

Prevention

Geographic targeting of oral cholera vaccine

Cholera is a waterborne disease with a high burden in sub-Saharan Africa. The World Health Organization recently declared a commitment to reduce cholera mortality by 90% by 2030. Currently, the Oral Cholera Vaccine (OCV) is an effective and safe management option but preventative use is not routine as global supplies of the vaccine are limited. A model has been used to examine the projected health impact and cost-effectiveness for targeted prevention strategies working around the idea that targeted preventative strategies would be less resource intensive. The model compared several different targeting strategies and analysis suggested that targeting vaccination efforts to districts in sub-Saharan Africa based on historical cholera burden is a significantly more effective strategy than targeting districts based on access to water and sanitation infrastructure. The study also suggested that targeting campaigns according to geography is more cost-effective than increasing vaccine supply and coverage. The research team adds that mass improvement in cholera control cannot be made without improved water access and sanitation.

Lee EC, Azman AS, Kaminsky J, et al. The projected impact of geographic targeting of oral cholera vaccination in sub-Saharan Africa: A modeling study. *PLoS Med* 2019; 16(12): e1003003. <https://doi.org/10.1371/journal.pmed.1003003>

Smartphones versus wearable technology

Monitoring physical activity is an increasingly popular tool used by individuals to assess and assist in improving health behaviors. There are a few methods for monitoring activity including the increasingly prevalent use of specialized wearable technology gadgets and use of existing activity trackers on smartphones. A new study has looked at different methods for self-monitoring and investigated which is the most sustainable for long-term monitoring of patients following hospital discharge. The randomized trial followed patients for 6 months post-discharge and found that patients using a smartphone to monitor physical activity were more likely to use this method long-term and transmit data for a greater proportion of time. The authors suggest that smartphones are a

scalable method for remotely monitoring patient health behaviors that proves to be more sustainable than wearable technology.

Patel MS, Polsky D, Kennedy EH, et al. Smartphones vs Wearable Devices for Remotely Monitoring Physical Activity After Hospital Discharge: A Secondary Analysis of a Randomized Clinical Trial. *JAMA Netw Open* 2020;3(2):e1920677. doi:10.1001/jamanetworkopen.2019.20677

Virtually delivered inhaler technique education

Proper management of chronic obstructive pulmonary disease (COPD) and asthma involves the correct method of inhaler technique in order to effectively deliver medicines into the airways to improve disease management and help prevent worsening of COPD and asthma exacerbations. Patients are not always taught the correct techniques for medicine delivery and it is thought most hospitalizations are preventable. To help tackle this, a wide-scale approach for teaching individuals may be required. A study has compared the efficacy of trained teacher-delivered with virtually-delivered inhaler technique education in adults admitted to hospital with asthma or COPD (n=121). The virtually delivered education provided a similar result to teacher-delivered education in improving correct inhaler technique. The authors would like further work to know if virtual education provides as long-lasting skills, adherence, and outcomes to teacher delivered methods as this could be a resource-economic alternative solution to improving obstructive airway disease outcomes.

Press VG, Arora VM, Kelly CA, Carey KA, White SR, Wan W. Effectiveness of Virtual vs In-Person Inhaler Education for Hospitalized Patients With Obstructive Lung Disease: A Randomized Clinical Trial. *JAMA Netw Open* 2020;3(1):e1918205. doi:10.1001/jamanetworkopen.2019.18205

Preschool screening of T1DM

Identifying patients with a disease before it clinically manifests may provide opportunity for better health outcomes. In type 1 diabetes mellitus (T1DM), children are commonly diagnosed during a hospital admission with 20% of cases diagnosed with diabetic ketoacidosis at presentation and this can be severe and even fatal. Researchers have considered the possibility of diagnosing T1DM at earlier stages in order to reduce morbidity associated with the disease. A study has assessed the prevalence of screening for T1DM in presymptomatic children. Over 90,600 children aged between 2 and 5 in Bavaria, Germany,

were screened for T1DM using presence of 2 or more of islet autoantibodies, which has been linked to eventual diagnosis of overt diabetes in previous studies. Of the population screened, 0.33% had presymptomatic T1DM. The authors argue that pre-school screening for T1DM is feasible and could reduce the burden of diabetic ketoacidosis and further complications of T1DM seen in symptomatic diagnosis in children.

