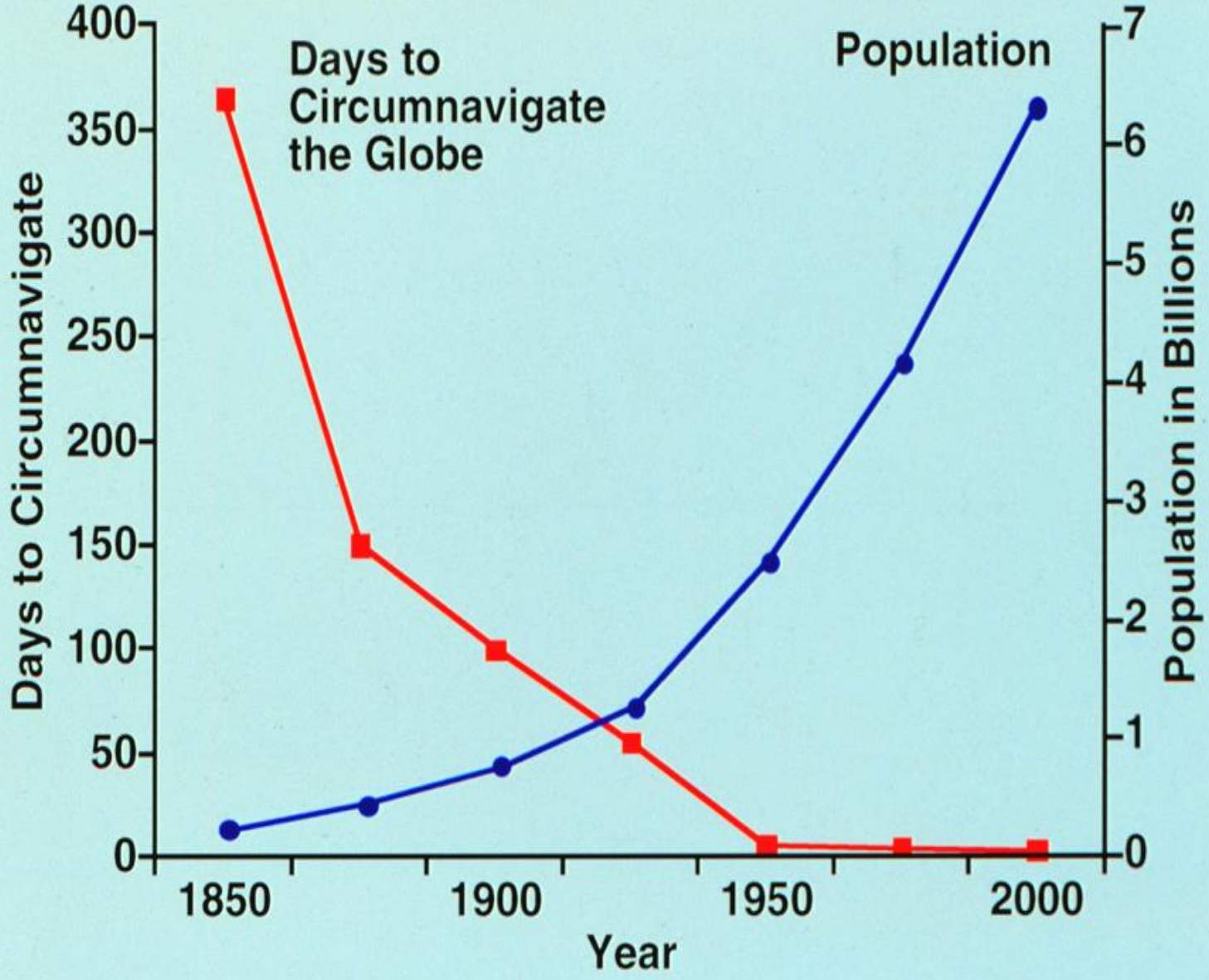
Days to Circumnavigate the Globe
Population
Days to Circumnavigate
Population in Billions
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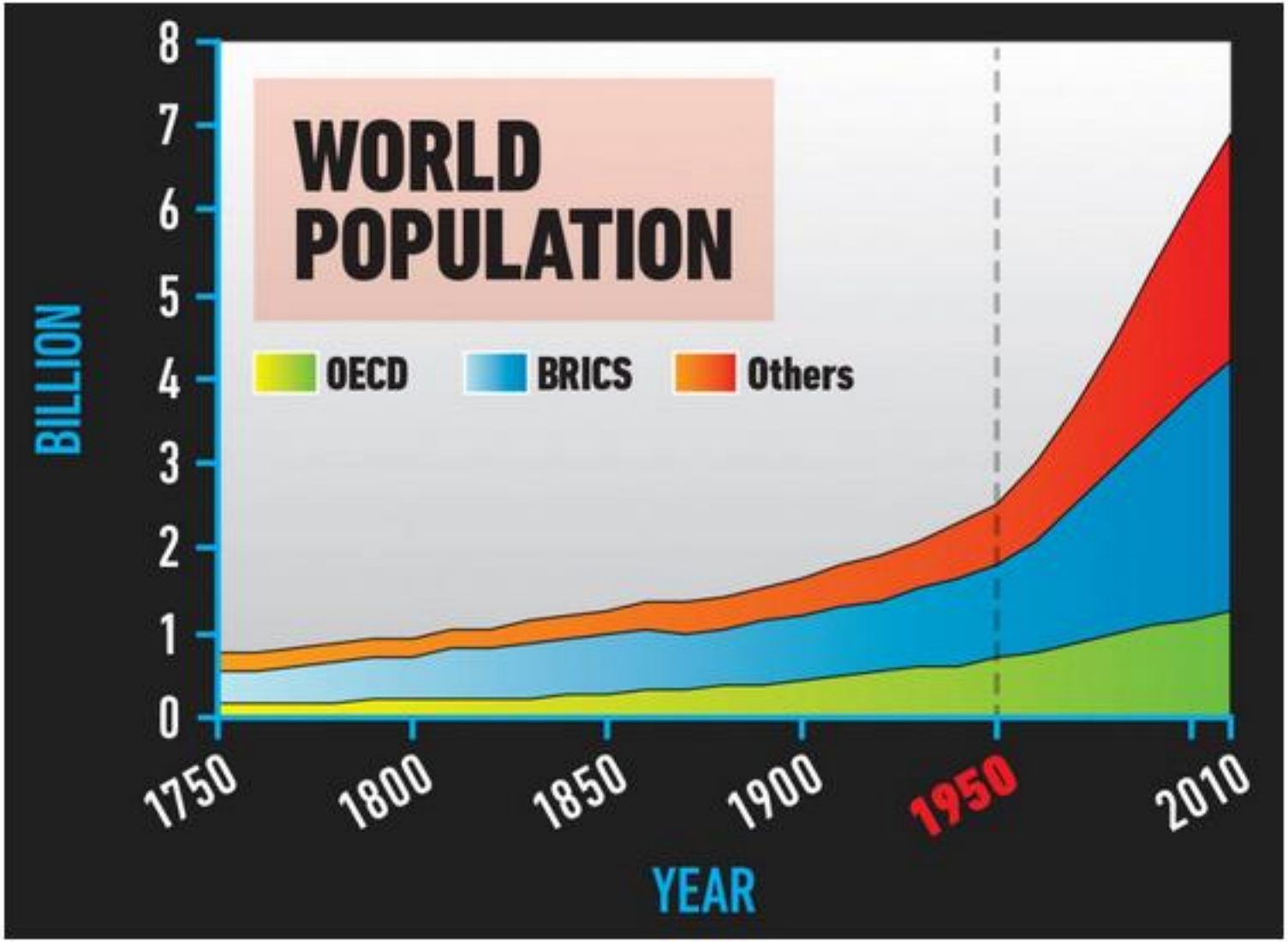
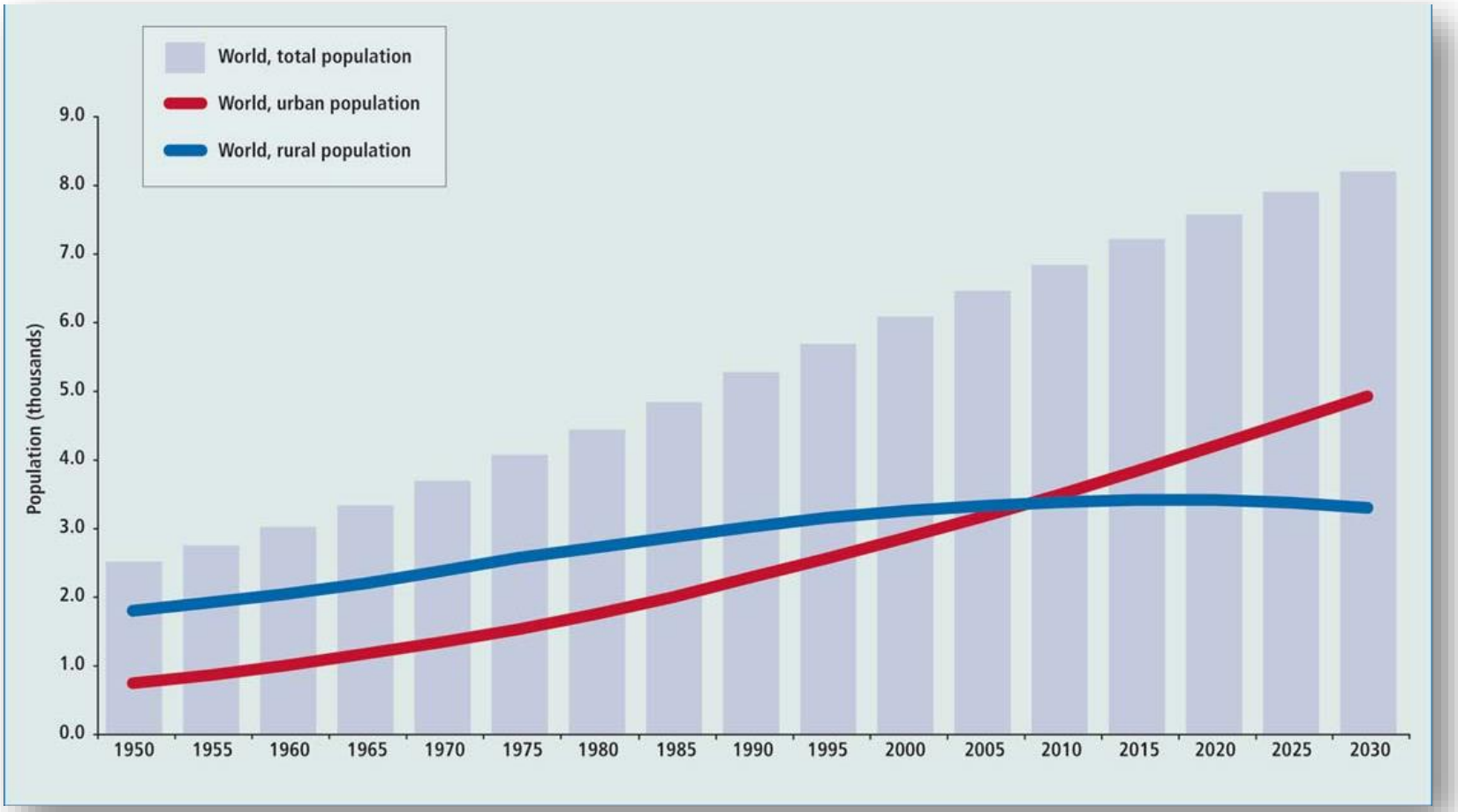


(Steffen et al 2014) Global population data according to the HYDE (History Database of the Global Environment) database. Data before 1950 are modelled. Data are plotted as decadal points.

SOURCES: HYDE database 2013; Klein Goldewijk et al. 2010.

Macro Trend: Global Urbanization and Incursion

Urban and Rural Population of the World 1950-2050

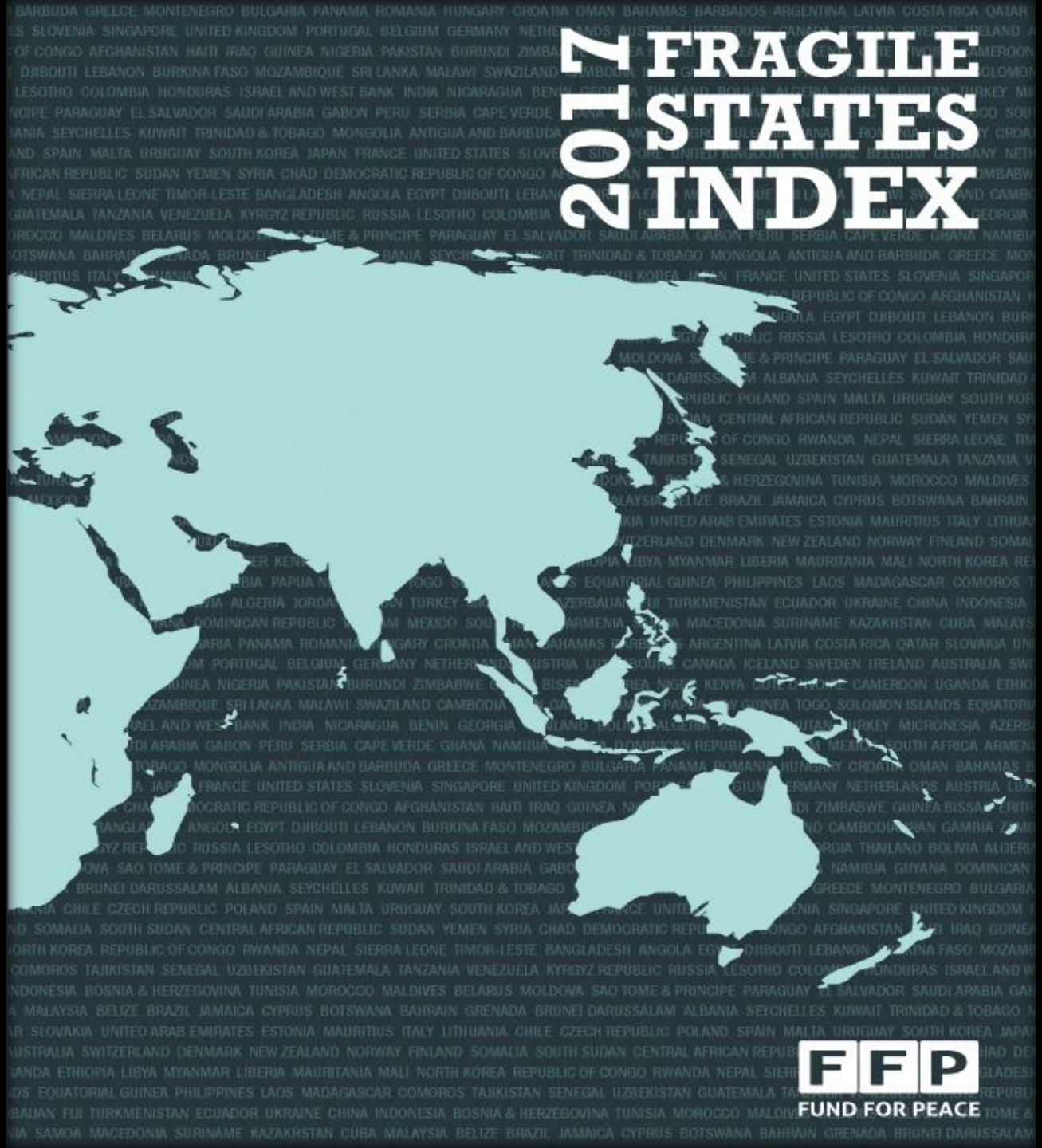


Peri-urban Slum: Mumbai, India

Urbanization of African Countries of Potential Concern

- Kinshasa, DRC/Brazzaville, RC
  - 13.8 million (four other cities > 1 million)
- Lagos, Nigeria
  - 13.2 million (five other cities > 1 million)
- Nairobi, Kenya
  - 4.1 million
- Acura, Ghana
  - 2.8 million
- Monrovia/Freetown/Conakry
  - 4.2 million

2017 FRAGILE STATES INDEX



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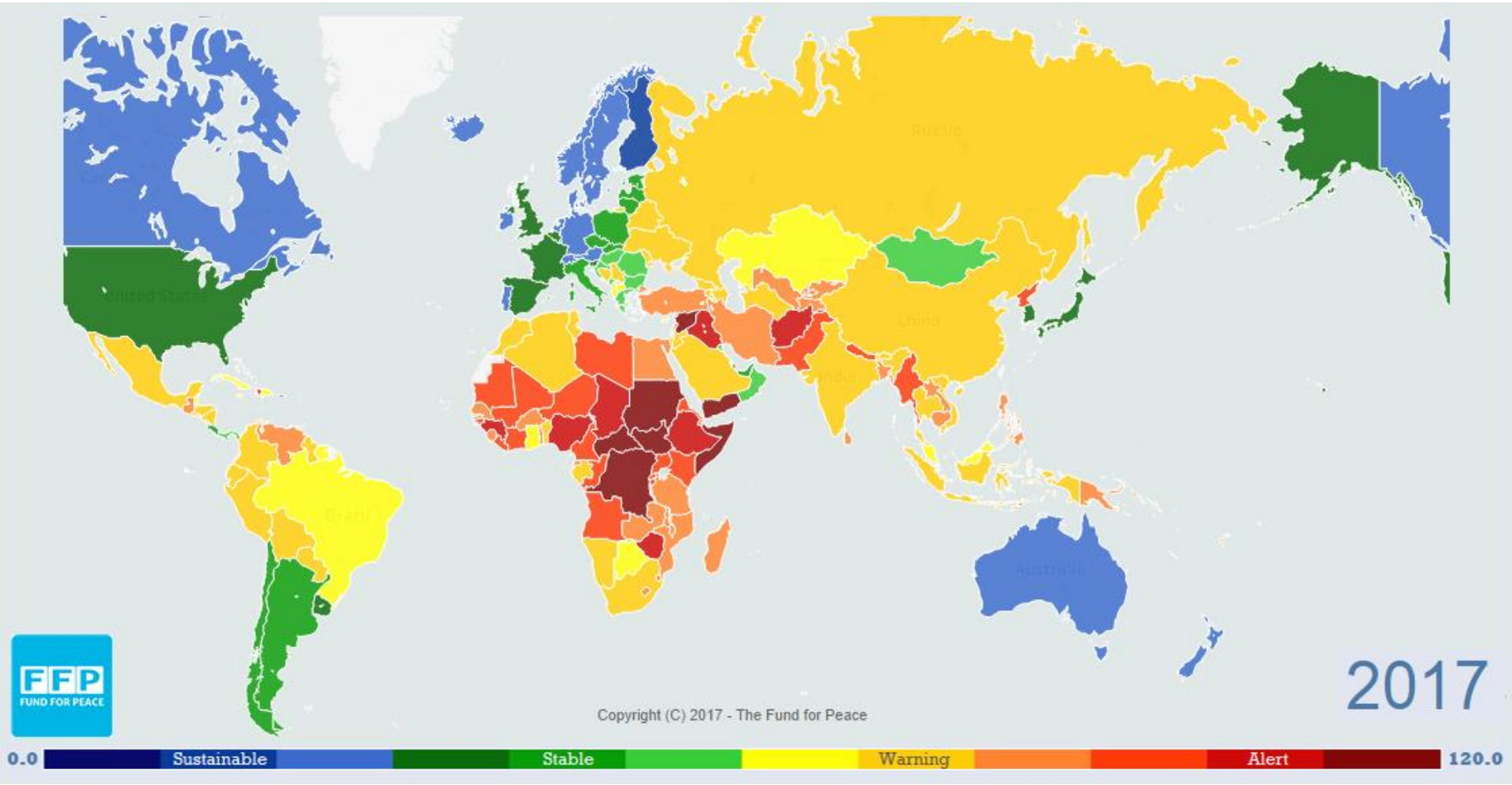
FUND FOR PEACE

2017 FRAGILE STATES INDEX



The New York Times

The Real Threat to National Security: Deadly Disease

By MICHAEL T. OSTERHOLM and MARK OLSHAKER MARCH 24, 2017

While the Trump administration is proposing significantly increased military spending to enhance our national security, it seems to have lost sight of the greatest national security threat of all: our fight against infectious disease.

