



STANFORD *health 4 all*

We know health starts – long before illness – in our homes, communities, schools and jobs.

Societally, we devote most attention to medications and healthcare delivery, but a major opportunity for improving wellness starts long before medical care. Stanford Health 4 All's goal is to train prevention experts to address health in our families, neighborhoods, schools, communities and workplace; and to inspire and engage new clinicians and researchers in the field.

SPRC's Stanford Health 4 All Fellows Program addresses critical community health needs and provides actionable skills amidst a sobering reality: 16.1% of young persons are out of work; 2 million of these young unemployed have college degrees; and 1 in 5 have an interest in public health, yet few have necessary skills to tackle the reality. To prepare the next generation of prevention experts, we offer a dual-edged, 9-month, fee-based, professional certificate program:

- Didactic: evidence-based knowledge & tools
- Immersive, experiential community-based learning partnerships with custom interventions
- Close mentorship, coaching, guided steps from Stanford Health 4 All
- Environmental and social determinants, community-based assessment
- Back-and-forth between classroom and implementation: an “executive MBA” type model for health promotion in the community
- The business side of things: impact assessment/evaluation, budgets, quality improvement skills, operations research.

Our Stanford faculty-led curriculum includes:

- Science of Prevention
- Theory & Practice of Behavior Change
- Healthy Living (Nutrition, Activity, etc.)
- Design Thinking to Engage Communities
- Assessment & Impact
- Demystifying Health Data
- Research Lab experience

Our Stanford and Community Partners include, but are not limited to the Stanford Primary Care Clinics, Arbor Free Clinic, Vaden Health Services, the Health Improvement Project (HIP); Clinics with local health providers; schools ranging from Preschool to High School; Correctional Facilities; Race and Ethnicity-based Centers, Senior Centers, Faith-based organizations, Local Corporations, and more.

PREVENTION COULD SAVE

**\$300
billion**

IN DIRECT HEALTHCARE COSTS (US)

**\$150
billion**

PER YEAR SPENT ON OBESITY +
CHRONIC DISEASE MEDICAL COSTS
(US)

70%

US DEATHS = CARDIOVASCULAR
DISEASE + CANCER + DIABETES

58%

DECREASE IN NEW DIABETES CASES
VIA INTENSIVE LIFESTYLE CHANGES
VS. 31% VIA DRUG THERAPY

50%

OF GLOBAL MORTALITY LINKED
TO BEHAVIORAL RISK FACTORS
(TOBACCO, PHYSICAL INACTIVITY,
UNHEALTHY DIET)



REVERSING *childhood obesity*

The global epidemic of childhood obesity is one of the greatest public health threats of the 21st Century.

The medical, psychological, social, and economic consequences are staggering. Children are being diagnosed with obesity-related diseases that were previously only seen in adults. Low income and minority children in the U.S. are more likely to be obese, further widening health and socio-economic disparities. Without effective prevention and treatment, overweight children will become obese adults, who suffer from diabetes, high blood pressure, heart disease, stroke, and cancer. The U.S. has one of the highest rates of childhood obesity in the world but international rates have been increasing rapidly, even in middle- and low-income countries.

It is hard to imagine a more complex problem. Both the causes and potential solutions involve every level of our lives, from basic biology to global politics. There is no single cause and no single solution. Instead, the childhood obesity epidemic will only be reversed through interactions among biological, psychological, behavioral, cultural, political, economic, and environmental changes. The Stanford Prevention Research Center takes a holistic, interdisciplinary, systems approach where research groups collaborate to contribute multiple perspectives to tackle childhood obesity.

The Solutions Science Lab, led by Drs. Thomas Robinson and Donna Matheson, is known for its innovative and effective family, school, and community programs for childhood obesity prevention and treatment, used in medical, public health and public policy programs throughout the World. The Nutrition Studies group, led by Dr. Christopher Gardner, is experimenting with garden-based education to increase children's preferences for vegetables and fruits. Dr. Lisa Goldman Rosas of the Prevention Outcomes and Practices Program is developing and testing culturally-tailored, family-focused strategies to help obese Latino adolescents. Stanford Prevention Research Center scientists collaborate with researchers and clinicians across Stanford, the U.S., and the world to discover solutions to childhood obesity.

CHILDHOOD OBESITY HAS

tripled

IN THE PAST 30 YEARS

CHILDREN SPEND

more time

WATCHING TV THAN IN SCHOOL

<10%

OF SCHOOL CHILDREN RECEIVE
DAILY PHYSICAL EDUCATION

CHILDREN CONSUME

**more
calories**

FROM SUGARY DRINKS THAN ANY
OTHER FOOD OR BEVERAGE

<1/4

OF CHILDREN EAT THE
MINIMUM RECOMMENDED
AMOUNT OF VEGETABLES



GLOBAL *health*

Chronic diseases account for 59% of all deaths globally, with 80% of these in low- and middle-income countries.