Ziegler A, Kick K, Bonifacio E, et al. Yield of a Public Health Screening of Children for Islet Autoantibodies in Bavaria, Germany. *JAMA*. 2020;323(4):339–351. doi:10.1001/jama.2019.21565

Vehicle ownership and physical activity

Worldwide obesity rates are rising. Lifestyle trends are often attributed to this problem and one possible culprit is the long-term decline in active forms of transportation. One study has now looked at the relationship between car ownership and physical activity. The study was set in Beijing where there is a vehicle permit. Participants were aged 18 and over and taken from a random sample of households who had entered the permit lottery. Permit losers were those without a car. Those who won the permit went ahead with vehicle purchase 91% of the time. At 5 years follow-up, permit winners walked and cycled significantly less than those who did not win the permit lottery. There was no difference in average weight, however, in those aged 50 and above there was an increase in weight over the 5 years compared to permit lottery losers. Vehicle ownership leads to long-term reduced physical activity and can lead to an increase in weight.

Anderson ML, Lu F, Yang J. Physical activity and weight following car ownership in Beijing, China: quasi-experimental cross sectional study *BMJ* 2019; 367 :l6491

Diet

Soy products and mortality

We know that diet is a determinant of non-communicable diseases. The shift from a traditional plant based food diet to a calorie dense, high fat diet is considered to be a risk factor in the development of non-communicable disease. Soy based products are still consumed in large quantities in Asia and are thought to improve nutrient intake especially in those with a low consumption of plant based foods. Researchers have

now looked at the impact of a soy product containing diet. Intake of several soy products, including total soy products, fermented soy products, non-fermented products and tofu were investigated for association with mortality in this population based cohort study where participants data was followed-up at nearly 15 years. A higher intake of fermented soy products (natto and miso) was associated with lower risk of mortality. In particular, natto intake was associated with lower cardiovascular mortality in both sexes. There was no association seen with total soy products. High intake of fermented soy products may be associated with a lower risk of mortality.

Katagiri R, Sawada N, Goto A, et al. Association of soy and fermented soy product intake with total and cause specific mortality: prospective cohort study *BMJ* 2020; 368 :m34

Laws implementing dietary snack consumption

Dietary intake is a key modifiable health behavior associated with morbidity and mortality. Unhealthy dietary habits are associated with cardiovascular disease, stroke, diabetes and obesity. A science-based dietary recommendation, Smart Snacks in School standards, was issued in the United States in 2013 with the aim of improving students' dietary intake behaviors. A study has now examined if state laws that force schools to implement the Smart Snacks guidelines influences student dietary intake outcomes. Students in states in the United States with laws requiring schools to implement the Smart Snacks recommendations had better dietary intake than students in states without these laws. Students consumed over 50 fewer kilocalories from solid fats and added sugars per day. There were improved student dietary behaviors seen in students from schools with laws made to support dietary standards in schools. Implementation of state-level policy mechanisms may be a useful intervention for improving dietary habits of children and adolescents.

Turner L, Leider J, Piekarz-Porter E, Chriqui JF. Association of State Laws Regarding Snacks in US Schools With Students' Consumption of Solid Fats and Added Sugars. *JAMA Netw Open*. 2020;3(1):e1918436. doi:10.1001/jamanetworkopen.2019.18436

Fish oil supplementation

Fish oils are a rich source of omega 3 fatty acids. There is a breadth of data suggesting that intake of supplementary fish oils reduces cardiovascular disease (CVD) and as such fish oils have long been a common supplement for the

general population. However, there have also been several studies that have shown no benefit which makes the existing literature contradictory. Researchers have again looked at this relationship, this time using a large population based, prospective cohort study. Over 420,000 men and women aged between 40 and 69 who had no CVD at baseline were enrolled between 2006 and 2010 and followed up until 2018. Participants were assessed for habitual use of fish oil supplementation via questionnaires. Habitual use of fish oil was associated with a lower risk of all cause cardiovascular disease mortality and was seen to provide a marginal benefit against CVD related events among the general population. This study supports the role of fish oils in protecting cardiovascular health.