We already spend far more on our military than any other country in the world. To help pay for the increases, President Trump wants to cut back many federal programs, including those that prepare us to wage war against microbes, the greatest and most lethal enemy we are ever likely to face. This is where "defense spending" needs to increase, significantly.

President Trump's budget would cut funding for the National Institutes of Health by 18 percent. It would cut the State Department and the United States Agency for International Development, a key vehicle for preventing and responding to outbreaks before they reach our shores, by 28 percent. And the repeal of the Affordable Care Act would kill the billion-dollar Prevention and Public Health Fund, which provides funding for the Centers for Disease Control and Prevention to fight outbreaks of infectious disease. (While the budget also calls for the creation of an emergency fund to respond to outbreaks, there is no indication that it would offset the other cuts, or where the money would come from.)

Defense: The U.S. Outspends These Countries Combined

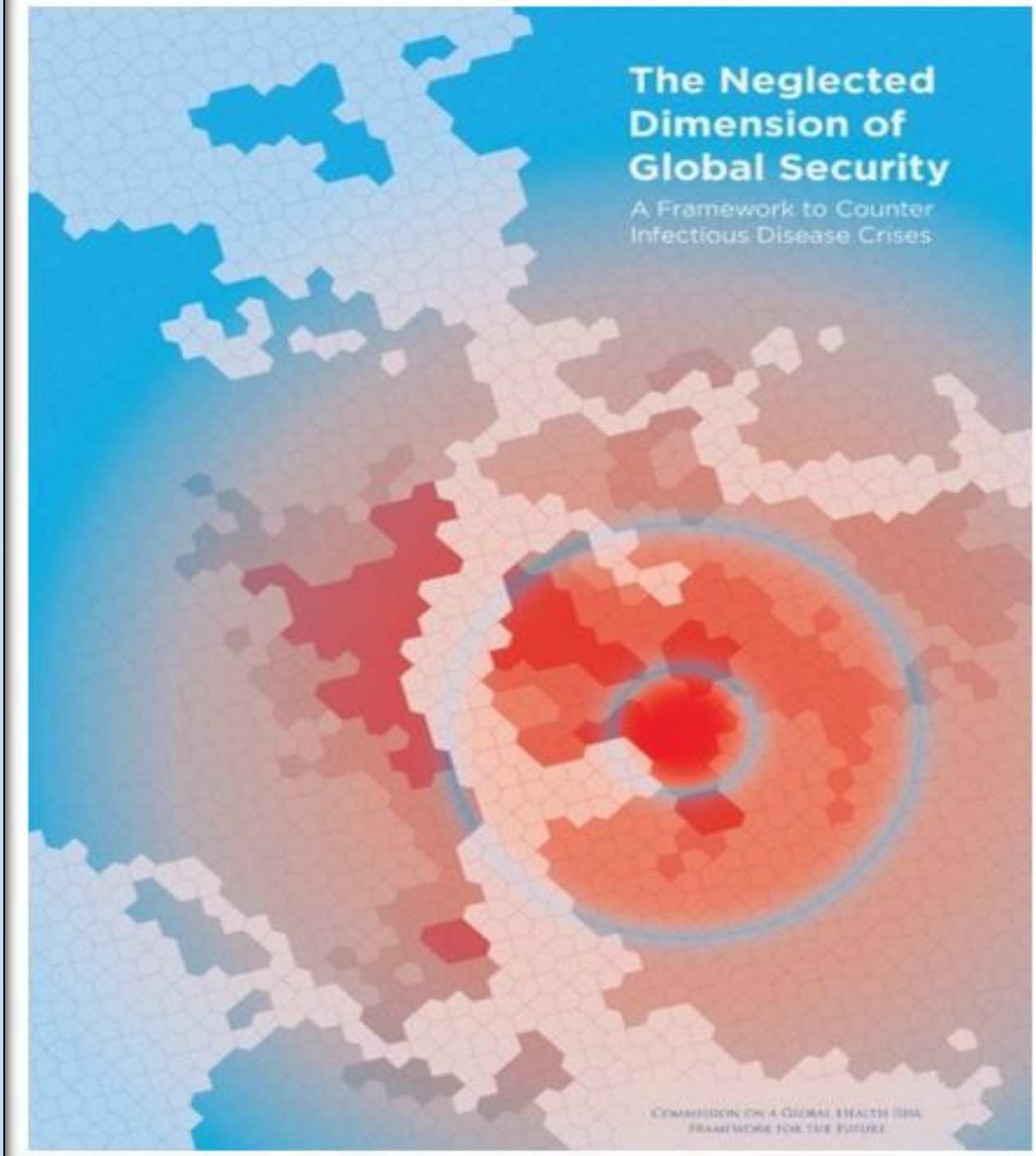
Military expenditure in 2015 in billion U.S. dollars and as share of own GDP

* SIPRI estimate

Source: Stockholm International Peace Research Institute (SIPRI)

Report of the

Ebola Interim Assessment Panel


The Neglected Dimension of Global Security
A Framework to Counter Infectious Disease Crises
Commission on a Global Health Risk Framework for the Future

Will Ebola change the game? Ten essential reforms before the next pandemic. The report of the Harvard-LSHTM Independent Panel on the Global Response to Ebola

Suerie Moon, Devi Sridhar, Muhammad A Pate, Ashish K Jha, Chelsea Clinton, Sophie Delaunay, Valnora Edwin, Mosoka Fallah, David P Fidler, Laurie Garrett, Eric Goosby, Lawrence O Gostin, David L Heymann, Kelley Lee, Gabriel M Leung, J Stephen Morrison, Jorge Saavedra, Marcel Tanner, Jennifer A Leigh, Benjamin Hawkins, Liana R Waskie, Peter Piot

Lancet 2015; 386: 2204–21
Published Online November 22, 2015 http://dx.doi.org/10.1016/S0140-6736(15)00946-0
See Editorial page 2118

Harvard Global Health Institute (Prof A Jha MD, S Moon PhD, L R Waskie MSc, J A Leigh MPH), Harvard T.H. Chan School of Public Health (Prof A K Jha, S Moon, L R Waskie, J A Leigh), and Harvard Kennedy School (S Moon), Harvard University, Boston, MA, USA; University of Edinburgh Medical School, Edinburgh (Prof D Sridhar DPhil); Duke Global Health Institute, Durham, NC, USA (M A Pate MD); Bill, Hillary & Chelsea Clinton Foundation, New York, NY, USA (C Clinton DPhil); Médecins Sans Frontières, New York , NY, USA (S Delaunay MA); Campaign for Good Governance, Freetown, Sierra Leone (V Edwin MA); Action Contre La Faim International , Monrovia, Liberia (M Fallah PhD); Indiana University Maurer School of Law, Bloomington, IN, USA (Prof D P Fidler JD); Council on Foreign Relations, New York, NY, USA (L Garrett PhD); University of California, San Francisco, CA, USA (Prof E Goosby MD); Georgetown University, Washington, DC, USA (Prof L Gostin JD); Chatham House, London, UK (Prof D L Heymann MD); Simon Fraser University, Burnaby, BC, Canada (Prof K Lee DPhil); Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong, China (Prof G M Leung MD); Center for Strategic and International Studies, Washington DC, USA (J S Morrison PhD); AIDS

Executive summary

The west African Ebola epidemic that began in 2013 exposed deep inadequacies in the national and international institutions responsible for protecting the public from the far-reaching human, social, economic, and political consequences of infectious disease outbreaks. The Ebola epidemic raised a crucial question: what reforms are needed to mend the fragile global system for outbreak prevention and response, rebuild confidence, and prevent future disasters? To address this question, the Harvard Global Health Institute and the London School of Hygiene & Tropical Medicine jointly launched the Independent Panel on the Global Response to Ebola. Panel members from academia, think tanks, and civil society have collectively reviewed the worldwide response to the Ebola outbreak. After difficult and lengthy deliberation, we concluded that major reforms are both warranted and feasible. The Panel's conclusions offer a roadmap of ten interrelated recommendations across four thematic areas:

1 Preventing major disease outbreaks

All countries need a minimum level of core capacity to detect, report, and respond rapidly to outbreaks. The shortage of such capacities in Guinea, Liberia, and Sierra Leone enabled Ebola to develop into a national, and worldwide, crisis.

- Recommendation 1: The global community must agree on a clear strategy to ensure that governments invest domestically in building such capacities and mobilise adequate external support to supplement efforts in poorer countries. This plan must be supported by a transparent central system for tracking and monitoring the results of these resource flows. Additionally, all governments must agree to regular, independent, external assessment of their core capacities.
- Recommendation 2: WHO should promote early reporting of outbreaks by commending countries that rapidly and publicly share information, while publishing lists of countries that delay reporting. Funders should create economic incentives for early reporting by committing to disburse emergency funds rapidly to assist countries when outbreaks strike and compensating for economic losses that might result. Additionally, WHO must confront governments that implement trade and travel restrictions without scientific justification, while developing industry-wide cooperation frameworks to ensure private firms such as airlines and shipping companies continue to provide crucial services during emergencies.

2 Responding to major disease outbreaks

When preventive measures do not succeed, outbreaks can cross borders and surpass national capacities. Ebola exposed WHO as unable to meet its responsibility for responding to such situations and alerting the global community.

- Recommendation 3: A dedicated centre for outbreak response with strong technical capacity, a protected budget, and clear lines of accountability should be created at WHO, governed by a separate Board.
- Recommendation 4: A transparent and politically protected WHO Standing Emergency Committee should be delegated with the responsibility for declaring public health emergencies.
- Recommendation 5: An independent UN Accountability Commission should be created to do system-wide assessments of worldwide responses to major disease outbreaks.

3 Research: production and sharing of data, knowledge, and technology

Rapid knowledge production and dissemination are essential for outbreak prevention and response, but reliable systems for sharing epidemiological, genomic, and clinical data were not established during the Ebola outbreak.

- Recommendation 6: Governments, the scientific research community, industry, and non-governmental organisations must begin to develop a framework of norms and rules operating both during and between outbreaks to enable and accelerate research, govern the conduct of research, and ensure access to the benefits of research.
- Recommendation 7: Additionally, research funders should establish a worldwide research and development financing facility for outbreak-relevant drugs, vaccines, diagnostics, and non-pharmaceutical supplies (such as personal protective equipment) when commercial incentives are not appropriate.

The NEW ENGLAND JOURNAL of MEDICINE

Perspective

The Next Epidemic — Lessons from Ebola

Bill Gates

Perhaps the only good news from the tragic Ebola epidemic in Guinea, Sierra Leone, and Liberia is that it may serve as a wake-up call: we must prepare for future epidemics of diseases that may spread more effectively than Ebola. There is a significant chance that an epidemic of a substantially more infectious disease will occur sometime in the next 20 years; after all, we saw major epidemics during the 20th century, including the Spanish influenza epidemic of 1918–1919 and the ongoing pandemic of human immunodeficiency virus. In fact, of all the things that could kill more than 10 million people around the world, the most likely is an epidemic stemming from either natural causes or bioterrorism.

Ebola is far from the most infectious known disease. Other disease agents (measles and influenza, for example) are far more infectious because they can be spread through the air, rather than requiring direct contact. People may not even be aware that they are infected or infectious. Since a person carrying one of these pathogens can infect many strangers in a marketplace or on an airplane, the number of cases can escalate very quickly.

As the Ebola epidemic fades from the world's attention, we risk missing the opportunity to learn from it. Even if the system we have today had worked perfectly for Ebola, it would fail to contain a more infectious disease.

It's instructive to compare our preparations for epidemics with our preparations for another sort of global threat — war. The North Atlantic Treaty Organization (NATO) has a mobile unit that is ready to deploy quickly. Although the system is not perfect, NATO countries participate in joint exercises in which they work out logistics such as how fuel and food will be provided, what language they will speak, and what radio frequencies will be used. Few, if any, such measures are in place for response to an epidemic. The world does not fund any organization to manage the broad set of coordinated activities required in an epidemic. The last serious simulation of an epidemic in the United States, the Dark Winter exercise, took place in 2001. And few countries have met their commitments under the International Health Regulations, which were adopted by the United Nations after the 2002–2003 outbreak of the severe acute respiratory syndrome (SARS) and were intended to improve the world's ability to prevent and contain outbreaks.[1]

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Gloomy assessment underpins UN panel's health crisis advice

Filed Under: Ebola; H1N1 2009 Pandemic Influenza; MERS-CoV; Pandemic Influenza; SARS; VHF

Lisa Schnirring | News Editor | CIDRAP News | Feb 09, 2016

The world underestimates the risk of a health threat worse than Ebola, and its capacity to prepare and respond is "woefully insufficient," according to a high-level panel appointed by United Nations (UN) Secretary-General Ban Ki-moon to look at improvements based on lessons learned during the recent outbreak.

Andrew d'Entremont/ Flickr cc

The scope of West Africa's Ebola outbreak in September 2014 led to the UN's first-ever special mission to address a public health crisis. Appointed in April 2015, the six-member group was led by Tanzanian President Jakaya Mrisho Kikwete.

Before making its findings and recommendations, the full panel met six times last year and held six roundtable meetings. The group's unedited, 95-page advance report, dated Jan 25, is posted on the United Nations' Web site.

ADVANCE UNEDITED COPY

Protecting Humanity from Future Health Crises

Report of the

High-level Panel on the Global Response to Health Crises

25 January 2016

Following its extensive consultations, the Panel notes that the high risk of major health crises is widely underestimated, and that the world's preparedness and capacity to respond is woefully insufficient. Future epidemics could far exceed the scale and devastation of the West Africa Ebola outbreak. The Panel was very concerned to learn that the emergence of a highly pathogenic influenza virus, which could rapidly result in millions of deaths and cause major social, economic and political disruption, is not an unlikely scenario.