Deaths due to chronic diseases in developing countries are expected to substantially increase over the next decade. With action, 36 million deaths worldwide can be averted. Building upon the work of Center founder Dr. John W. Farquhar, co-founder of the International Heart Health Society, SPRC researchers collaborate on global health initiatives to address the chronic disease pandemic:

Dr. Wes Alles and the Health Improvement Program train and share solutions to health promotion challenges with hospitals and corporate partners in Asia, Europe, and Brazil.

Dr. Sanjay Basu and his team travel to India for the World Health Organization (WHO), identifying nutritional factors affecting diabetes and heart disease as part of the largest-ever global study of chronic disease, nutrition, and aging.

Dr. Abby King's Healthy Aging Research & Technology Solutions laboratory employs portable technologies to empower "citizen-scientists" to identify neighborhood barriers to active living & healthful eating in Mexico, the UK, and Middle East.

Dr. Jodi Prochaska evaluates the treatment of tobacco dependence in Australia and works with the World Heart Federation to disseminate treatment curriculum to providers in China, the Middle East, and South America.

Dr. Thomas Robinson's Solutions Science Lab collaborates with international scientific, public health, and governmental agencies to develop and evaluate policies to prevent and control childhood obesity globally.

Dr. Marilyn Winkleby's 15-year NIH-funded research with Drs. Jan and Kristina Sundquist at Lund University in Sweden examines neighborhood influences on cardiovascular disease, and the long-term physical health outcomes of mental illness, substance abuse, and preterm births.

Dr. Randall Stafford's work with the WHO Agency for International Research on Cancer has helped evaluate the carcinogenic potential of common drugs and chemicals.

59%

OF ALL DEATHS GLOBALLY ARE DUE
TO CHRONIC DISEASES

80%

OF CHRONIC DISEASE DEATHS
OCCUR IN LOW AND MIDDLE-INCOME
COUNTRIES

36
million

DEATHS COULD BE AVERTED
YEARLY WITH PREVENTIVE AND
COLLABORATIVE ACTION

LEADING RISK FACTORS
FOR GLOBAL DISEASE:

#1

DIET & PHYSICAL INACTIVITY

#2

HIGH BLOOD PRESSURE

#3

TOBACCO SMOKING



WOMEN'S *health*

The SPRC has been a leader in women's health research for decades and is a key site of the Women's Health Initiative (WHI), the largest, most ambitious clinical research program ever conducted.

As one of the first research centers to include women in studies of lifestyle, e.g. physical activity, diet and weight control, for heart disease prevention, SPRC quickly broadened its research to other interventions and chronic diseases, i.e. cancer, osteoporosis, and dementia, and to study "healthy aging."

The SPRC was one of 40 academic centers to recruit over 161,000 postmenopausal women across the U.S. in the mid-1990s for the WHI Clinical Trials (of menopausal hormones, low-fat diet, and calcium/vitamin D supplementation) and Observational Study, with SPRC's Marcia Stefanick, as Chair of the WHI Steering Committee from 1998-2011. The dramatic findings that combined (estrogen and progesterone) menopausal hormone therapy (MHT) increased the risk of breast cancer, stroke, heart disease and blood clots led to a 50% reduction in MHT use, which was followed by the first-ever national reduction in breast cancer, with an estimated 15,000 fewer women diagnosed each year.

As one of four "regional centers" for the extended follow-up of the large WHI cohort, with its rich 15-year dataset of lifestyle, genetic, biomarker, medical and other personal data and health outcomes, SPRC has become a leader in aging research in women (as well as in men, due to other research projects). SPRC researchers are particularly interested in the potential role of physical activity in preventing heart disease and stroke and maintaining physical and cognitive function, and thus, mobility and independence in older women.

SPRC researchers are also assessing potential benefits of lifestyle and other interventions in women with established chronic diseases, e.g. heart disease (HERS trial) and early stage breast cancer (WHEL trial), for preventing disease progression and promoting overall well-being. Current collaborations are focusing on whether physical activity can ameliorate adverse outcomes of cancer chemotherapy and other treatments, including bone loss, changes in body composition, brain and cognitive function, sleep and psychosocial health, e.g. depression, and cardiovascular disease risk in breast cancer survivors.