Li Zhi-Hao, Zhong Wen-Fang, Liu Simin, Kraus Virginia Byers, Zhang Yu-Jie, Gao Xiang et al. Associations of habitual fish oil supplementation with cardiovascular outcomes and all cause mortality: evidence from a large population based cohort study *BMJ* 2020; 368 :m456

Sugar taxing beverages

Obesity is increasing in prevalence in many developed countries where there is ample access to high calorie foods. To combat this, government ruled sugar taxes have become popular in recent years in many countries where there exists a high population of obese individuals. A study has looked at the impact of a specific sugar tax that was set against beverages in Portugal in 2017. The study highlighted several key findings. The tax resulted in a reduction in the demand for sugar-sweetened products and triggered product reformulation where sugar content was cut. The reduction in sugar consumption observed is estimated to prevent up to 78 new cases of obesity in Portugal every year. The joint projected impact of reduced consumption and product reformulation is estimated to be 4 to 8 times greater than the projected impact of reformulation alone. The authors urge that sugar taxation is an effective population-wide intervention.

Goiana-da-Silva F, Severo M, Cruz e Silva D, et al. Projected impact of the Portuguese sugar-sweetened beverage tax on obesity incidence across different age groups: A modelling study. *PLoS Med* 2020; 17(3): e1003036. <https://doi.org/10.1371/journal.pmed.1003036>

Childhood intake of gluten and diabetes risk

A recent study has found a potential link between gluten intake and risk of developing type 1 diabetes (T1DM).

Results from a large previous study has shown a link between maternal intake of gluten and risk of T1DM in offspring. To investigate this relationship further a study has now looked for any association of not only maternal intake but also offspring intake of gluten and later risk of T1DM. The study used an observational nationwide cohort method and estimated mother's intake of gluten up to week 22 of pregnancy and offspring gluten intake at 18 months old. The results from this study did not find a relationship between mother's intake of gluten and offspring T1DM this time but did see that a higher gluten intake by the child in their early years was associated with a higher risk of developing T1DM. High dietary gluten intake by children may be associated with a higher risk of developing T1DM. The authors urge further research, including randomized trials.

Lund-Blix NA, Tapia G, Mårild K, et al. Maternal and child gluten intake and association with type 1 diabetes: The Norwegian Mother and Child Cohort Study. *PLoS Med* 2020; 17(3): e1003032. <https://doi.org/10.1371/journal.pmed.1003032>

Obstetrics

Maternal smoking in pregnancy and childhood fractures

The concern around maternal smoking and fetal growth restriction is well known. It has also been hypothesized that maternal smoking may compromise development of the fetal skeleton by reducing bone mass. Researchers have now studied the impact of maternal smoking during pregnancy on fractures in offspring. Cohort data were taken from over 1.6 million people using the national register in Sweden with follow-up at just over 20 years. There was an association seen between maternal smoking during pregnancy and fractures, and this association differed by age. The strongest association was seen with a higher rate of fractures in offspring before 1 year of age and this followed a dose dependent pattern with more than 10 cigarettes per day having a higher association than none, or 1-9 cigarettes. There was still a higher risk of fractures for up to 32 years offspring age versus no maternal smoking history. Prenatal exposure to maternal smoking is associated with an increased risk of fractures in offspring, particularly in the first year of life.

Brand JS, Hiyoshi A, Cao Y, et al. Maternal smoking during pregnancy and fractures in offspring:

national register based sibling comparison study *BMJ* 2020; 368 :l7057

Aspirin and reduced preterm birth

Preterm birth is a common cause of neonatal mortality and there is a high burden in low- and middle-income countries. Existing studies looking at the use of aspirin to prevent pre-eclampsia suggest there is also some evidence of reduced pre-term birth. A randomized, double-masked study has now looked at the direct use of aspirin in preventing preterm birth. Participants were nulliparous women with confirmed singleton pregnancies who were randomized to receive either low-dose aspirin (81mg once daily) or placebo starting between 6 and 13 weeks of pregnancy and continued until week 36- and 7-days gestation or until delivery. There were significantly fewer preterm births seen in the group taking low-dose aspirin versus placebo. There were also significant reductions in perinatal mortality, fetal loss, early preterm delivery (<34 weeks' gestation) and incidence of early preterm deliveries in women with hypertensive disorders. Low-dose aspirin may reduce chances of preterm births in nulliparous women with singleton pregnancies.