Jakaya Mrisho Kikwete
United Republic of Tanzania
Panel Chair

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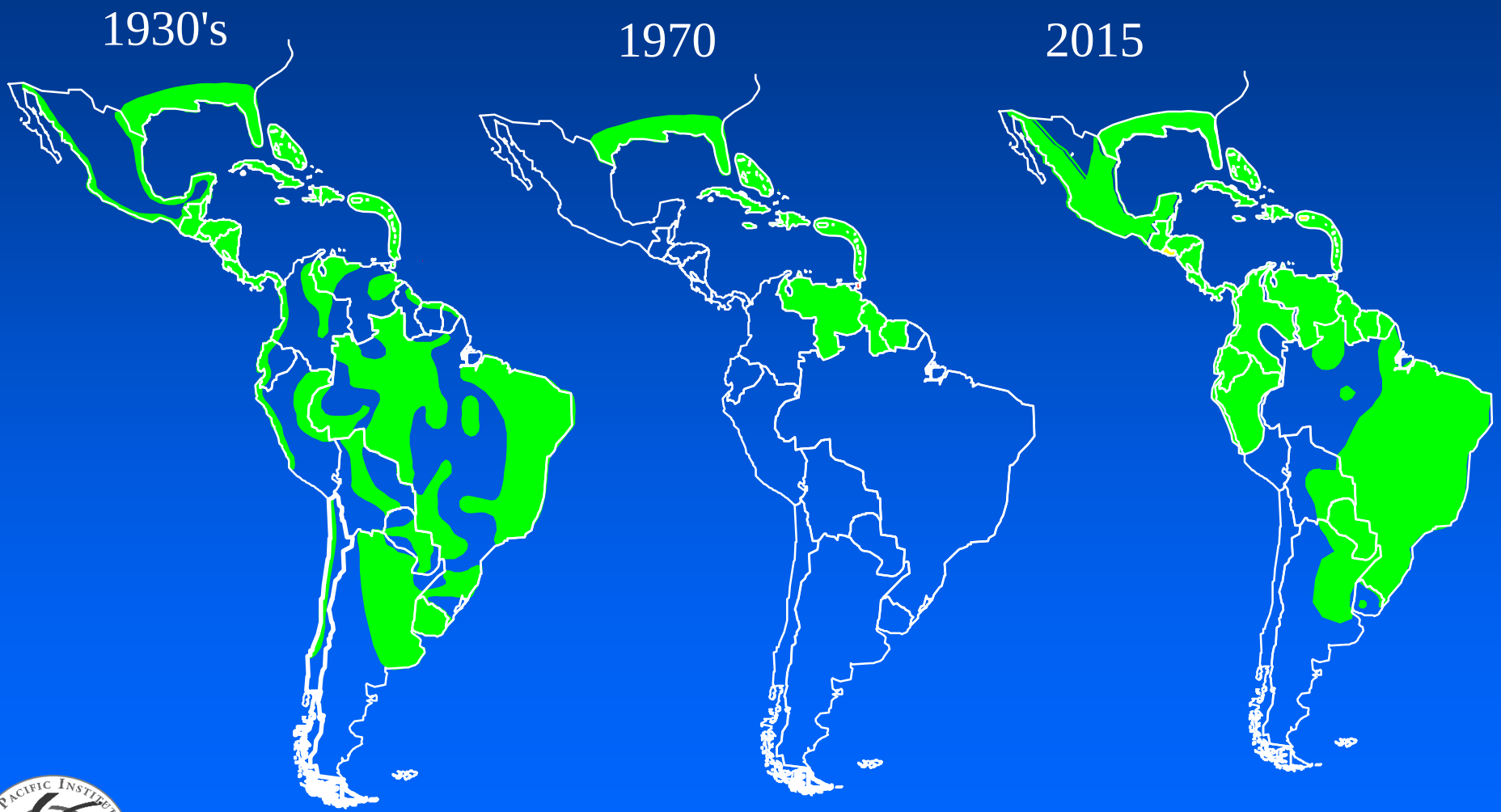
Center for Infectious Disease Research & Policy
University of Minnesota

Aedes aegypti Distribution in the Americas



Adapted from Gubler, 1998

The New York Times

Hard Times in Venezuela Breed Malaria as Desperate Flock to Mines

Many turn to panning for black-market gold in the watery pits of mines, where mosquitoes infect them. Once they return home to recover, the disease spreads.

Written by NICHOLAS CASEY; Photographs by MERIDITH KOHUT

REUTERS

HEALTH NEWS | Tue May 9, 2017 | 3:56pm EDT

Infant mortality and malaria soar in Venezuela, according to government data

By **Alexandra Ulmer** | CARACAS

Venezuela's infant mortality rose 30 percent last year, maternal mortality shot up 65 percent and cases of malaria jumped 76 percent, according to government data, sharp increases reflecting how the country's deep economic crisis has hammered at citizens' health.

The statistics, issued on the ministry's website after nearly two years of data silence from President Nicolas Maduro's leftist government, also showed a jump in illnesses such as diphtheria and Zika. It was not immediately clear when the ministry posted the data, although local media reported on the statistics on Tuesday.

Recession and currency controls in the oil-exporting South American nation have slashed both local production and imports of foreign goods, and Venezuelans are facing shortages of everything from rice to vaccines. The opposition has organized weeks of protests against Maduro, accusing him of dictatorial rule and calling for elections.

In the health sector, doctors have emigrated in droves and patients have to settle for second-rate treatment or none at all. A leading pharmaceutical association has said roughly 85 percent of medicines are running short. Venezuelans often barter medicine, post pleas on social media, travel to neighboring countries if they can afford it, or line up for hours at pharmacies.

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DRC confirms 2 Ebola infections, probes suspected cases

Filed Under: Ebola; VHF

Lisa Schnirring | News Editor | CIDRAP News | May 08, 2018

suprunvitaly / iStock

The Democratic Republic of the Congo (DRC) today declared a new Ebola virus outbreak in a northwestern province, with two confirmed cases so far, coming almost a year since the country's last outbreak began in a different remote location.

The World Health Organization (WHO) said in a statement today that the new outbreak is located in Bikoro, in Equateur province on the shores of Lake Tumba. The town is roughly 40 miles from the Republic of Congo border. The cases were reported from Ilkoko Iponge health facility, about 18 miles from the town of Bikoro (see Google map below), which has very limited health facilities and few supplies.

Of samples collected from five sick patients and sent to the national biomedical research laboratory in Kinshasa, two were positive for Ebola virus. The WHO said more specimens are being collected for

World Health Organization

New Ebola outbreak declared in Democratic Republic of the Congo

8 May 2018 | News Release | Geneva/Brazzaville/Kinshasa

The Government of the Democratic Republic of the Congo declared a new outbreak of Ebola virus disease (EVI in Bikoro in Equateur Province today (8 May). The outbreak declaration occurred after laboratory results confirm two cases of EVD.

The Ministry of Health of Democratic of the Congo (DRC) informed WHO that two out of five samples collected from five patients tested positive for EVD at the Institut National de Recherche Biomédicale (INRB) in Kinshasa. More specimens are being collected for testing.

WHO is working closely with the Government of the DRC to rapidly scale up its operations and mobilize health partners using the model of a successful response to a similar EVD outbreak in 2017.

"Our top priority is to get to Bikoro to work alongside the Government of the Democratic Republic of the Congo a partners to reduce the loss of life and suffering related to this new Ebola virus disease outbreak," said Dr Peter Salama, WHO Deputy Director-General, Emergency Preparedness and Response. "Working with partners and responding early and in a coordinated way will be vital to containing this deadly disease."

The first multidisciplinary team comprised of experts from WHO, Médecins Sans Frontières and Provincial Divisi of Health travelled today to Bikoro to strengthen coordination and investigations.

Bikoro is situated in Equateur Province on the shores of Lake Tumba in the north-western part of the country ne the Republic of the Congo. All cases were reported from Ilkoko Iponge health facility located about 30 kilometres from Bikoro. Health facilities in Bikoro have very limited functionality, and rely on international organizations to provide supplies that frequently stock out.

"We know that addressing this outbreak will require a comprehensive and coordinated response. WHO will work closely with health authorities and partners to support the national response. We will gather more samples, conduct contact tracing, engage the communities with messages on prevention and control, and put in place methods for improving data collection and sharing," said Dr Matshidiso Moeti, the WHO Regional Director for Africa.

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DRC notes 14 more suspected Ebola cases, new death

Filed Under: Ebola; VHF
Lisa Schnirring | News Editor | CIDRAP News | Jun 11, 2018

Over the past few days, 14 more suspected cases have been reported in the Democratic Republic of Congo (DRC) Ebola outbreak, and one more patient has died from the disease, according to one of the top World Health Organization (WHO) officials leading the response.

Ollivier Girard, CIFOR / Flickr cc

Peter Salama, MD, the WHO's deputy director-general of emergency response, said on Twitter today that, of the new suspected cases, 3 are from Jun 9 and 11 are from Jun 8. Samples from 12 earlier suspected patients were negative for Ebola virus, putting the overall outbreak total at 66, including 38 confirmed cases, 14 probable infections, and 14 suspected illnesses.

He said the death occurred in a known confirmed case, which nudges the fatality total to 28.

'Expeditionary surveillance'

Over the weekend, Salama said the next phase of the response revolves around expeditionary surveillance, which the WHO has said will now target Iboko, a remote community in a heavily forested part of the

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More suspected DRC Ebola cases amid enhanced surveillance

Filed Under: Ebola; VHF

Lisa Schnirring | News Editor | CIDRAP News | Jun 13, 2018

Steve Cockburn, Oxfam / Flickr cc

The Democratic Republic of Congo (DRC) health ministry yesterday reported four more suspected Ebola cases, three from the two remote hot spots and one from Wangata health zone, an area that includes part of the provincial capital city of Mbandaka.

The new developments push the overall outbreak total to 59 cases, which include 38 confirmed illnesses, 14 probable, and 7 suspected. No new deaths were reported, keeping the fatality count at 28.

One remaining active transmission area

Two of the new suspected cases are from Iboko health zone, which includes the Itipo health area, the remaining area of active transmission, according to a situation report yesterday from the World Health Organization (WHO).

Two days ago the WHO's director-general and the DRC's health minister visited Itipo to assess the situation and support response operations. They also met with patients who recovered from Ebola and visited Itipo's new Ebola treatment center.

EBOLA VIRUS DISEASE

Democratic Republic of the Congo

External Situation Report 15

Date of issue: 12 July 2018
Data as reported by: 9 July 2018

1. Situation update

Grade	Cases	Deaths	CFR
3	53	29	54.7%

The Ministry of Health and WHO continue to closely monitor the outbreak of Ebola virus disease (EVD) in Équateur Province, the Democratic Republic of the Congo. Until the outbreak is declared over, intensive surveillance, survivor monitoring and other response activities are ongoing to prevent, promptly detect and respond to potential resurgences of the virus.

No new laboratory-confirmed EVD cases have been detected since the last case developed symptoms on 2 June 2018 (Figure 1). Since the beginning of the outbreak (on 4 April 2018), a total of 38 laboratory confirmed and 15 probable cases (deaths for which it was not possible to collect laboratory specimens for testing) have been reported. Of these 53 cases, 29 died, giving a case fatality ratio of 54.7%. Twenty-eight (53%) cases were from Iboko, 21 (40%) from Bikoro and four (8%) from Wangata health zones (Table 1 and Figure 2). Five healthcare workers were affected, of which two died.

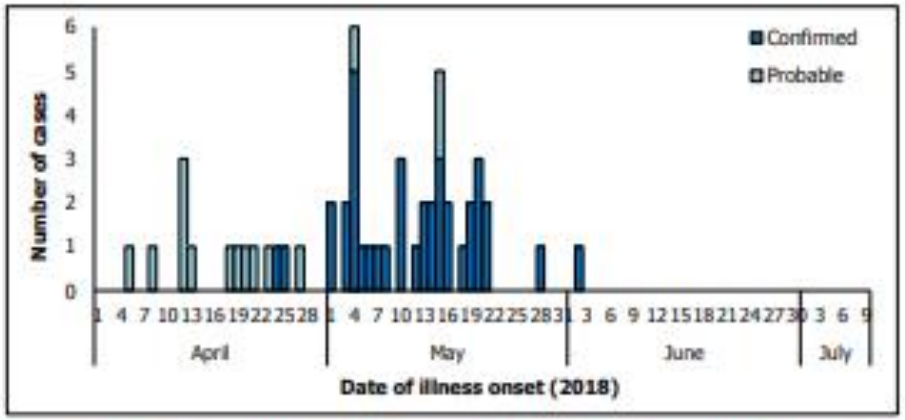
An additional eleven suspected EVD cases have been reported since our last report on 3 July 2018 *(External Situation report 14)*. As of 9 July, five suspected cases are currently awaiting laboratory results. All other previously reported suspected cases have tested negative.

The last surviving confirmed EVD case was discharged from an Ebola treatment centre (ETC), following two negative tests on serial laboratory specimens, on 12 June 2018. Before the outbreak can be declared over, a period of 42 days (two incubation periods) following the last possible exposure to a confirmed case must elapse without any new confirmed cases being detected.

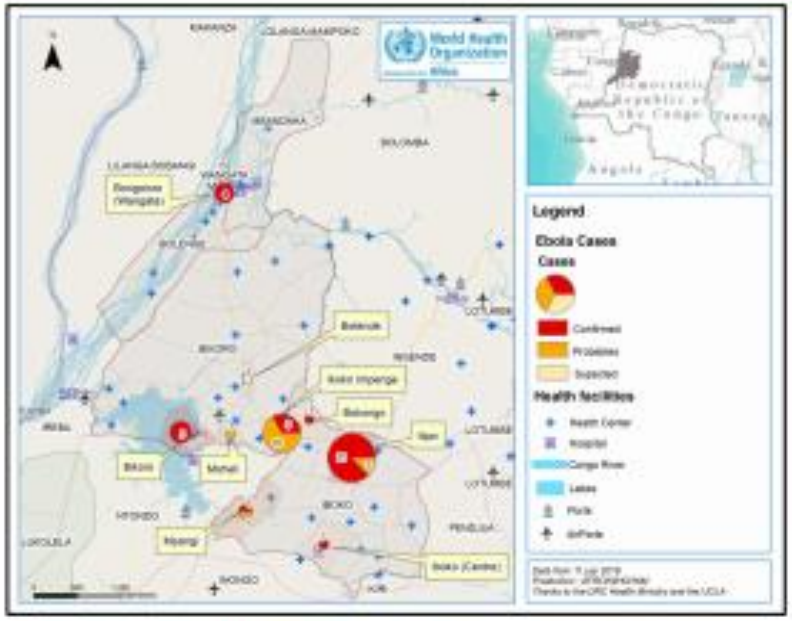
Context

On 8 May 2018, the Ministry of Health of the Democratic Republic of the Congo notified WHO of an EVD outbreak in Bikoro Health Zone, Equateur Province. The event was initially reported on 3 May 2018 by the Provincial Health Division of Equateur when a cluster of 21 cases of an undiagnosed illness, involving 17 community deaths, occurred in Ikoko-Impenge health area. A team from the Ministry of Health, supported by WHO and Médecins Sans Frontières (MSF), visited Ikoko-Impenge health area on 5 May 2018 and found five case-patients, two of whom were admitted in Bikoro General Hospital and three were in the health centre in Ikoko-Impenge. Samples were taken from each of the five cases and sent for analysis at the Institute National de Recherche Biomédicale (INRB), Kinshasa on 6 May 2018. Of these, two tested positive for Ebola virus, *Zaire ebolavirus* species, by reverse transcription polymerase chain reaction (RT-PCR) on 7 May 2018, and the outbreak was officially declared on 8 May 2018. This is the ninth EVD outbreak in the Democratic Republic of the Congo over the last four decades, with the most recent one occurring in May 2017. Further information on past outbreaks is available at: http://www.who.int/ebola/historical-outbreaks-drc/en/.

Figure 1: Confirmed and probable EVD cases by date of illness onset, Democratic Republic of the Congo, 1 April – 9 July 2018 (n=53)



Geographical distribution of confirmed and probable Ebola virus disease cases, Democratic Republic of the Congo, 1 April – 9 July 2018 (n=53).



Équateur Province covers an area of 130 442 km² and has an estimated population of 2 543 936 people, with 16 health zones and 284 health centres.

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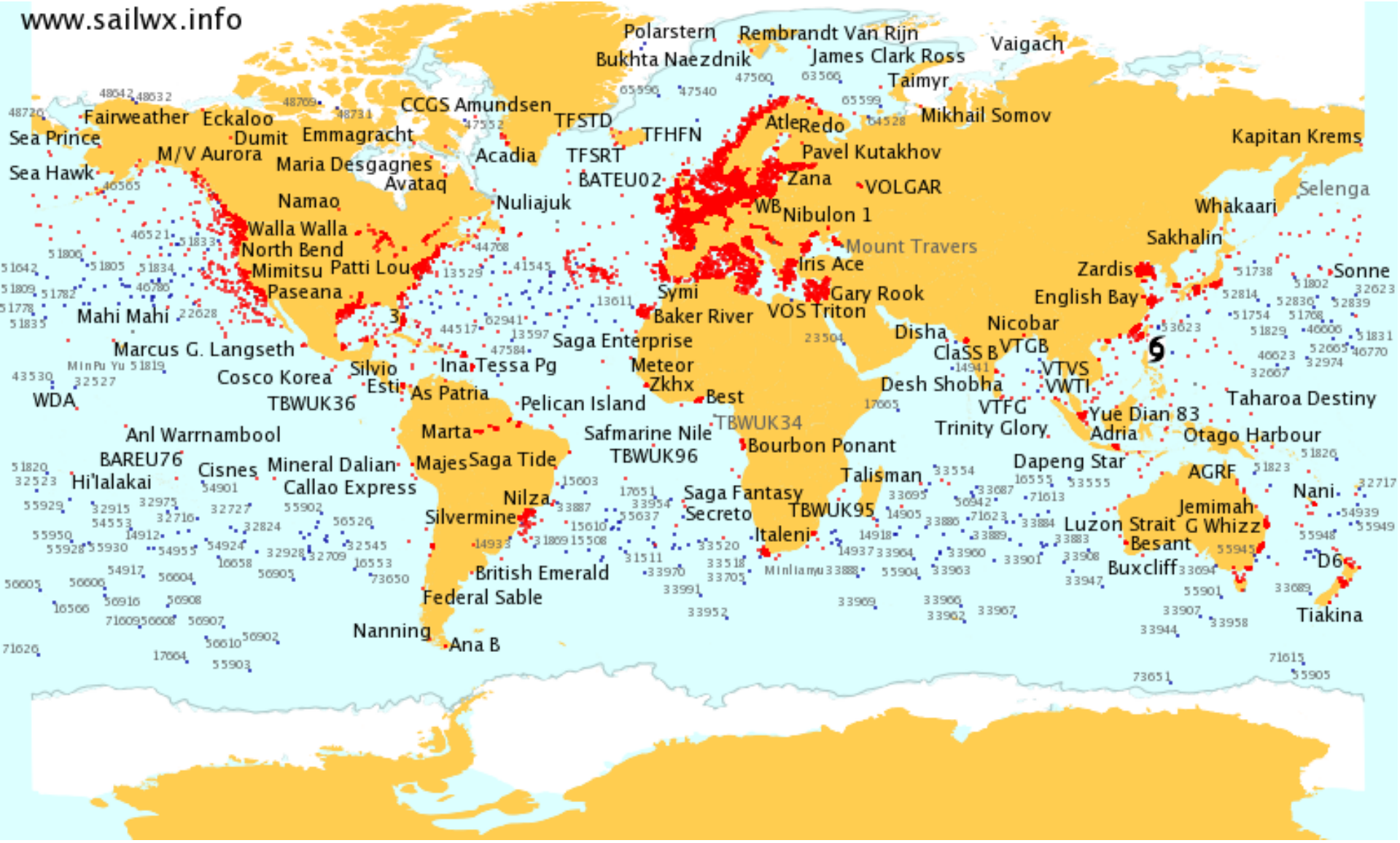

World container ship traffic has doubled since 1997

Ship Traffic Worldwide: **Monday, July 16, 2018, 4:45 PM UTC**


OOCL HONG KONG
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News Scan for Oct 09, 2017

Puerto Rico hurricane damage stretches supply of IV saline

Damage in Puerto Rico from Hurricane Maria has disrupted the nation's supply of some intravenous (IV) saline and dextrose bags, the *Washington Post* reported today. Baxter International, one of the makers of small-volume IV bags, widely used for rehydration and to dilute medications, said "multiple production days" were lost in the aftermath of the storm, and it has established a system to allocate the product to hospitals based on past purchases.