Hoffman MK, Goudar SS, Kodkany BS, et al. Low-dose aspirin for the prevention of preterm delivery in nulliparous women with a singleton pregnancy (ASPIRIN): a randomised, double-blind, placebo-controlled trial. *Lancet* 2020; 395:285-293

Maternal fish intake and mercury levels

A new study has assessed associations of fish intake and mercury exposure during pregnancy with metabolic syndrome and alterations in biomarkers of inflammation in exposed children. The prospective birth cohort study used data from 5 European countries spanning between 2003 and 2016. Mothers (n=805) and singleton offspring were followed up until children were aged between 6 and 12 years. Maternal fish intake during pregnancy was measured in times eaten per week and maternal mercury concentration was assessed using maternal blood and cord blood samples. Maternal fish intake that was consistent with health recommendations of between 1 and 3 portions (and no more) a week was associated with reduced metabolic syndrome in children compared to those with less than 1 portion exposure a week. High maternal mercury concentrations were independently associated with an increase

in metabolic syndrome in offspring. Inflammatory markers were lower in offspring of children exposed to moderate and high fish consumption. Moderate fish intake may influence favorable metabolism in offspring.

Stratakis N, Conti DV, Borrás E, et al. Association of Fish Consumption and Mercury Exposure During Pregnancy With Metabolic Health and Inflammatory Biomarkers in Children. *JAMA Netw Open*. 2020;3(3):e201007.

Maternal exposure to magnetic field radiation

It is estimated that approximately 11% of all children aged between 4 and 17 years in the United States are diagnosed with attention-deficit/hyperactivity disorder (ADHD). One study has now found an association between exposure to magnetic field (MF) nonionizing radiation during pregnancy and later risk of ADHD in offspring. These findings have now been reported in both animal and human studies. This most recent study used a birth cohort setting and found that high maternal exposure to magnetic field nonionizing radiation, captured via monitoring meters, was associated with an increased risk of ADHD in offspring. The study found that this association was strongest in children who received diagnoses in adolescence (≥ 12 years old). Additionally, the association was strong in children who had immune-related comorbidities. The authors urge more research to examine the biological association of in utero magnetic field exposure and risk of attention-deficit/hyperactivity disorder.

Li D, Chen H, Ferber JR, Hirst AK, Odouli R. Association Between Maternal Exposure to Magnetic Field Nonionizing Radiation During Pregnancy and Risk of Attention-Deficit/Hyperactivity Disorder in Offspring in a Longitudinal Birth Cohort. *JAMA Netw Open*. 2020;3(3):e201417. doi:10.1001/jamanetworkopen.2020.1417

Miscellaneous

Factors associated with missed appendicitis diagnoses

Appendicitis is a common surgical emergency. However, diagnosis of appendicitis is missed in up to 15% of children and up to 23% of adults during emergency department (ED) admission. A study has now looked at what factors might be associated with potentially missed diagnosis of appendicitis within the ED among children and adults. The cohort study used a retrospective analysis of commercially insured claims data and included information from individu-

als who reported to the ED with recent history of symptoms associated with appendicitis (including abdominal pain, constipation, nausea and vomiting, diarrhoea) and compared this with data from patients diagnosed with appendicitis on the same day as ED presentation. The study found that regardless of age, missed diagnosis of appendicitis was more likely to occur in women, patients with comorbidities, and patients who experienced abdominal pain with constipation. The authors urge improvement in recognizing and diagnosing appendicitis cases presenting to the emergency department. Mahajan P, Basu T, Pai C, et al. Factors Associated With Potentially Missed Diagnosis of Appendicitis in the Emergency Department. *JAMA Netw Open*. 2020;3(3):e200612.s

Gastrointestinal bleeding prophylaxis in critically ill patients

Patients who are critically ill and being treated in intensive care are at risk of gastrointestinal bleeding (for example, from stress ulceration). Acid suppression medicines are commonly given during stays in intensive care. The use of bleeding prophylaxis has been recommended by authorities, but this area is somewhat controversial with some data suggesting an association with increased risk of pneumonia. A systematic review and meta-analysis has looked at the impact of proton pump inhibitors (PPIs), histamine-2-receptor antagonists (H2RAs) and no gastrointestinal bleeding prophylaxis on patient outcomes. For critically ill patients with a high risk of bleeding, PPIs and H2RAs reduced gastrointestinal bleeding compared in patients with no prophylaxis. There was little effect seen in those considered low risk of bleeding. However, both PPIs and H2RAs resulted in an increase in pneumonia and there were no important differences seen with mortality outcomes.

Wang Ying, Ye Zhikang, Ge Long, et al. Efficacy and safety of gastrointestinal bleeding prophylaxis in critically ill patients: systematic review and network meta-analysis *BMJ* 2020; 368 :l6744

Air pollution and stroke risk

Ambient air pollution is a major public health concern worldwide and more than 90% of the world's population lives in regions where air quality is below that recommended by the World Health Organization. A population based prospective cohort study has looked at the effect of long-term exposure to ambient fine particulate matter on total, ischemic, and hemorrhagic stroke among Chinese adults. Fine particulate matter was defined as a diameter of ≤ 2.5 mi-

crometers. Participants with the highest quarter range of fine particulate matter were at an increased risk of incident, ischemic, and hemorrhagic stroke. For each 10micrometer per m3 increase of fine particular matter the increased risks of incident stroke, ischemic stroke, and hemorrhagic stroke were 13%, 20%, and 12% respectively. This study provides evidence that long term exposure to raised fine particulate matter is associated with increased risk of all major stroke types. These findings should be used to highlight environmental and health policy development needs not only in China but also in other low- and middle-income countries.

Huang K, Liang F, Yang X, et al. Long term exposure to ambient fine particulate matter and incidence of stroke: prospective cohort study from the China-PAR project *BMJ* 2019; 367 :l6720

Surgery for persistent sciatica

Management of chronic back pain and sciatica is not yet optimised. The existing data for the management of sciatica resulting from an acute disc prolapse is more thorough than existing data for the management of chronic sciatica (lasting several months) caused by lumbar disc herniation. A research group have investigated the efficacy of a discectomy versus a conservative approach in the managing of pain in chronic sciatica. This single centre trial included patients who had sciatica for 4- to 12- months associated with a lumbar disc herniation at the vertebral level of L4-L5 or L5-S1. Participants (n=128) were randomised (1:1) to either undergo a microdiscectomy operation or to receive 6 months of standardised nonoperative care. The primary outcome measured was leg-pain intensity score at 6 months. At follow-up, the leg-pain intensity scores were significantly lower for those who had been given a microdiscectomy versus the nonoperative management. Microdiscectomy may provide better pain reduction and quality of life in those suffering chronic sciatica associated with lumbar disc herniation.

Bailey C, Rasoulinejan P, Taylor D, et al. Surgery versus conservative care for persistent sciatica lasting 4 to 12 months. *NEJM* 2020; 382:1093-1102

Consequences of under-vaccination

Measles was declared eliminated in the United States in 2000. However, an outbreak in 2018 that started in New York City saw the return measles and

brought vaccination efforts back into discussion. This particular outbreak was traced back to New York City when an unvaccinated child returned from a trip to Israel and brought back with them measles. Researchers have looked into how this outbreak happened. The study investigated suspected cases of measles through means of interviews and medical and immunisation records, and diagnostic testing. During the study period 649 cases of measles were confirmed within their study population. Of patients with a known vaccination history, 86% of these were not vaccinated against measles. The authors suggest that importation of measles, and vaccination delay among young children led to the outbreak seen in New York. This highlights a potentially widespread problem that we may see mirrored elsewhere. The authors also note that during this period vaccination campaigns improved uptake but more can still be done.

Zucker J, Rosen J, Iwamoto M, et al. Consequences of under vaccination – measles outbreak, New York City, 2018-2019; *NEJM* 2020 ; 382:1009-1017

Second-hand smoke related deaths

The direct effects of first-hand smoking are well documented. The ill effects of second-hand smoking (SHS) are far less studied. A new study has looked at the estimated worldwide mortality associated with second-hand tobacco smoke exposure. The study set out to assess how many individuals who smoke were associated with the death of a single individual who does not smoke but has been exposed to SHS. Data were collected from separate World Bank regions and analysed to assess for the number of individuals who smoke in each country and the number of premature deaths related to SHS between 1990 and 2016. Assessment of first-hand smoke was taken using the pack-year index. The study revealed a favourable trend. Globally, the number of smokers associated with one death rose from 31.3 individuals in 1990 to 52.3 smokers associated with the death of one individual related to SHS. The study also reported a large variation and disparity between worldwide regions which may be beneficial for local policy makers to understand the scale of harm associated with SHS.

Yousuf H, Hofstra M, Tijssen J, et al. Estimated Worldwide Mortality Attributed to Second-hand Tobacco Smoke Exposure, 1990-2016, *JAMA Netw Open.* 2020;3(3):e201177.



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