On Oct 6, Food and Drug Administration (FDA) Commissioner Scott Gottlieb, MD, issued a statement saying the FDA is taking new steps to mitigate the impact of two recent hurricanes on the island's medical product manufacturing sector, alongside its ongoing efforts to directly assist Puerto Rico's residents. He said pharmaceutical and biological products account for about 30% of the territory's gross domestic product, and 10% of all drugs consumed by Americans are made in Puerto Rico. "And that doesn't even account for medical devices. Puerto Rico is vital to the health and wellbeing of Americans," he said.

Some facilities were hit harder than other, but the ones that sustained minor damage are running on generator power and aren't back at full production. "New shortages could result from these disruptions, and shortages that existed before the storms could potentially be extended," Gottlieb said, adding that the FDA is in close contact with senior management at the companies.

The FDA says it is monitoring 40 products on a list of critical products for which shortages could have a substantial public health impact. The FDA said it will provide more details on specific products as appropriate and as it learns more.

IV bags in short supply across US after Hurricane Maria

By Susan Scutti, CNN

Updated 4:21 PM ET, Wed January 17, 2018

Story highlights

The US IV bag shortage began before Hurricane Maria harmed operations of a supplier in Puerto Rico

FDA has approved importation of bags from other countries

(CNN) — Before Hurricane Maria made landfall in Puerto Rico on September 20, the United States had already experienced intermittent shortages of IV bags, which are used to administer and dilute medications. The devastation caused by the Category 4 hurricane -- the first to hit the island in more than eight decades -- amplified the IV bag shortage, in particular sodium chloride 0.9% injection bags, which are ubiquitous in medical facilities and hospitals.

Puerto Rico, which produces more pharmaceuticals by dollar value for the nation than any of the individual 50 states or any foreign country, has been key to the supply of these IV saline bags.

Since early November, the US Food and Drug Administration has issued updates and guidance to hospitals and medical facilities.

On Tuesday, Dr. Scott Gottlieb, the FDA commissioner, said in a statement the agency continues "to expect that the shortage of IV fluids will improve in the coming weeks and months."

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News Scan for Mar 09, 2018

FDA chief says situation involving IV saline bag shortage improving

In an update on an ongoing intravenous saline bag shortage, US Food and Drug Administration (FDA) Commissioner Scott Gottlieb, MD, said yesterday the situation is improving, and the agency expects that the problems will be resolved well before the next flu season begins.

In a series of Twitter posts, he said existing manufacturer Baxter, which has a facility in Puerto Rico, said manufacturing levels are now back to pre-hurricane levels.

Two new saline bag makers, Grifols and Fresenius Kabi, were licensed last year and are now producing saline bag products. Gottlieb said the FDA has permitted imports of saline from six facilities located outside of the United States, and officials are encouraging them to get approval to help address the long-term shortage issue.

Scott Gottlieb Twitter feed

EXPOSING THE RISKS OF AMERICA'S DEPENDENCE ON CHINA FOR MEDICINE

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Report: Fragile supply chain causing antibiotic shortages, resistance threat

Filed Under: Antimicrobial Stewardship

Chris Dall | News Reporter | CIDRAP News | May 31, 2018

A new report is warning about an emerging crisis in the global antibiotic supply chain that's causing antibiotic shortages and contributing to antimicrobial resistance (AMR).

Anastasiia New / iStock

In a white paper released today, the Dutch nonprofit Access to Medicine Foundation argues that a fragile global supply chain that's dependent on a small number of antibiotics manufacturers, along with a financially unstable economic model, are responsible for shortages of antibiotics on a global and national level. Because of these shortages, some patients in need of antibiotics are being treated with lower-quality medications that don't cure their infections and increase the risk of resistance.

"Less effective or more toxic treatment alternatives can contribute to AMR because every time we use an antibiotic, we give bacteria the chance to adapt and develop resistance," the authors write. "To reduce the threat of AMR, doctors must ensure that the right antibiotic is used against the right organism."

Emergency Department Visits

Data are for the U.S.

- Number of visits: 141.4 million
- Number of injury-related visits: 40.0 million
- Number of visits per 100 persons: 45.1
- Number of emergency department visits resulting in hospital admission: 11.2 million
- Number of emergency department visits resulting in admission to critical care unit: 1.8 million
- Percent of visits with patient seen in fewer than 15 minutes: 32.2%
- Percent of visits resulting in hospital admission: 7.9%
- Percent of visits resulting in transfer to a different (psychiatric or other) hospital: 1.9%

Source: National Hospital Ambulatory Medical Care Survey: 2014 Emergency Department Summary Tables, tables 1, 4, 15, 25, 26 [PDF – 1.9 MB]

BT item #	Description	Mfctr ETA for next release	Date Mfctr expects back orders to clear	Possible sub **	Description
0542-02	Adenosine 6mg, 2ml Vial (limited qty on hand)	mfctr allocation			
0301-67	Adenosine 6mg, 2ml LL Syringe (limited qty on hand)	August			
0651-04	ADENOSINE 12MG 4ML SDV (limited qty on hand)	mfctr allocation			
0301-68	Adenosine 12mg, 4ml LLSyringe	November			
5921-01	Aminophylline 250gm, 10ml vial	September			
0302-66	Amiodarone 150mg, 3ml syringe	The only product available is short dated (1/2019) Please indicate acceptance of date at the time of order		0616-03	Amiodarone 150mg, 3ml vial (due in July)
ab1630-10	Atropine 1mg, 10ml ANSYR	July	July	374911	Atropine 1mg, 10ml Lifeshield
374910	ATROPINE 0.5MG 5ML LIFESHIELD SYRINGE 1040A 10EA/BX	July	September	No Available Sub	
371631	Calcium Chloride 1gm, 10ml Lifeshield	July	September	No Available Sub	
373304	Calcium Chloride 1gm, 10ml Luer Jet	mfctr allocation			
371010	Calcium Chloride 1gm, 10ml ANSYR	July	July		
360-19	Calcium Gluconate	mftr allocation			
0370-01	Cyanokit 5 gm Hydroxocobalamin Kit, Contains 1 IV Admin set and 1 Transfer Spike, 16ea/cs	mfctr allocation			
371115	C2 DEMEROL 50MG/ML 1ML AMPULE 25/BOX CS15	August	August		
371117	C2 DEMEROL 100MG/ML 1ML CPJ LL 10/BOX	March 2019- BTM not accepting backorders due to extended BO period		No Available Sub	
371176	C2 DEMEROL 25MG/ML 1ML CPJ LL SLM 10/BX	June 2019- BTM not accepting backorders due to extended BO period			
371116	C2 DEMEROL 50MG/ML, 1ML, CPJ LL SLM 10/BX	June 2019- BTM not accepting backorders due to extended BO period			
371775	Dextrose 25% 10ml ANSYR Syringe	July	September	No Available Sub	
0074490201	Dextrose 50% 50ml Lifeshield	July			
373301	DEXTROSE 50% 25GM, 50ML LUER JET 1013B	Available			
377515	DEXTROSE 50% 25GM, 50ML ANSYR SYRINGE	Available			
D6648-02	Dextrose 50%, 25gm, 50ml Vial 25ea/bx	in stock		0074490201	Dextrose 50% 50ml Lifeshield
370951EA	C4 DIAZEPAM 10MG AUTO- INJECTOR	Unknown	Unknown	3213-12	DIAZEPAM 5MG/ML 10ML VIAL
371104	DIAZEPAM 10MG, 2ML CARPUJECT	August	March 2019		
3213-16	Diazepam 50mg, 10ml vial	July			
0409-4350-03	DILTIAZEM 100MG ADD-VANTAGE VIAL	July	March 2019	No Available Sub	
1171-01ea	DILTIAZEM 25MG, 5ML VIAL	Mar-19	June 2019		
6013-10	Diltiazem, 25 mg, 5 ml Vial *Refrigerate* 10ea/Box	mfctr allocation			
6014-10	Diltiazem, 50mg, 10ml Vial *REFRIGERATE* 10ea/Box	mfctr allocation			
374402	DIPHENHYDRAMINE 50MG LUER LOCKING CARPUJECT	March 2019- BTM not accepting backorders due to extended BO period		0376-25	DIPHENHYDRAMINE 50MG/ML 1ML SDV 2035 - BENADRYL 25 VIALS/PK
234401	DOBUTAMINE 250MG 20ML/VIAL	July	July	No Available Sub	
0074581901	MFG B/O DOPAMINE 200MG 5ML VIAL 2040 25EA/BX	September	December	No Available Sub	
379104	DOPAMINE 400MG, 10ML VIAL	June 2019			
377808	DOPAMINE 200MG/ D5 250ML BAG	mfctr DC'd			
118-2B0832	Dopamine, 200 mg, 5% Dextrose, inj, 250ml	unknown			
7808-22	MFG B/O Dopamine 400mg/D5W 250ml Bag 12EA/CS	August	2019		
118-2B0842EA	Dopamine, 400mg, 5% Dextrose, injection, 250ml	unknown			
377809	DOPAMINE 800MG/D5W 500ML BAG 3025 12EA/CS	November	December		
118-2B0843EA	Dopamine, 800mg, 5% Dextrose, injection, 500ml	unknown			
620-01	Duodote Auto Injectors	mfctr allocation		No Available Sub	
6019-10	Duramorph CII 10mg, 10ml ampule	mfctr allocation		No Available Sub	
AB2122-01	Enalaprilat 1.25mg, 1ml vial	June 2019		9787-10	Enalaprilat 1.25mg, 1ml Vial
1649-49	Epinephrine 0.3mg Autoinjector 2 pack	unknown		2102-02	Epinephrine Adult 2-Pack Autoinjector 0.3mg, 0.3ml *SAFETY*
1695-49	Epinephrine Auto Injector 0.15mg 2/pack	unknown		2101-02	Epinephrine Junior 2-Pack Auto-Injector 0.15mg, 0.3ml *SAFETY*
374921	EPINEPHRINE 1:10000 1MG 10ML LIFESHIELD SYRINGE	July	September	103-10	Epinephrine 1mg, 1ml ampule (not a direct sub,

BT item #	Description	Mfctr ETA for next release	Date Mfctr expects back orders to clear	Possible sub **	Description
373316	Epinephrine 1:10000 1mg 10ml Luer Jet	mfctr allocation		[illegible]	potential alternate)
0182-10	Esmolol 100mg, 10ml vial	July			
6695-02	ETOMIDATE 40MG, 20ML VIAL	mfctr allocation	October	6695-01	ETOMIDATE 20MG, 10ML VIAL
376029	AMIDATE 40MG, 20ML LIFESHIELD	TBD			
379094	C2 FENTANYL 0.05MG/ML 2ML SDV 25/BX	August	March 2019	6027-25 (mfctr allocation)	C2 Fentanyl, 0.05mg/ml, 2ml Vial, 25/Bx with Safety Seal
371276	C2 FENTANYL 2ML CPJT	June 2019			
371124	C2 FENTANYL 0.05MG/ML 2ML AMPULE 10/BOX CS24	August	March 2019		
379425	FENTANYL 0.05MG/ML 5ML SDV	August	March 2019	6028-25 (mfctr allocation)	C2 Fentanyl, 0.05mg/ml, 5ml Vial, 25/Bx
371133	C2 FENTANYL 5ML AMP	August	March 2019		
186063501	FUROSEMIDE 40MG 4ML ANSYR	July	July	6102-04	FUROSEMIDE 40MG 4ML SDV 2048 25EA/BX
0426-12	Haloperidol 5mg, 1ml vial	July			
373474	Haloperidol 5mg, 1ml vial	July			
373614	Hydralazine 20mg, 1ml vial	July			
1312-30	C2 Hydromorphone 2mg, 1ml cpjt	2019	March 2019		
CS1283-01	C2 HYDROMORPHONE 1MG/ML 1ML CARPUJECT 10/BX	June 2019	March 2019		
2051-05	C3 KETAMINE 100MG/ML, 5ML VIAL, 10/BX	Mar-19	June 2019		
0205310	C3 KETAMINE 50MG/ML, 10ML VIAL, 10/BX	Mar-19	June 2019	No Available Sub	
9508-10	C3 KETAMINE 50MG/ML 10ML VIAL	mfctr allocation			
0181-20	C3 Ketamine 10mg/ml, 20ml vial	unknown			
378701	Ketorolac 30mg cpj	June 2019		3795-01	Ketorolac 30mg, 1ml vial
378702	Ketorolac 60mg, 2ml cpj	June 2019		3796-01	Ketorolac 60mg, 2ml vial
372339	LABETALOL 20MG 4ML LUER LOCK CARPUJECT 1030 10EA/BX	TBD- BTM not accepting backorders due to extended BO period	March 2019		
2267-20	Labetalol 100 mg, 20 ml Vial	Best dating is 12/2018 (Please indicate acceptance of date at the time of order)	2019	alt item in set up process	
0934-98	Labetalol 100mg, 20ml vial	Best dating avaialble is less than 12 months (Please indicate acceptance of date at the time of order)			
9622-01	Labetalol 100mg, 20ml vial	Best date avaialble is 5/2019 (Please indicate acceptance of date at the time of order)			
3375-04	LEVOPHED 0.1% 4MG, 4ML VIAL 10ea/bx	July	September	No Available Sub	
4276-02	LIDOCAINE 1% 500MG, 50ML MDV 25/BX	August	December		
4276-01S	Lidocaine 1% 20ml vial	July	December		
3178-03EA	Lidocaine 1% w/Epinephrine 1:100,000 50ml Vial 25ea/bx 4bx/cs	July	September		
374277	Lidocaine 2% 20ml vial	August	December		
374904	LIDOCAINE 2% 100MG 5ML Lifeshield	July	September	373390	LIDOCAINE 2% 100MG 5ML LUER JET 1026B 10EA/PK
0074490301	LIDOCAINE 2% 100MG 5ML ANSYR	July	Mar-19		
373178	Lidocaine w/Epi 100,000ml 20ml vial	July	Sep-18		
2066-05	Lidocaine 2% 100mg, 5ml vial Preserv Free	July	Jun-19		
2b0973	Lidocaine 2gm, 500ml bag	mfctr removed from distribution channel			
5876	Lidocaine 2gm, 500ml bag	mfctr allocation			
118-2B096	Lidocaine 2gm/ D5 250ml bag	mfctr removed from distribution channel			

BT item #	Description	Mfctr ETA for next release	Date Mfctr expects back orders to clear	Possible sub **	Description
9594-20	Lidocaine 1gm, 250ml bag	mfctr allocation			
9584-20	Lidocaine 1 gm/D5W 250ml Bag 24ea/cs	mfctr allocation			
1539-31	C4 LORAZEPAM 4MG/ML 1MLCPJ	June 2019- BTM not accepting backorders due to extended BO period			
376779	C4 Lorazepam, 4mg, 1ml Vial	July	December		
371102	C4 LORAZEPAM 2MG 1ML LUER LOCKING CARPUJECT *REFRIG* CS02 10/BX	September	Mar-19	No Available Sub	
371100	C4 LORAZEPAM 2MG 1ML VIAL 10/BOX *REFRIGERATE**CS01	July	July		
6044-25 (limited stock on hand)	C4 Lorazepam, 2mg, 1ml Vial *Refrigerate* 25/Box	mfctr allocation			
064-11	MAGNESIUM SULFATE 50% 5GM 10ML Vial	July 2018			
74491401	Magnesium Sulfate 5gm ANSYR syringe	September			
064-03	Magnesium Sulfate 50% 1gm, 2ml vial	July 2018			
377715	Mannitol 20% 500ml bag	July	July	No Available Sub	
1587-50	Marcaine 0.25% 50ml vial	2019	2019		
3414-01	Metoclopramide 10mg, 2ml vial	July	July	No Available Sub	
372285	Metoprolol 5mg, 5ml ampule	Mar-19	June 2019	No Available Sub	
660-05	Metoprolol 5mg, 5ml vial	July	August	No Available Sub	
2305-05	C4 Midazolam 5mg, 5ml vial 10/BX	July	December	6059-10	C4 Midazolam 5mg, 5ml vial 10/BX
6059-10	C4 Midazolam 5mg, 5ml vial 10/BX	mfctr allocation			
2587-05	C4 Midazolam 10mg, 10ml vial 10 / box	September	September		
371108	C4 MIDAZOLAM **VERSED** 1MG/ML 2ML SLIMPACK CPJ 10/BOX CS08	June 2019		371113	C4 MIDAZOLAM 10MG, 2ML VIAL 10/BOX
3815-12	Morphine 10mg, 10ml vial	July	Mar-19	No Available Sub	
6127-25	C2 Morphine 10mg 1ml Vial 25/bx	manufacturer allocation			
1893-01	Morphine 10mg, 1ml CPJT	June 2019- BTM not accepting backorders due to extended BO period			
1891-01	Morphine 4mg, 1ml CPJT	TBD- BTM not accepting backorders due to extended BO period	Mar-19		
1890-01	Morphine 2mg, 1ml CPJT	4/1/2019- BTM not accepting backorders due to extended BO period			
0074146301	NALBUPHINE 10MG 1ML AMPULE 10EA/BX 2097	July	September	No Available Sub	
1465-01	Nalbuphine, 20mg, 1ml Ampule 10/bx	July	September		
0162-10	Norepinephrine 4mg, 4ml Ampule (1mg/ml) 10ea/bx	July		No Available Sub	
1120-12	Ondansetron Injection, 4mg, 2ml iSecure	June 2019- BTM not accepting backorders due to extended BO period		4759-01	Ondansetron 2mg/ml, 20ml vial
4755-02	Ondansetron Injection, 4mg, 2ml vial	July	September		
0390-10	Ondansetron 4mg dissolve tab	July			
0391-10	Ondansetron 8mg dissolve tab	July			
0074190301	Procainamide 500mg/ml 2ml vial	12/2018 expiration date			

Bound Tree

Your Partner in EMS

July 9, 2018 Pharmaceutical Backorder Report

BT item #	Description	Mfctr ETA for next release	Date Mfctr expects back orders to clear	Possible sub **	Description
3157-83	PROMETHAZINE 25MG/ML 1ML AMP 2098 25EA/BX	mfctr allocation	Unknown	0928-25	Promethazine, 25mg, 1ml Vial 25ea/bx
1132-04	Proventil Inhaler 6.7gm	July			
375204	Quelicin 200mg, 10ml vial	Best dating is 12/2018 (Please indicate acceptance of date at the time of order)	July		
4200-02	Rocuronium 10mg/ml, 5ml vial *REFRIGERATE* 10ea/bx	in stock		9558-05	Rocuronium 10mg/ml, 5ml vial *REFRIGERATE* 10ea/bx
4200-06	Rocuronium 10 mg/ml, 10 ml vial *REFRIGERATE* 10EA/BX	July	August	9558-10	Rocuronium 10 mg/ml, 10 ml vial *REFRIGERATE* 10EA/BX
0074490000	SODIUM BICARBONATE 8.4% 10ML PEDI LIFESHIELD 1044 10EA/BX	August	September		
0074488810	Sodium Chloride 0.9% 10ml Plastic Flip-Top Single Dose Vial	July	December	600-10	Sodium Chloride 0.9% 10ml Prefilled Syringe
374888	Sodium Chloride 0.9% 10ml Plastic Vial 25ea/bx	July	September		
0074488710	Sterile Water 10ml vial	July	September		
3977-03	Sterile Water, Bact. 30ml	August	September		
374887	STERILE WATER FOR INJ 20ML SDV 25EA/BX	July	December		
4887-50	STERILE WATER 50ML VIAL, 25/bx	August	October		
9746-10EA	Terbutaline 1mg, 1ml Vial 10ea/bx	Best Date available is 3/2019 (Please indicate acceptance of date at the time of order)			
6535-01	Vancomycin 1gm addvantage vial	July	2019		
1632-01	VECURONIUM 10MG 10ML VIAL 10EA/BX	2019 - BTM not accepting backorders due to extended BO period		0931-44 (Best Dating avail 03/2019)	VECURONIUM 10MG 10ML VIAL 10EA/BX

Although BTM has commented on supply dates provided to us by the manufacturer, our noted times of arrival are best estimates. The supply allocation and shipments from the manufacturer are fluctuating daily. Please call the following number for additional questions: BTM Customer Service Department: 800-533-0523.

Updated: July 9, 2018

BTM Item#	Item Description	mfctr item #	Mfctr	Mfctr status /ETA for next shipment	Mfctr expected clear date
371124	FENTANYL 0.05MG/ML 2ML AMPULE 10/BOX CS24	9093-32	Pfizer	August	**estimated recovery is 3/2019
9094-28	FENTANYL 0.05MG/ML 10ML VIALS 25/BX	9094-28	Pfizer	Available	
371276	FENTANYL 0.05MG/ML 2ML CARPUJECT 10/BX	1276-32	Pfizer	June 2019 BTM not accepting backorders due to extended BO period	
379094	FENTANYL 0.05MG/ML 2ML SDV 25/BX	9094-22	Pfizer	June	**estimated recovery is 3/2019
371133	FENTANYL 0.05MG/ML 5ML AMP 10/BX	9093-35	Pfizer	August	**estimated recovery is 3/2019
379425	FENTANYL 0.05MG/ML 5ML SDV 25/BOX	9094-25	Pfizer	August	**estimated recovery is 3/2019
not set up	Fentanyl 50mcg/ml, 2ml ampule	17478-0030-25	Akorn	backorder no ETA	
not set up	Fentanyl 50mcg/ml, 5ml ampule	17478-0030-55	Akorn	backorder no ETA	
6027-25	Fentanyl, 0.05mg/ml, 2ml Vial, 25/Bx with Safety Seal	6027-25	West-Ward	June	allocation
6028-25	Fentanyl, 0.05mg/ml, 5ml Vial, 25/Bx	6028-25	West-Ward	allocation	allocation
	Morphine 2mg (Simplist PFS)	76045-0004-10	Fresneius	allocation	
	Morphine 4mg (Simplist PFS)	76045-0005-10	Fresneius	backorder no ETA	
	Morphine 4mg, 1ml vial	6125-25	West-Ward	allocation	allocation
not set up	Morphine 5mg (Simplist PFS)	76045-0006-10	Fresneius	backorder no ETA	
not set up	Morphine 8mg (Simplist PFS)	76045-0007-10	Fresneius	backorder no ETA	
not set up	Morphine 10mg (Simplist PFS)	76045-0008-10	Fresneius	backorder no ETA	
1892-01	Morphine Sulfate, 8mg/ml, 1ml PF CPJ 10/bx	1892-01	Pfizer	June 2019	
6127-25	Morphine 10mg 1ml Vial 25/bx	6127-25	West-Ward	15-30 days	allocation

not set up	Morphine 5mg 10ml Vial 25/bx	3814-12	Pfizer	available	
3815-12	MORPHINE 10MG, 10ML VIAL 5/BX	3815-12	Pfizer	July	March 2019
1893-01	Morphine Sulfate, 10mg, 1ml PF CPJ 10/bx	1893-01	Pfizer	June 2019- BTM not accepting backorders due to extended BO period	
not set up	Morphine Sulfate, 10mg, 1ml iSecure 10/bx	1893-11	Pfizer	June 2019- BTM not accepting backorders due to extended BO period	
1890-01	Morphine Sulfate, 2mgl, 1ml PF CPJ 10/bx	1890-01	Pfizer	March 2019- BTM not accepting backorders due to extended BO period	
not set up	Morphine Sulfate, 2mg, 1ml iSecure 10/bx	1890-11	Pfizer	June 2019- BTM not accepting backorders due to extended BO period	
1891-01	Morphine Sulfate, 4mg, 1ml PF CPJ 10/bx	1891-01	Pfizer	March 2019- BTM not accepting backorders due to extended BO period	
not set up	Morphine Sulfate, 4mg, 1ml iSecure 10/bx	1891-11	Pfizer	June 2019- BTM not accepting backorders due to extended BO period	
6019-10	Duramorph 10mg, 10ml ampule 10/bx	6019-10	West-Ward	available	allocation
	Duramorph (Morphine Sulfate Injection, USP) C-II 50mg, 10ml vial	0641-6020-10	West-Ward	15-30	allocation
	Hydromorph Inj 10mg/1ML SSOL 1X10 VL	0409-2634-01	Pfizer	2019	March 2019
	Hydromorph Inj 1mg/1ML SSOL 1X10 AMP	0409-2552-01	Pfizer	TBD	
	Hydromorph Inj 1mg/1ML SSOL 1X10 iSEC	0409-1283-10	Pfizer	June 2019	
not set up	Hydromorph Inj 1mg/1ML Carpuject	0409-1283-31	Pfizer	TBD	March 2019
	Hydromorph Inj 2mg/1ML SSOL 1X10 AMP	0409-3356-01	Pfizer	TBD	
	Hydromorph Inj 2mg/1ML SSOL 1X10 CARP	0409-1312-30	Pfizer	June	Mar-19
not set up	Hydromorph Inj 2mg/1ML SSOL 1X10 iSEC	0409-1312-10	Pfizer	June 2019	
	Hydromorph Inj 2mg/1ML SSOL 1X25 VL	0409-3365-01	Pfizer	June	March 2019
	Hydromorph Inj 4mg/1ML SSOL 1X10 AMP	0409-2540-01	Pfizer	TBD	

not set up	Hydromorph Inj 4mg/1ML SSOL 1X10 CARP	0409-1304-31	Pfizer	June 2019	
	Hydromorphone Hydrochloride Injection, USP C-II 2 mg , 2 mL vial	0641-0121-25	West-Ward	8-14 days	
not set up	Hydromorphone Hydrochloride Injection, USP C-II 40 mg, 20 mL vial	0641-2341-41	West-Ward	allocation	allocation
CS1283-01	HYDROMORPHONE 1MG/ML 1ML CARPUJECT 10/BX	1283-31	Pfizer	Jun-19	March 2019

The following items are on nationwide, manufacturer shortage. Product is being allocated by the manufacturers listed at a rate that is significantly less than market demands.

BTM item #	Description	Mfctr	Mfctr #
1921-16217	Dextrose 10% 250 ml Bag 36ea/cs Baxter	BAXTER HEALTHCARE-DMG	2B0162Q
7520-20	Dextrose 10% 250 ml Bag 24ea/cs	B. BRAUN MEDICAL, INC	L5202
118-2B2074X	Dextrose 5% / Lactated Ringers 1000 ml Bag 14/cs	BAXTER HEALTHCARE-DMG	2B2074X
0085-04	Dextrose 5% / Sodium Chloride 0.45% 1000 ml Bag	BAXTER HEALTHCARE-DMG	2B1074X
7926-30	Dextrose 5% / Sodium Chloride 0.45% 500 ml VisIV Container 24/cs	HOSPIRA WORLDWIDE, INC	07926-30
C010124	Dextrose 5% / Sodium Chloride 0.9% 1000 ml Bag 14/cs	BAXTER HEALTHCARE-DMG	2B1064X
G0902	Dextrose 5% 1000 ml Bag 12ea/cs BBraun L5100	B. BRAUN MEDICAL, INC	L5100
1921-06102	Dextrose 5% 150 ml Bag 36ea/cs	BAXTER HEALTHCARE-DMG	2B0061
7922-02	Dextrose 5% 250 ml Bag 24ea/cs	HOSPIRA WORLDWIDE, INC	07922-02
G0900	Dextrose 5% 250 ml Bag 24ea/cs BBraun L5102	B. BRAUN MEDICAL, INC	L5102
7922-25	Dextrose 5% 250 ml VisIV Container 24/cs	HOSPIRA WORLDWIDE, INC	07922-25
355101	Dextrose 5% 500 ml Bag 24ea/cs BBraun L5101	B. BRAUN MEDICAL, INC	L5101
600064X	Dextrose 5% in Water 1000 ml Bag 14ea/cs	BAXTER HEALTHCARE-DMG	2B0064X
600062	Dextrose 5% in Water 250 ml Bag 36ea/cs Baxter 2B0062Q	BAXTER HEALTHCARE-DMG	2B0062Q
600063	Dextrose 5% in Water 500 ml Bag 24ea/cs Baxter 2B0063Q	BAXTER HEALTHCARE-DMG	2B0063Q
357953	Lactated Ringers 1000 ml Bag 12ea/cs	HOSPIRA WORLDWIDE, INC	07953-09
357500	Lactated Ringers 1000 ml Bag 12ea/cs BBraun L7500	B. BRAUN MEDICAL, INC	L7500
602324X	Lactated Ringers 1000 ml Bag 14ea/cs Baxter 2B2324X	BAXTER HEALTHCARE-DMG	2B2324X
7953-48	Lactated Ringers 1000 ml VisIV Container	HOSPIRA WORLDWIDE, INC	07953-48
7953-02	Lactated Ringers 250 ml Bag 24ea/cs	HOSPIRA WORLDWIDE, INC	07953-02
602325	Lactated Ringers 250 ml Bag 36ea/cs Baxter 2B2322Q	BAXTER HEALTHCARE-DMG	2B2322Q
7953-03	Lactated Ringers 500 ml Bag 24ea/cs	HOSPIRA WORLDWIDE, INC	07953-03
602323	Lactated Ringers 500 ml Bag 24ea/cs Baxter 2B2323Q	BAXTER HEALTHCARE-DMG	2B2323Q
G0903	Lactated Ringers 500 ml Bag 24ea/cs BBraun L7501	B. BRAUN MEDICAL, INC	L7501
G0940	Normasol-R 1000 ml Bag 12/cs	HOSPIRA WORLDWIDE, INC	7967-09
2639	Sodium Chloride 0.45% 1000 ml Bag 14ea/cs Baxter	BAXTER HEALTHCARE-DMG	2B1314X
2638	Sodium Chloride 0.45% 500 ml Bag 24ea/cs Baxter	BAXTER HEALTHCARE-DMG	2B1313Q
3940	Sodium Chloride 0.45% 500 ml Bag 24ea/cs Hospira	HOSPIRA WORLDWIDE, INC	07985-03
7984-23	Sodium Chloride 0.9% 100 ml Bag 48ea/cs Individually Packaged	HOSPIRA WORLDWIDE, INC	07984-23
358437	Sodium Chloride 0.9% 100 ml Bag Singles 96ea/cs	BAXTER HEALTHCARE-DMG	2B1307
12294	Sodium Chloride 0.9% 100 ml Bag 16/pk 6pk/cs Baxter	BAXTER HEALTHCARE-DMG	2B1309

7984-11	Sodium Chloride 0.9% 100 ml VisIV Bag 60ea/cs	HOSPIRA WORLDWIDE, INC	07984-11
608309	Sodium Chloride 0.9% 1000 ml Bag 12ea/cs	HOSPIRA WORLDWIDE, INC	07983-09
358000	Sodium Chloride 0.9% 1000 ml Bag 12ea/cs BBraun L8000	B. BRAUN MEDICAL, INC	L8000
601324X	Sodium Chloride 0.9% 1000 ml Bag 14ea/cs	BAXTER HEALTHCARE-DMG	2B1324X
7983-48	Sodium Chloride 0.9% 1000 ml VisIV Bag 12ea/cs	HOSPIRA WORLDWIDE, INC	07983-48
601321	Sodium Chloride 0.9% 150 ml Bag 36ea/cs	BAXTER HEALTHCARE-DMG	2B1321
355410	Sodium Chloride 0.9% 25 ml Fill in a 100 ml Bag 116ea/cs	B. BRAUN MEDICAL, INC	S8004-5410
608302	Sodium Chloride 0.9% 250 ml Bag 24ea/cs	HOSPIRA WORLDWIDE, INC	07983-02
358002	Sodium Chloride 0.9% 250 ml Bag 24ea/cs BBraun L8002	B. BRAUN MEDICAL, INC	L8002
601322	Sodium Chloride 0.9% 250 ml Bag 36ea/cs Baxter 2B1322Q	BAXTER HEALTHCARE-DMG	2B1322Q
7983-25	Sodium Chloride 0.9% 250 ml VisIV Bag 24ea/cs	HOSPIRA WORLDWIDE, INC	07983-25
C898307	Sodium Chloride 0.9% 50 ml Mini-Bag 96/cs	BAXTER HEALTHCARE-DMG	2B1301
7984-06	Sodium Chloride 0.9% 50 ml VisIV Bag 60ea/cs	HOSPIRA WORLDWIDE, INC	07984-06
608304	Sodium Chloride 0.9% 500 ml Bag 24ea/cs	HOSPIRA WORLDWIDE, INC	07983-03
601323	Sodium Chloride 0.9% 500 ml Bag 24ea/cs Baxter 2B1323Q	BAXTER HEALTHCARE-DMG	2B1323Q
358001	Sodium Chloride 0.9% 500 ml Bag 24ea/cs BBraun L8001	B. BRAUN MEDICAL, INC	L8001
7983-30	Sodium Chloride 0.9% 500 ml VisIV Bag 24ea/cs	HOSPIRA WORLDWIDE, INC	07983-30
1921-35317	Sodium Chloride 3% 500 ml Bag 24/cs	BAXTER HEALTHCARE-DMG	2B1353Q
AB7990-09C	Sterile Water 1000 ml Bag 12/cs	HOSPIRA WORLDWIDE, INC	07990-09

Letters

RESEARCH LETTER

Prevalence of Immunosuppression Among US Adults, 2013

The number of immunosuppressed adults in the United States is unknown but thought to be increasing because of both greater life expectancy among immunosuppressed adults due to improvements in medical management, as well as new indications for immunosuppressive treatments.[1-4] Immunosuppression increases the risks and severity of primary or reactivation infections; its prevalence has implications for food and water safety, tuberculosis control, vaccine programs, infection control strategies, outbreak preparedness, travel medicine, and other facets of public health.[1] We present data on the prevalence of self-reported immunosuppressed adults in the United States.

Supplemental content at jama.com

Methods | We conducted a cross-sectional analysis of noninstitutionalized civilian adults in the United States aged 18 years or older using the 2013 National Health Interview Survey (NHIS), an annual health survey conducted via household interviews.[5] The NHIS uses a multistage probability design; sample weights allow inferences on national prevalence to be estimated. The National Center for Health Statistics research ethics review board oversees the NHIS, including the questions used in this study; participants provided verbal informed consent.[5]

In 2013, respondents were asked whether they had ever been told by a "doctor or other health professional" that their immune system was weakened. Those responding yes were

Table. Self-reported Immunosuppressed Status

	No. (%) (n = 951)	Prevalence per 100 US Population, % (95% CI)
Currently immunosuppressed	951 (2.8)[a]	2.7 (2.4-2.9)
Sex		
Male	298 (31.3)	1.8 (1.5-2.1)
Female	653 (68.7)	3.5 (3.1-3.9)
Race/ethnicity[b]		
Hispanic	128 (13.5)	1.6 (1.2-1.9)
Non-Hispanic		
White	641 (67.4)	3.0 (2.7-3.4)
Black	122 (12.8)	2.3 (1.8-2.8)
Asian	29 (3.0)	1.7 (0.8-2.7)
Other	31 (3.3)	3.9 (2.0-5.9)
Age group, y		
18-39	182 (19.1)	1.6 (1.3-1.9)
40-49	136 (14.3)	2.3 (1.8-2.8)
50-59	281 (29.5)	4.4 (3.7-5.1)
60-69	213 (22.4)	3.9 (3.2-4.5)
70-79	101 (10.6)	3.1 (2.4-3.8)
≥80	38 (4.0)	2.5 (1.4-3.5)

[a] Based on responses from 34 426 participants to survey questions in the Box. Response of "yes" to question 1 (n = 2148) and question 2 and to either questions 3 or 4 or had hematologic cancer within last 2 years (latter based on question 7 and date calculations from question 8). Those not meeting this definition were categorized as not immunosuppressed. Remaining questions used to assess validity of responses; immune status of respondents providing contradictory answers was categorized using sensitivity analyses (eTable 1 and eTable 2 in the Supplement). There were 103 excluded due to response of "refuse" or "do not know" to any of the questions.

[b] Self-identified from provided categories; categories are mutually exclusive.

Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

New CDC report: More than 100 million Americans have diabetes or prediabetes

Diabetes growth rate steady, adding to health care burden

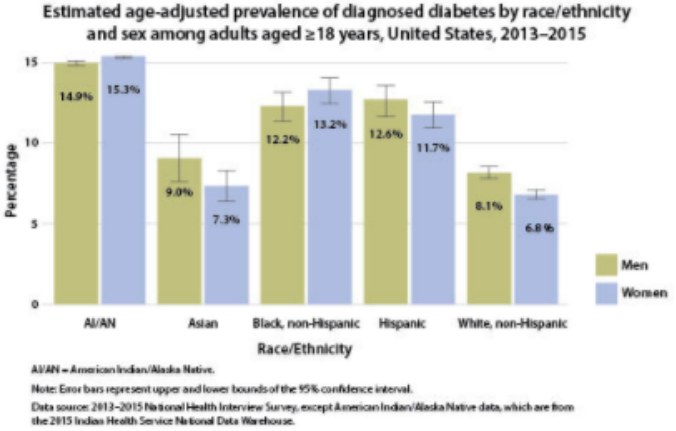
Press Release

For Immediate Release: Weekday, July 18, 2017

Contact: Media Relations
(404) 639-3286

More than 100 million U.S. adults are now living with diabetes or prediabetes, according to a new report released today by the Centers for Disease Control and Prevention (CDC). The report finds that as of 2015, 30.3 million Americans – 9.4 percent of the U.S. population –have diabetes. Another 84.1 million have prediabetes, a condition that if not treated often leads to type 2 diabetes within five years.

The report confirms that the rate of new diabetes diagnoses remains steady. However, the disease continues to represent a growing health problem: Diabetes was the seventh leading cause of death in the U.S. in 2015. The report also includes county-level data for the first time, and shows that some areas of the country bear a heavier diabetes burden than others.



View large image and text description

"Although these findings reveal some progress in diabetes management and prevention, there are still too many Americans with diabetes and prediabetes," said CDC Director Brenda Fitzgerald, M.D. "More than a third of U.S. adults have prediabetes, and the majority don't know it. Now, more than ever, we must step up our efforts to reduce the burden of this serious disease."

Symptoms, Testing, and Treatment

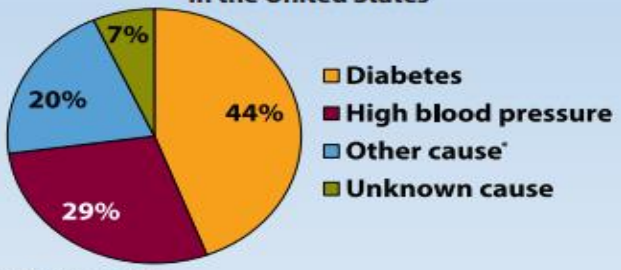
- People with CKD may not feel ill or notice any symptoms. The only way to find out for sure if you have CKD is through specific blood and urine tests. These tests include measurement of both the creatinine level in the blood and protein in the urine.
- Once detected, CKD may be addressed through lifestyle changes, including making healthier choices about what you eat and drink, and can often be treated with medications. These approaches and treatments may keep CKD from getting worse and may prevent additional health problems such as heart disease.
- People with diabetes or high blood pressure who are diagnosed with CKD should talk to their doctor about treating these conditions to keep their blood sugar and blood pressure under control and lower their risk for kidney failure.

Health Problems Caused and Affected by CKD

Kidney Failure

- Kidney disease usually gets worse over time though treatment has been shown to slow progression. When the kidneys stop working, dialysis or kidney transplant is needed for survival. Kidney failure treated with dialysis or kidney transplant is called end-stage renal disease (ESRD). Not all patients with kidney disease progress to kidney failure and, in some patients, kidney disease progresses to kidney failure even with proper treatment.

Reported Causes of New Cases of ESRD in the United States



N=118,014 (all ages, 2014)
Source: US Renal Data System
*Includes glomerulonephritis and cystic kidney disease, among other causes.

Renal is a medical term meaning "having to do with the kidneys."

Some Facts About ESRD

- In 2014, 118,000 people in the United States started treatment for ESRD, and 662,000 were living on chronic dialysis or with a kidney transplant.
- Men are 64% more likely than women to develop ESRD.
- African Americans are 3 times more likely than whites to develop ESRD.
- Hispanics are 35% more likely than non-Hispanics to develop ESRD.
- In US adults aged 18 years or older, the main reported causes of new cases of ESRD are diabetes and high blood pressure.
- In US adolescents aged 13 to 17 years, the main reported cause of new cases of ESRD is glomerulonephritis (inflammation of the kidneys).

Heart Disease and Stroke

- Having kidney disease increases the chances of also having heart disease and stroke.
- Managing blood pressure, blood sugar, and cholesterol levels—all risk factors for heart disease and stroke—is more difficult, but much more important in the presence of CKD.

Other Health Consequences of CKD

- Anemia or low number of red blood cells can cause fatigue and weakness.
- Infections can occur because of a weakened immune system.
- Low calcium levels and high phosphorus levels in the blood can cause bone problems.
- High potassium levels in the blood (hyperkalemia) can cause an irregular or abnormal heartbeat.
- Loss of appetite or eating less.
- Excess fluids in the body causing high blood pressure, swelling in the legs, or shortness of breath because of fluid in the lungs (a condition known as pulmonary edema).
- Depression or lower quality of life.

Risk of Dying

Premature death from both heart disease and from all causes is higher in adults with CKD compared with adults without CKD.

"A powerful book that looks at the threat of emerging diseases with clarity and realism, and offers us not just fear but plans." —**RICHARD PRESTON, author of *The Hot Zone* and *The Demon in the Freezer***

DEADLIEST ENEMY

Michael T. Osterholm, PhD, MPH
and Mark Olshaker

OUR WAR AGAINST KILLER GERMS

Infectious Diseases and a Global Crisis Agenda

- Priority 1: Influenza, influenza and influenza
- Priority 2: Antimicrobial resistance
- Priority 3: Vaccines and diseases of critical regional importance
- Priority 4: Mosquitoes, mosquitoes and mosquitoes
- Priority 5: Bioterrorism
- Priority 6: Gain of function and dual use research of concern
- Priority 7: HIV, TB and malaria
- Priority 8: Climate change
- Priority 9: One Health

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University of Minnesota

Infectious Diseases and a Global Crisis Agenda

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PANDEMIC

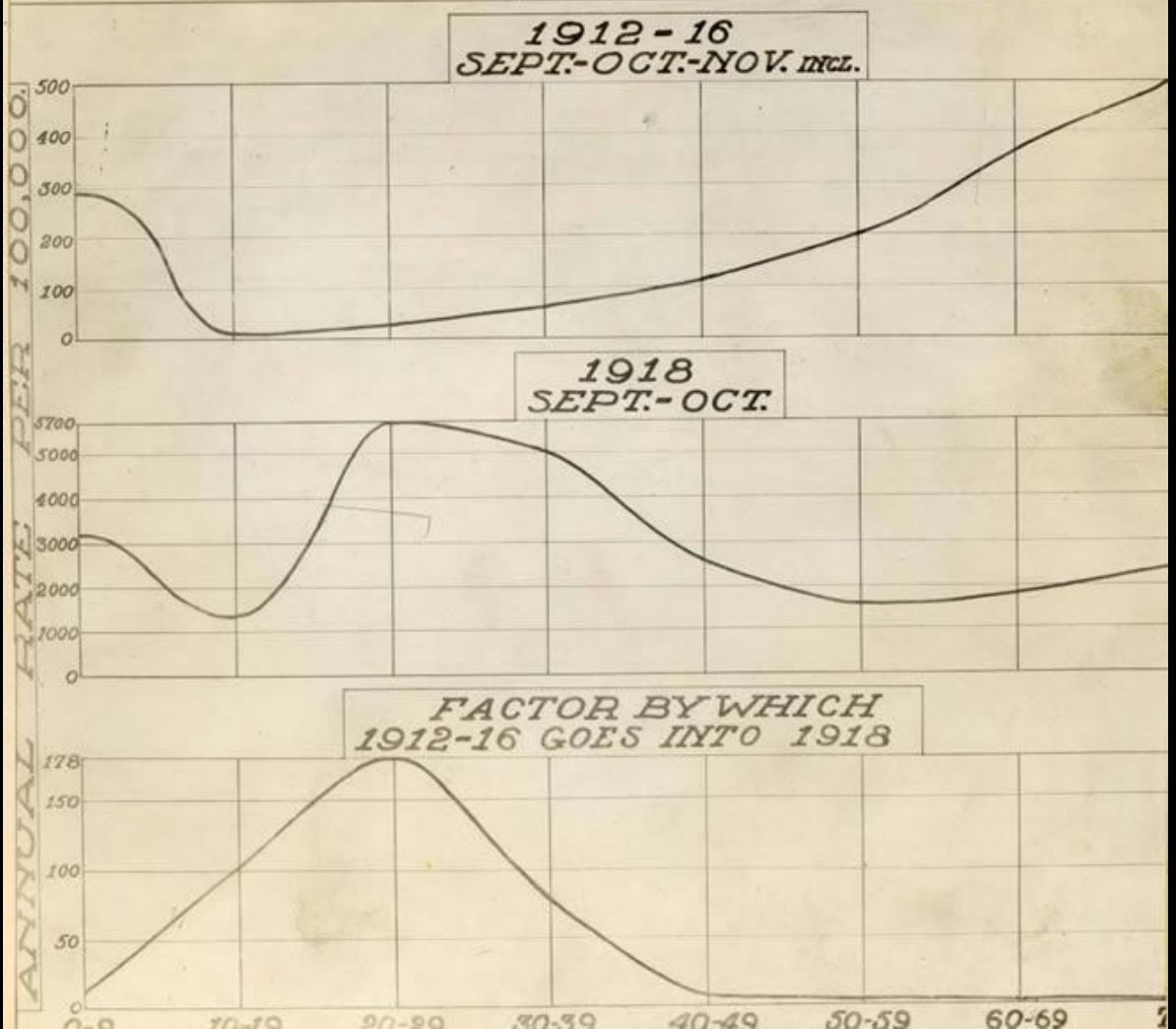
The Great Influenza

THE EPIC STORY OF THE 1918 PANDEMIC

John M. Barry

author of *Rising Tide*

AGE DISTRIBUTION OF DEATHS FROM INFLUENZA AND PNEUMONIA AT BOSTON



UNIVERSITY OF MINNESOTA

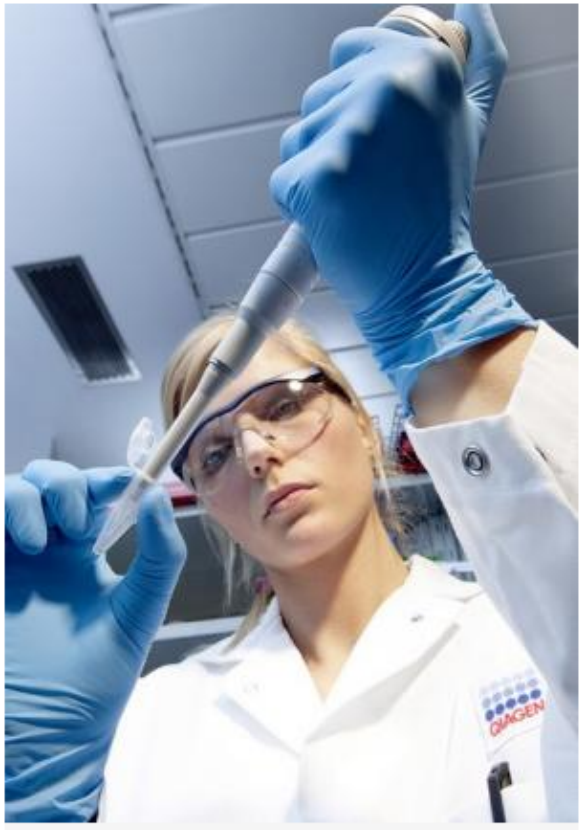
CIDRAP Center for Infectious Disease Research and Policy

Experts review 1918 pandemic, warn flu is global threat

Filed Under: Pandemic Influenza; Business Preparedness

Stephanie Soucheray | News Reporter | CIDRAP News | May 07, 2018

The US Centers for Disease Control and Prevention (CDC) partnered with Emory University to mark the 100th anniversary of the 1918 flu with a symposium about influenza pandemics: when and if they will strike, how ready the United States is to confront a pandemic, and how to do so.



Qiagen / Flickr cc

"The more I learn about flu, the less I know," said Michael Osterholm PhD, MPH, director of the University of Minnesota's Center for Infectious Disease Research and Policy, publisher of CIDRAP News, as he began his remarks on the challenges of anticipating the next pandemic. Osterholm's sentiment was echoed by others throughout the day-long event. No one argued that the United States is prepared to face a flu pandemic, as experts explained the current status of avian flu viruses, a universal vaccine, and challenges to preparedness.

"I don't know what the virus will do," said Osterholm. "But history tells us that influenza comes back and comes back and comes back."

World Health Organization

Warning signals from the volatile world of influenza viruses

February 2015

The current global influenza situation is characterized by a number of trends that must be closely monitored. These include: an increase in the variety of animal influenza viruses co-circulating and exchanging genetic material, giving rise to novel strains; continuing cases of human H7N9 infections in China; and a recent spurt of human H5N1 cases in Egypt. Changes in the H3N2 seasonal influenza viruses, which have affected the protection conferred by the current vaccine, are also of particular concern.

Viruses in wild and domestic birds

The diversity and geographical distribution of influenza viruses currently circulating in wild and domestic birds are unprecedented since the advent of modern tools for virus detection and characterization. The world needs to be concerned.

Viruses of the H5 and H7 subtypes are of greatest concern, as they can rapidly mutate from a form that causes mild symptoms in birds to one that causes severe illness and death in poultry populations, resulting in devastating outbreaks and enormous losses to the poultry industry and to the livelihoods of farmers.

World Health Organization

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World Health Organization

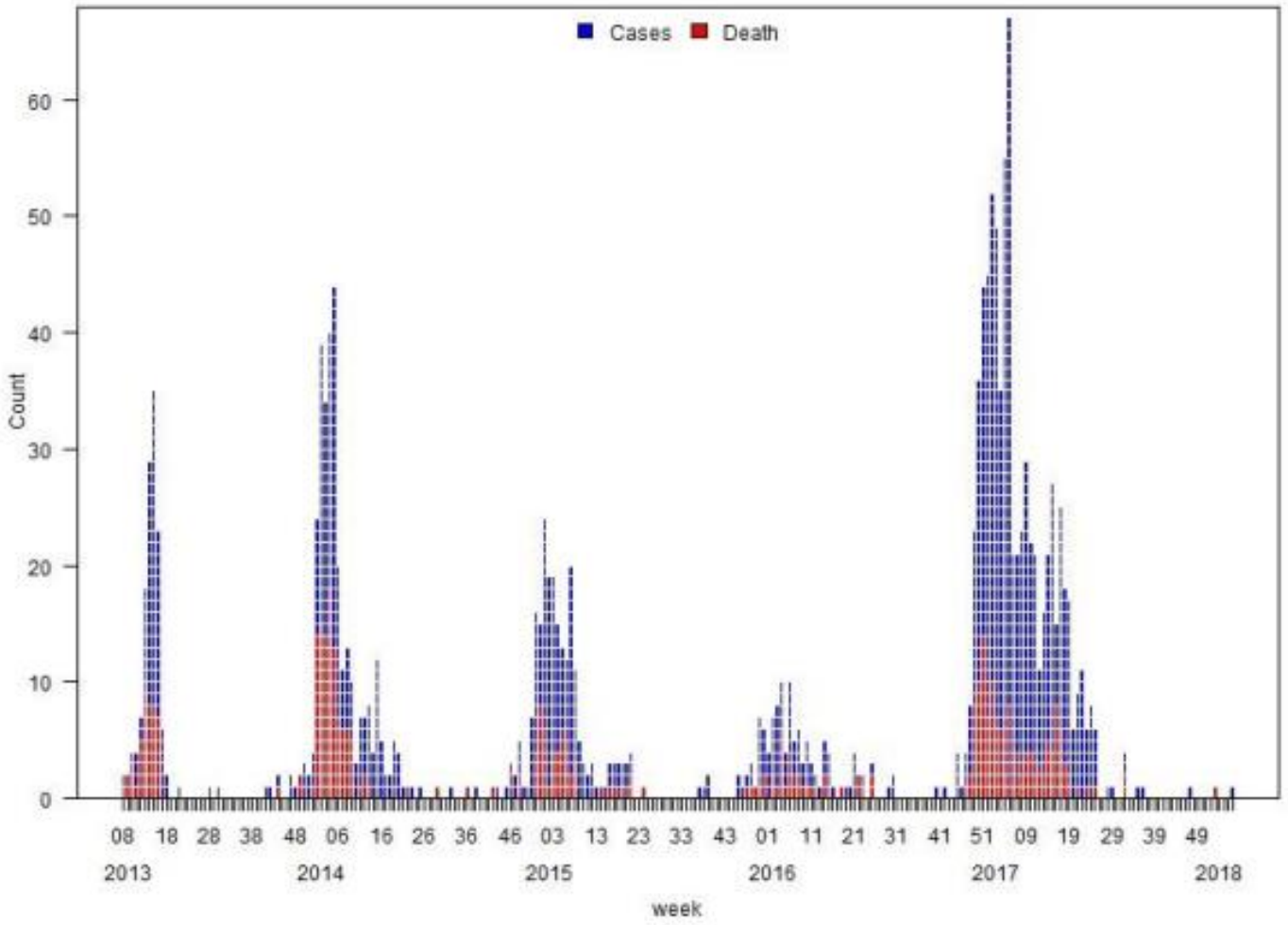
Warning signals from the volatile world of influenza viruses

February 2015

Since the start of 2014, the Organisation for Animal Health, or OIE, has been notified of 41 H5 and H7 outbreaks in birds involving 7 different viruses in 20 countries in Africa, the Americas, Asia, Australia, Europe, and the Middle East. Several are novel viruses that have emerged and spread in wild birds or poultry only in the past few years.

World Health Organization

Figure 1: Epidemiological curve of avian influenza A(H7N9) cases in humans by week of onset, 2013-2018.



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Avian Flu Scan for Sep 07, 2017

Wrap-up of China's fifth H7N9 waves highlights dominance of new lineage

The number of towns, provinces, and regions that reported human cases in China's unprecedented fifth wave of H7N9 avian influenza activity, which began in October 2016, is higher than the previous four waves combined, researchers from the US Centers for Disease Control and Prevention and their collaborators in China reported today in the latest edition of *Morbidity and Mortality Weekly Report* (*MMWR*).

In their wrap-up of the latest epidemiologic and genetic sequencing information, the group said 759 illnesses were reported in the fifth wave, 281 of them fatal, and that among several new developments over the past months, the newly emerged Yangtze River Delta low pathogenic lineage accounted for most of the activity and scores as having the highest potential pandemic risk (moderate to high) on the CDC's Influenza Risk Assessment Tool. In February, World Health Organization (WHO) flu vaccine advisors recommended new candidate vaccine viruses for the Yangtze River Delta lineage, for which current H7N9 candidate vaccine viruses show limited protection.

Other notable features of the fifth wave were the emergence of the highly pathogenic strain in poultry, which was found in 27 of 759 cases and was most often seen in those from rural areas, people with early hospital admission, and in those who had been exposed to sick or dead poultry, according to the report.

Despite the wider geographic spread, the patterns of spread from poultry to humans and from human to humans haven't changed much, the group said. Fourteen clusters of two or three people were reported to the WHO in the fifth wave, compared to an average of nine in each of the earlier waves. Transmission from poultry is rare and the virus doesn't pass easily among people, but when infections do occur, they are linked to severe and fatal infections, requiring close vigilance, they added.

Sep 8 *MMWR* report

University of Minnesota

CIDRAP Center for Infectious Disease Research and Policy

Detailing recent H7N9 cases, WHO notes 3 clusters

Filed Under: H7N9 Avian Influenza; Avian Influenza (Bird Flu)

Lisa Schnirring | News Editor | CIDRAP News | Mar 16, 2017

Ben Piven / Flickr cc

The World Health Organization (WHO) in two new reports weighed in on 84 recently reported H7N9 avian influenza infections reported by China, including a recent imported case from Hong Kong, noting three possible human-to-human illness clusters.

In the overviews, posted yesterday and today, the WHO covered cases reported between Feb 24 and Mar 10. China is experiencing its fifth and biggest wave of H7N9 activity, which surged dramatically in December and peaked in February.

Though cases are starting to decline, China continues to report new infections, such as a case from the city of Chongqing reported today by Hong Kong's Centre for Health Protection (CHP).

Clusters include family members, hospital patient

Of the 84 patients noted in the WHO updates, illness onsets ranged from Feb 24 to Mar 4. Fourteen deaths were reported, and for patients with available clinical information, 60 have pneumonia or severe pneumonia. One had a mild infection.

UNIVERSITY OF MINNESOTA

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News Scan for Dec 01, 2017

Flu expert says H7N9 viruses are rare 2nd warning of public health threat

The world rarely receives advance notice of a significant public health threat, but the detection of the highly pathogenic form of H7N9 avian influenza in China serves as a second warning, an expert from the World Health Organization's collaborating center in Australia said today in a *Cell Research* commentary.

Recent studies found a high level of genetic diversity in H7N9 viruses from China, including seven highly pathogenic viruses bearing four different hemagglutinin sequences. In addition, an isolate from a human showed a mutation that may make it more virulent. So far, 28 human infections with highly pathogenic H7N9 have been reported.

Kanta Subbarao, MBBS, MPH, wrote that the emergence of highly pathogenic H7N9 represents a second warning in two ways. First, uncontrolled spread of highly pathogenic H5N1 allowed the virus to become enzootic, allowing it to evolve, spread, and cause severe sporadic infections in humans. Second, low-pathogenic H7N9 viruses in 2017 spread more widely, and scientists found that highly pathogenic viruses came from more than one low-pathogenic precursor. "Once is a warning, twice is a lesson; we cannot afford to ignore the spread of H7N9 viruses and allow them to become enzootic," she wrote.

Focusing control measures on only poultry flocks infected with highly pathogenic H7N9 won't solve the problem, Subbarao said. Both forms of H7N9 need to be eradicated from avian species, and human isolates need to be monitored very closely.

Dec 1 *Cell Res* commentary

ALL Findings

Update on Avian Influenza Findings
Poultry Findings Confirmed by USDA's National Veterinary Services Laboratories

Animal Health

- Contact Us
- Program Overview
- Animal Disease Information
- Emergency Management
- Export from the U.S.
- Import into the U.S.
- Laboratory Information Services

223 Detections Reported	**48,091,293** Birds Affected
12/19/14 First Detection Reported	**6/17/15** Last Detection Reported

Efficacy and effectiveness of influenza vaccines: a systematic review and meta-analysis

Michael T Osterholm, Nicholas S Kelley, Alfred Sommer, Edward A Belongia

Summary

Background No published meta-analyses have assessed efficacy and effectiveness of licensed influenza vaccines in the USA with sensitive and highly specific diagnostic tests to confirm influenza.

Methods We searched Medline for randomised controlled trials assessing a relative reduction in influenza risk of all circulating influenza viruses during individual seasons after vaccination (efficacy) and observational studies meeting inclusion criteria (effectiveness). Eligible articles were published between Jan 1, 1967, and Feb 15, 2011, and used RT-PCR or culture for confirmation of influenza. We excluded some studies on the basis of study design and vaccine characteristics. We estimated random-effects pooled efficacy for trivalent inactivated vaccine (TIV) and live attenuated influenza vaccine (LAIV) when data were available for statistical analysis (eg, at least three studies that assessed comparable age groups).

Findings We screened 5707 articles and identified 31 eligible studies (17 randomised controlled trials and 14 observational studies). Efficacy of TIV was shown in eight (67%) of the 12 seasons analysed in ten randomised controlled trials (pooled efficacy 59% [95% CI 51–67] in adults aged 18–65 years). No such trials met inclusion criteria for children aged 2–17 years or adults aged 65 years or older. Efficacy of LAIV was shown in nine (75%) of the 12 seasons analysed in ten randomised controlled trials (pooled efficacy 83% [69–91]) in children aged 6 months to 7 years. No such trials met inclusion criteria for children aged 8–17 years. Vaccine effectiveness was variable for seasonal influenza: six (35%) of 17 analyses in nine studies showed significant protection against medically attended influenza in the outpatient or inpatient setting. Median monovalent pandemic H1N1 vaccine effectiveness in five observational studies was 69% (range 60–93).

Interpretation Influenza vaccines can provide moderate protection against virologically confirmed influenza, but such protection is greatly reduced or absent in some seasons. Evidence for protection in adults aged 65 years or older is lacking. LAIVs consistently show highest efficacy in young children (aged 6 months to 7 years). New vaccines with improved clinical efficacy and effectiveness are needed to further reduce influenza-related morbidity and mortality.

Funding Alfred P Sloan Foundation.

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See Online/Comment DOI:10.1016/S1473-3099(11)70383-4

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Correspondence to: Prof Michael Osterholm, Center for Infectious Disease Research and Policy, University of Minnesota, MN 55455, USA mto@umn.edu

Introduction

The main strategy for prevention and control of seasonal and pandemic influenza for the past 60 years has been vaccination.[1,2] The first population-scale use of an inactivated influenza vaccine was in US military personnel in 1945.[3] In 1960, the US Surgeon General, in response to substantial morbidity and mortality during the 1957–58 pandemic, recommended annual influenza vaccination for individuals with chronic debilitating disease, people aged 65 years or older, and pregnant women.[4] This recommendation was made without data for vaccine efficacy or effectiveness for these high-risk populations. Instead, it was made on the basis of studies showing efficacy in young, healthy military recruits with clinical illness or seroconversion as primary measures of infection. In 1964, the Advisory Committee on Immunization Practices (ACIP) reaffirmed this recommendation but noted the absence of efficacy data.[5] Because of the longstanding public health recommendation of annual vaccination in the elderly and other high-risk groups, such patients have been excluded from placebo-controlled randomised clinical trials in the USA for the past 50 years. The ACIP supports the widely held view that inclusion of individuals at high-risk of influenza in placebo-controlled trials would be unethical.[2]

In 2010, the ACIP established the first recommendation of national universal seasonal influenza vaccination.[2] Vaccination every year is now recommended with trivalent inactivated vaccine (TIV) for all individuals aged 6 months or older, or live attenuated influenza vaccine (LAIV) for healthy non-pregnant people aged 2–49 years.[2] In the USA, TIV has been used since 1978 and accounts for approximately 90% of influenza vaccine given at present.[6] The LAIV was first approved for use in the USA in 2003 and accounts for approximately 9% of the vaccine given.[7,8] The universal influenza vaccination recommendation came after a decade of incremental changes during which the ACIP expanded recommendations to include an ever-increasing proportion of the US population.

Previous meta-analyses of TIV or LAIV efficacy and effectiveness have included studies that used diagnostic

Seasonal Influenza Vaccine Effectiveness, 2005-2017

CDC conducts studies to measure the benefits of seasonal flu vaccination each flu season to help determine how well flu vaccines are working. These vaccine effectiveness (VE) studies regularly assess and confirm the value of flu vaccination as a public health intervention. Study results of vaccine effectiveness can vary based on study design, outcome(s) measured, population studied and the season in which the flu vaccine was studied.

CDC has been working with researchers at universities and hospitals since the 2003-2004 flu season to estimate how well flu vaccine works through observational studies using medically attended laboratory-confirmed flu as the outcome. This is the U.S. Flu Vaccine Effectiveness (VE) Network. The U.S. Flu VE Network currently consists of five study sites across the United States that measure the flu vaccine's effectiveness at preventing outpatient medical visits due to laboratory-confirmed influenza. CDC's observational studies at U.S. Flu VE Network sites measure outpatient visits* for laboratory-confirmed influenza infections using a highly accurate lab test called rRT-PCR to verify the outcome. These studies compare the odds of vaccination among outpatients with acute respiratory illness and laboratory-confirmed influenza infection to the odds of vaccination among outpatients with acute respiratory illness who test negative for influenza infection.

The overall, adjusted vaccine effectiveness estimates for influenza seasons from 2005-2017 are noted in the chart below. (Estimates are typically adjusted for study site, age, sex, underlying medical conditions, and days from illness onset to enrollment.)

Seasonal Influenza Vaccine Effectiveness, 2005-2018

Table. Adjusted vaccine effectiveness estimates for influenza seasons from 2005-2018

Influenza Season†	Reference	Study Site(s)	No. of Patients‡	Adjusted Overall VE (%)	95% CI
2004-05	Belongia 2009	WI	762	10	-36, 40
2005-06	Belongia 2009	WI	346	21	-52, 59
2006-07	Belongia 2009	WI	871	52	22 ,70
2007-08	Belongia 2011	WI	1914	37	22, 49
2008-09	Unpublished	WI, MI, NY, TN	6713	41	30, 50
2009-10	Griffin 2011	WI, MI, NY, TN	6757	56	23, 75
2010-11	Treanor 2011	WI, MI, NY, TN	4757	60	53, 66
2011-12	Ohmit 2014	WI, MI, PA, TX, WA	4771	47	36, 56
2012-13	McLean 2014	WI, MI, PA, TX, WA	6452	49	43, 55
2013-14	Gaglani 2016	WI, MI, PA, TX, WA	5999	52	44, 59
2014-15	Zimmerman 2016	WI, MI, PA, TX, WA	9311	19	10, 27
2015-16	Jackson 2017	WI, MI, PA, TX, WA	6879	48	41, 55
2016-17*	Unpublished final estimates.	WI, MI, PA, TX, WA	7410	40*	32, 46*
2017-18**	Flannery 2018	WI, MI, PA, TX, WA	4,562	36**	27, 44**

THE COMPELLING NEED FOR GAME-CHANGING INFLUENZA VACCINES

AN ANALYSIS OF THE INFLUENZA VACCINE ENTERPRISE AND RECOMMENDATIONS FOR THE FUTURE

OCTOBER 2012

CIDRAP
Center for Infectious Disease Research & Policy
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NIAID releases strategy toward universal flu vaccine

Filed Under: Influenza Vaccines; Pandemic Influenza

Lisa Schnirring | News Editor | CIDRAP News | Feb 28, 2018

Federal health officials today spelled out a strategy for developing a universal flu vaccine that includes a profile of what such a vaccine would accomplish and the different research areas that scientists would need to tackle to bring more protective vaccines for seasonal and pandemic influenza to market.

NIAID

A team from the National Institute of Allergy and Infectious Diseases (NIAID), led by its director, Anthony Fauci, MD, based the plan on discussions from a workshop convened in June 2017. They published the strategy today in the *Journal of Infectious Diseases*.

The plan's release comes amid a tough flu season dominated by the problematic H3N2 strain, which again laid bare gaps in protection with most currently available vaccines. Suboptimal protection by flu vaccines and the desire for better ones that can provide long-lasting protection against a range of strains, even a new pandemic one, has also caught the attention of a group of US senators. On Feb 15 they proposed a law what would invest $1 billion in

The New York Times

Opinion | OP-ED CONTRIBUTORS

We're Not Ready for a Flu Pandemic

By MICHAEL T. OSTERHOLM and MARK OLSHAKER JAN. 8, 2018

The influenza season is just getting started in the United States, and it already promises to be more severe than usual. Hospital emergency rooms are filling up with flu sufferers, and pharmacies have reported medicine shortages. Twelve children had died as of last month. To make matters worse, in Australia, which experienced its flu season four to six months ago, the current vaccine appeared to be only about 10 percent effective against this year's dominant strain.

Yet as bad as this winter's epidemic is, it won't compare with the flu pandemic that is almost certainly on the horizon if we don't dedicate energy and resources to a universal vaccine.

Influenza pandemics occur when a novel animal flu virus acquires the ability to infect humans and they, in turn, transmit it to other humans. The 1918-19 Spanish flu epidemic (which despite the name may have originated in the American Midwest) killed 50 million to 100 million around the globe. Accounts at the time described people falling ill in the morning and dying that night.

Infectious Diseases and a Global Crisis Agenda

- Priority 1: Influenza, influenza and influenza
- **Priority 2: Antimicrobial resistance**
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PLoS one

Antibiotic Resistance Is Prevalent in an Isolated Cave Microbiome

Kirandeep Bhullar[1], Nicholas Waglechner[1], Andrew Pawlowski[1], Kalinka Koteva[1], Eric D. Banks[2], Michael D. Johnston[2], Hazel A. Barton[2], Gerard D. Wright[1]*

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Abstract

Antibiotic resistance is a global challenge that impacts all pharmaceutically used antibiotics. The origin of the genes associated with this resistance is of significant importance to our understanding of the evolution and dissemination of antibiotic resistance in pathogens. A growing body of evidence implicates environmental organisms as reservoirs of these resistance genes; however, the role of anthropogenic use of antibiotics in the emergence of these genes is controversial. We report a screen of a sample of the culturable microbiome of Lechuguilla Cave, New Mexico, in a region of the cave that has been isolated for over 4 million years. We report that, like surface microbes, these bacteria were highly resistant to antibiotics; some strains were resistant to 14 different commercially available antibiotics. Resistance was detected to a wide range of structurally different antibiotics including daptomycin, an antibiotic of last resort in the treatment of drug resistant Gram-positive pathogens. Enzyme-mediated mechanisms of resistance were also discovered for natural and semi-synthetic macrolide antibiotics via glycosylation and through a kinase-mediated phosphorylation mechanism. Sequencing of the genome of one of the resistant bacteria identified a macrolide kinase encoding gene and characterization of its product revealed it to be related to a known family of kinases circulating in modern drug resistant pathogens. The implications of this study are significant to our understanding of the prevalence of resistance, even in microbiomes isolated from human use of antibiotics. This supports a growing understanding that antibiotic resistance is natural, ancient, and hard wired in the microbial pangenome.

Citation: Bhullar K, Waglechner N, Pawlowski A, Koteva K, Banks ED, et al. (2012) Antibiotic Resistance Is Prevalent in an Isolated Cave Microbiome. PLoS ONE 7(4): e34953. doi:10.1371/journal.pone.0034953

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Review on Antimicrobial Resistance

Tackling drug-resistant infections globally

TACKLING DRUG-RESISTANT INFECTIONS GLOBALLY:
AN OVERVIEW OF OUR WORK

THE REVIEW ON
ANTIMICROBIAL RESISTANCE

CHAIRED BY JIM O'NEILL

FEBRUARY 2016

Urgent Threats

- *Clostridium difficile*
- Carbapenem-resistant Enterobacteriaceae (CRE)
- Drug-resistant *Neisseria gonorrhoeae*

Serious Threats

- Multidrug-resistant *Acinetobacter*
- Drug-resistant *Campylobacter*
- Fluconazole-resistant *Candida* (a fungus)
- Extended spectrum β-lactamase producing Enterobacteriaceae (ESBLs)
- Vancomycin-resistant *Enterococcus* (VRE)
- Multidrug-resistant *Pseudomonas aeruginosa*
- Drug-resistant Non-typhoidal *Salmonella*
- Drug-resistant *Salmonella* Typhi
- Drug-resistant *Shigella*
- Methicillin-resistant *Staphylococcus aureus* (MRSA)
- Drug-resistant *Streptococcus pneumoniae*
- Drug-resistant tuberculosis

Concerning Threats

- Vancomycin-resistant *Staphylococcus aureus* (VRSA)
- Erythromycin-resistant Group A *Streptococcus*
- Clindamycin-resistant Group B *Streptococcus*

STAT

CDC: Drug-resistant 'nightmare bacteria' pose growing threat

By ASSOCIATED PRESS / APRIL 3, 2018

"Nightmare bacteria" with unusual resistance to antibiotics of last resort were found more than 200 times in the United States last year in a first-of-a-kind hunt to see how much of a threat these rare cases are becoming, health officials said Tuesday.

That's more than they had expected to find, and the true number is probably higher because the effort involved only certain labs in each state, officials say.

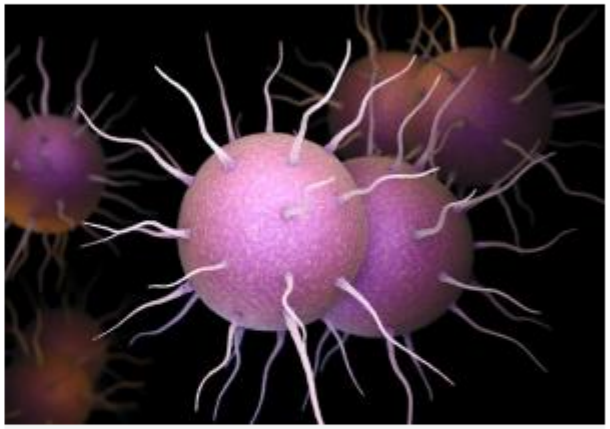
The problem mostly strikes people in hospitals and nursing homes who need IVs and other tubes that can get infected. In many cases, others in close contact with these patients also harbored the superbugs even though they weren't sick — a risk for further spread.

> Some of the sick patients had traveled for surgery or other health care to another country where drug-resistant germs are more common, and the superbug infections were discovered after they returned to the U.S.

CIDRAP Center for Infectious Disease Research and Policy

European report warns XDR gonorrhea threatens future treatment

Filed Under: Gonorrhea; Antimicrobial Stewardship
Chris Dall | News Reporter | CIDRAP News | May 08, 2018



iLexx / iStock

European health officials are warning that three recently reported cases of extensively drug-resistant (XDR) gonorrhea highlight an emerging global threat and indicate a need for action to preserve the last remaining effective treatment for the infection.

In a Rapid Risk Assessment published yesterday, the European Centre for Disease Prevention and Control (ECDC) said the three cases of XDR *Neisseria gonorrhoeae* reported in the United Kingdom and Australia are the first global reports of gonorrhea with resistance to ceftriaxone and high-level resistance to azithromycin, along with resistance to several other antibiotics. The dual therapy of ceftriaxone and azithromycin is the recommended first-line treatment for gonorrhea, which has developed resistance to most other antibiotics.

"These events give significant cause for concern considering the lack of alternative treatments for gonorrhoea," the authors of the report wrote.

Concerns about treatment failure

The three cases, one in the United Kingdom and the others in Australia, were initially reported in March and April. In the UK case, an isolate with resistance to ceftriaxone and high-level resistance to

Science

‘Frightening’ drug-resistant strain of typhoid spreads in Pakistan

By Jon Cohen | Jul. 16, 2018 , 5:05 PM

An antibiotic-defying strain of the bacterium that causes typhoid fever is gaining a foothold in Pakistan, leading some researchers to warn that it could turn the clock back 70 years, when surviving the disease was more a matter of luck than treatment. In the past 6 months, more than 2000 people in Pakistan have been infected with extensively drug-resistant (XDR) *Salmonella typhi*, according to the National Institute of Health in Islamabad. Only one oral antibiotic, azithromycin, works against the XDR strain, and the other options—expensive intravenous (IV) drugs—are impractical for widespread use in Pakistan and other low-income nations. *S. typhi* experts worry that the outbreak could soon spill into other countries.

“This is indeed a really alarming situation,” says pediatrician Zulfiqar Bhutta of The Aga Khan University in Karachi, Pakistan. “I’m not sure what can be done, as the horse has bolted. This will jump boundaries before long.”

Spread through contaminated water and food, *S. typhi* causes up to 22 million cases of typhoid fever a year. Early symptoms include high fever, headaches, and stomach pain. Left untreated, typhoid fever can lead to intestinal hemorrhage and perforation of the bowel, and kill up to 15% of infected people. Despite the availability of effective antibiotics, about 200,000 people die annually.

World Health Organization

Media centre

High levels of antibiotic resistance found worldwide, new data shows

News release

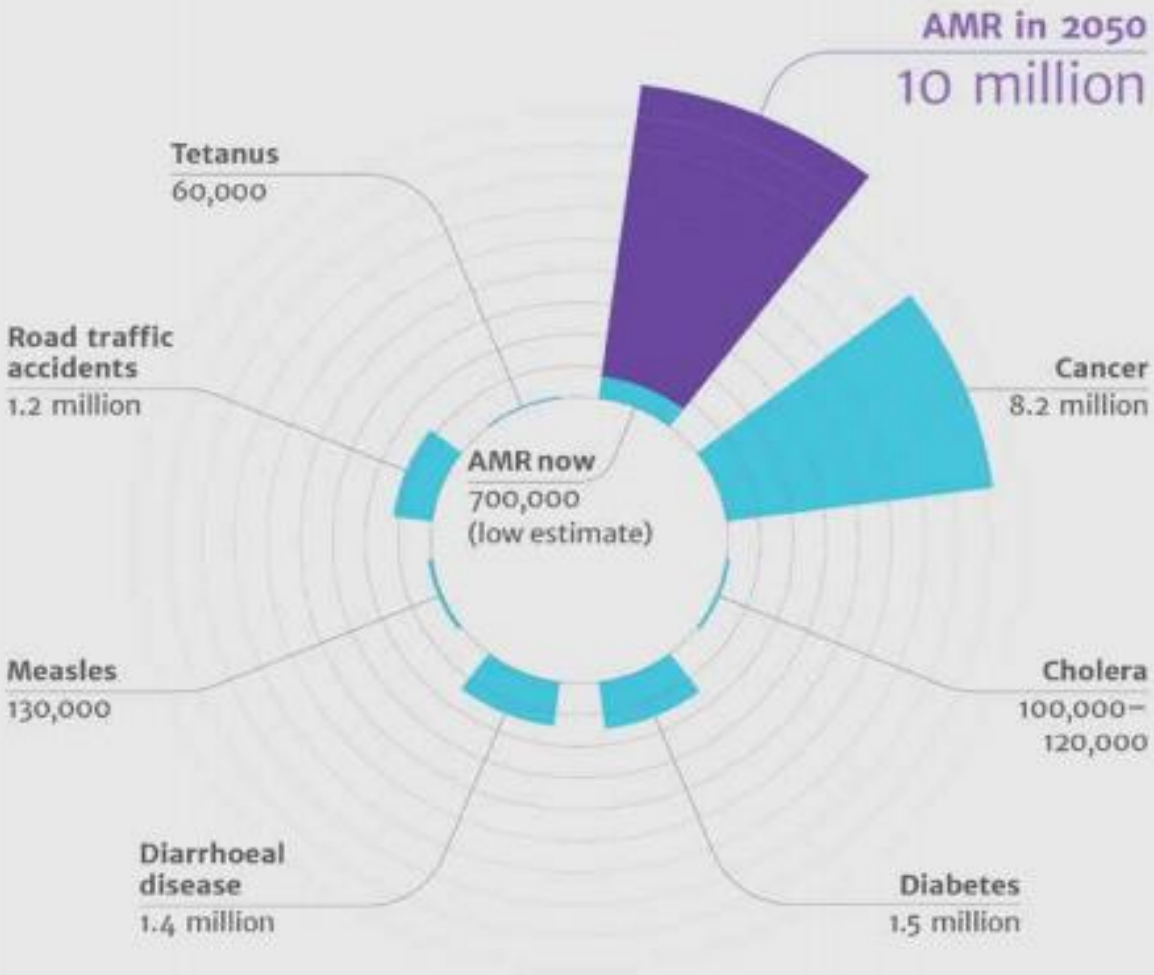
29 JANUARY 2018 | BANGKOK - WHO's first release of surveillance data on antibiotic resistance reveals high levels of resistance to a number of serious bacterial infections in both high- and low-income countries.

WHO's new Global Antimicrobial Surveillance System (GLASS) reveals widespread occurrence of antibiotic resistance among 500 000 people with suspected bacterial infections across 22 countries.

The most commonly reported resistant bacteria were *Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, and *Streptococcus pneumoniae*, followed by *Salmonella* spp. The system does not include data on resistance of *Mycobacterium tuberculosis*, which causes tuberculosis (TB), as WHO has been tracking it since 1994 and providing annual updates in the *Global tuberculosis report*.

Among patients with suspected bloodstream infection, the proportion that had bacteria resistant to at least one of the most commonly used antibiotics ranged tremendously between different countries – from zero to 82%. Resistance to penicillin – the medicine used for decades worldwide to treat pneumonia – ranged from zero to 51% among reporting countries. And between 8% to 65% of *E. coli* associated with urinary tract infections presented resistance to ciprofloxacin, an antibiotic commonly used to treat this condition.

Deaths attributable to AMR every year compared to other major causes of death



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Price to pay: Antibiotic-resistant infections cost $2 billion a year

Filed Under: Antimicrobial Stewardship

Chris Dall | News Reporter | CIDRAP News | Mar 22, 2018

Antibiotic resistance adds nearly $1,400 to the bill for treating a bacterial infection and costs the nation more than $2 billion annually, according to a study yesterday in *Health Affairs*.

The study, which is the first national estimate of the incremental costs for treating antibiotic-resistant infections, also found that the share of bacterial infections in the United States that were antibiotic resistant more than doubled over 13 years, rising from 5.2% in 2002 to 11% in 2014.

The authors of the study say the troubling numbers, on top of the human toll of antibiotic resistance, highlight the need for increased funding from both public and private sources for efforts to develop new antibiotics, diagnostics, and infection prevention strategies.

"The direct costs of these infections, in addition to the morbidity and mortality attributable to them noted in previous studies, make a compelling case for urgent action by national and international policy makers," they write.

ittipon2002 / iStock

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EU report: Animal use of medically important antibiotics up

Filed Under: Antimicrobial Stewardship

Chris Dall | News Reporter | CIDRAP News | Oct 17, 2016

New data on sales of veterinary antibiotics in Europe show a small drop in overall sales but a worrisome increase in the use of medically important antibiotics.

Oli / Flickr cc

The data from the European Medicines Agency (EMA) show that, from 2011 to 2014, an overall 2.4% fall in total sales of veterinary antibiotics and a 2.9% reduction in the volume of tons sold was observed in 25 countries reporting to the European Surveillance of Veterinary Antibiotic Consumption. The report suggests implementation of responsible-use campaigns, restrictions on antibiotic use, and greater awareness of the threat of antimicrobial resistance could explain the decline in veterinary antibiotic use observed in some countries.

"Despite low overall decrease in sales of veterinary antimicrobial products, data demonstrate that actions taken in the fight against antimicrobial resistance by the Member States are making a difference," the EMA said in a press release.

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Report: US pigs consume nearly as many antibiotics as people do

Filed Under: Antimicrobial Stewardship

Chris Dall | News Reporter | CIDRAP News | Jun 06, 2018

RGtimeline / iStock

A report today from the Natural Resources Defense Council (NRDC) is taking the US pork industry to task for irresponsible use of medically important antibiotics, saying the amount of antibiotics used in pigs is nearly the same as that used to treat humans.

The report estimates that 27.1% of all medically important antibiotics sold in the United States are for pig production, while a roughly equivalent amount—27.6%—is sold for use in human medicine. The report suggests that the heavy use of antibiotics in pigs is primarily for disease prevention, a practice the NRDC says is unnecessary. The group argues that the heavy use of antibiotics in pig and other livestock production is contributing to the rise and spread of antibiotic resistance in both animals and people.

Report author David Wallinga, MD, a senior health officer with NRDC, told CIDRAP News that the findings are "startling and important for anybody that cares about continued effectiveness of these drugs for treating sick people."

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CDC study: Antibiotics still widely overused for respiratory infections

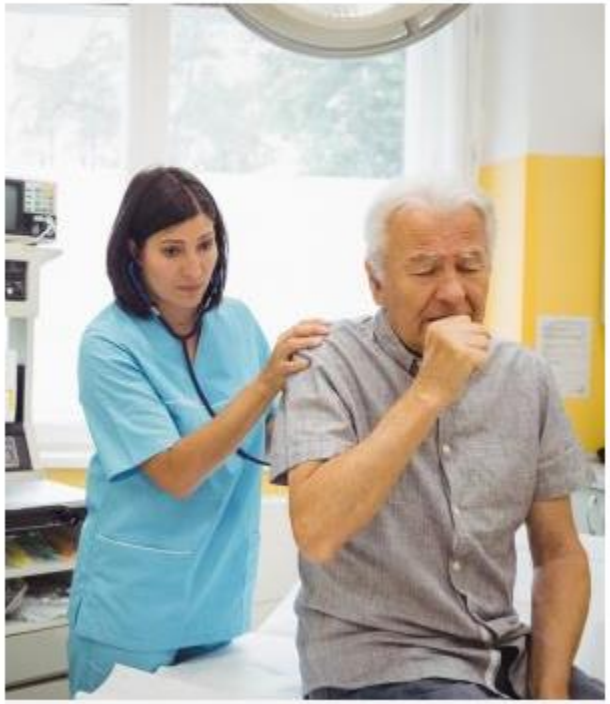
Filed Under: Antimicrobial Stewardship; Influenza, General; Diagnostics

Robert Roos | News Writer | CIDRAP News | Jun 08, 2018

The overuse of antibiotics to treat acute respiratory infections (ARIs), including influenza, is still widespread, according to a new study that covered close to 15,000 patients in five regions around the country over two flu seasons.

Researchers with the Centers for Disease Control and Prevention (CDC) found that 41% of antibiotic prescriptions written for patients with ARIs were inappropriate, according to their report published today in *JAMA Network Open*.

Among other things, the team found that close to 30% of patients who had lab-confirmed flu were prescribed antibiotics, though flu is a viral infection, and that more than a few sore-throat patients received such prescriptions even though they tested negative for a bacterial cause.



Wavebreakmedia / iStock

Estimated Annual Antimicrobial Use In the United States and China; 2015

United States

- 4,000 tons for human use
- 14,000 tons for animal use

China

- 81,000 tons for human use
- 98,000 tons for animal use
- 88,000 tons for export use in animals

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WHO report paints dire picture of antibiotic development

Filed Under: Antimicrobial Stewardship

Chris Dall | News Reporter | CIDRAP News | Sep 19, 2017

A new report today from the World Health Organization (WHO) argues that the antibiotics currently in clinical development are not sufficient to counter rising antimicrobial resistance (AMR), particularly in the pathogens that present the greatest threat to human health.

The authors of the report, a group composed of physicians, microbiologists, and experts in antibiotic resistance and drug development, say that while the current pipeline of antibiotics and biological drugs could produce 10 new drugs over the next 5 years, these new treatments "will add little to the already existing arsenal and will not be sufficient to tackle the impending AMR threat."

Few of the drugs currently in clinical trials can counter multidrug-resistant gram-negative pathogens, many of them are modifications of currently existing antibiotic classes and therefore only short-term solutions, and too few are truly innovative, they say.

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Novartis drops antibiotic development program

Filed Under: Antimicrobial Stewardship

Chris Dall | News Reporter | CIDRAP News | Jul 12, 2018

Editor's note: *This story was updated on Jul 13 with comments from Kevin Outterson, JD.*

Andrew / Wikimedia Commons

Antibiotic development efforts were dealt a blow yesterday when drug maker Novartis AG announced its decision to drop its antibacterial and antiviral research programs.

The decision means Novartis will no longer be working on several antimicrobial projects currently in development.

In an emailed statement explaining the move, the Switzerland-based company said "While the science for these programs is compelling, we have decided to prioritize our resources in other areas where we believe we are better positioned to develop innovative medicines that will have a positive impact for patients."

TACKLING ANTIMICROBIAL RESISTANCE ON TEN FRONTS

Public awareness

Sanitation and hygiene

Antibiotics in agriculture and the environment

Vaccines and alternatives

Surveillance

Rapid diagnostics

Human capital

Drugs

Global Innovation Fund

International coalition for action

Review on Antimicrobial Resistance

Infectious Diseases and a Global Crisis Agenda

- Priority 1: Influenza, influenza and influenza
- Priority 2: Antimicrobial resistance
- **Priority 3: Vaccines and diseases of critical regional importance**
- Priority 4: **Mosquitoes, mosquitoes and mosqui**toes
- Priority 5: **Bioterrorism**
- Priority 6: **Gain of function/dual use research of concern**
- Priority 7: **HIV, TB and malaria**
- Priority 8: **Climate change**
- Priority 9: **One Health**

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“It’s no use saying, ‘We’re doing our best.’ You have got to succeed in doing what is necessary.”

Sir Winston Churchill

“If you don’t know where you’re going, any road will get you there.”

- Lewis Carroll

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“Are these the shadows of the things that Will be, or are they shadows of things that May be, only?“

Ebenezer Scrooge

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Deadliest Enemy: Our War Against Killer Germs

If we do start questioning and demanding as we should, and our leaders do start rising to their responsibilities in public health, will everything we've proposed and endorsed completely neutralize the threat of infectious diseases and the severe, even terrifying impact on modern life around the world? Of course not. But what we can do, with the necessary collective will and commitment of resources, is to give many more people throughout the world, particularly our children and grandchildren, the chance to live out normal, happy, and productive lives. And we can trade innumerable bad deaths for good ones.

And that is all we've ever hoped for.

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