#1

CAUSE OF DEATH IN U.S. WOMEN IS HEART DISEASE, EXCEEDING ALL CANCER DEATHS COMBINED, WITH STROKE BEING THE THIRD, AFTER TOTAL CANCER DEATHS

2/3

OF FEMALE DEATHS DUE TO HEART DISEASE AND STROKE OCCUR IN WOMEN AGED 80 AND OLDER

1 in 3

U.S. WOMEN WILL BE DIAGNOSED WITH AN INVASIVE CANCER IN HER LIFETIME; ONE IN EIGHT U.S. WOMEN WILL BE DIAGNOSED WITH BREAST CANCER IN HER LIFETIME

20%

OF HIP FRACTURES ARE FATAL; 50% ARE DISABLING; NEARLY ALL REQUIRE HOSPITALIZATION

11 million

U.S. WOMEN WILL BE AGED 85 AND OVER (COMPARED TO 4 MILLION IN 2010) BY 2050

AFTER AGE 85, THE RISK OF ALZHEIMER'S DISEASE IS NEARLY

50%



WOMEN AND SEX DIFFERENCES *in medicine*

Vision: “Healthy women *and men* – from conception through the life course.”

Mission: Advancing human health across the lifespan through research and education in women’s health, biology of sex differences, and gender medicine.

Currently anchored in SPRC and co-directed by SPRC’s Marcia Stefanick, Ph.D., and her Ob/Gyn colleague, Lynn Westphal, M.D., the Stanford Center for Health Research on Women and Sex Differences in Medicine (i.e. WSDM Center) acknowledges the “wisdom” of research and education on sex (e.g. chromosomes, gonads, gonadal hormones) and gender (sociocultural) factors which influence health. Emphasizing women’s health and embracing the gender spectrum, this multi-disciplinary center is supported by every department in Stanford’s School of Medicine and has partnerships across the Stanford campus. WSDM Symposia (on Sex Differences, Women’s Health, and selected topics), Workshops, and special courses aim to educate the broader Stanford community and general public.

The Stanford WSDM Center promotes the scientific investigation of sex and gender influences on biology – from molecular and cellular levels to the organism from conception to old age, in individuals (clinical perspective) and across populations. The WSDM Center also aims to educate our community about gender biases in medical practice that create health disparities due to inadequate or inappropriate screening, diagnosis and/or medical care. Examples include female patients with diseases stereotypically regarded as “men’s” (e.g. heart disease), men with conditions generally considered to be “women’s” diseases (e.g. osteoporosis, breast cancer) and patients whose gender identity and/or sexual orientation lead to other “unmet clinical needs.”

The focus on conception recognizes the profound role of a mother’s physiology, including nutritional and obesity status, on the health and epigenetic outcomes of her developing fetus. The lifecourse approach emphasizes life transitions and medical issues specific to reproductive phases – from puberty to beyond menopause (in women); to social roles and aging. The important role of family caregivers on the health of children, partners, elderly relatives, and community members is also recognized. Emphasizing the broad gender spectrum and women’s health beyond reproductive physiology balances the current, predominantly male-based or sex/gender-blind medical literature and builds gender identity into the concept of “personalized” medicine.

#1

KILLER OF WOMEN IS HEART DISEASE, OFTEN CONSIDERED A “MAN’S DISEASE”

1 in 2

U.S. MEN VERSUS

1 in 3

U.S. WOMEN WILL DEVELOP AN INVASIVE CANCER IN THE COURSE OF THEIR LIFETIME

1 in 3

U.S. HIP FRACTURES ARE IN MEN, YET OSTEOPOROSIS IS USUALLY CONSIDERED A “WOMAN’S DISEASE”

78%

OF PEOPLE WHO DEVELOP AN AUTOIMMUNE DISEASE ARE WOMEN.

~55%

OF U.S. WOMEN LIVE TO AGE 80 OR OLDER, COMPARED TO ONLY 35% OF U.S. MEN.



HEALTH *improvement program*

As one of the first employer sponsored wellness programs, the Stanford Health Improvement Program (HIP) has been integral to SPRC for over 30 years.

We are a leading organization within the Stanford BeWell program, and our mission is to enhance the health, lifestyle, and quality of life of faculty, staff, their family members, and the broader community by sharing health improvement information. More than 9,000 faculty, staff, and their family members participate in the approximately 2,000 classes offered each quarter. Classes range from physical activity and health education to health improvement “events,” webinars, and online programs.

Stanford Health Promotion Resource Center (HPRC)

Since its inception more than 30 years ago, this unit has developed educational materials that have been licensed in many countries around the world.

Stanford Health Promotion Resource Center (SHPN)

Created more than ten years ago as a way of disseminating scientific information about wellness, this unit has over 88 community partners from high profile Silicon Valley companies, public health departments, hospitals and large medical groups, and universities.

YMCA of the USA

HIP has worked with the YMCA for more than a decade. Local and national projects include a healthy lifestyle program that taught YMCA employees how to deliver health promotion and behavior modification programs, and a fitness program for cancer survivors. HIP also supported the CDC’s Healthy Community Initiative and developed a Healthy Living Index that enables communities to evaluate healthy eating and physical activity resources.

Stanford Women’s Health Conference at Sierra Camp

This past year HIP offered its 20th annual Women’s Health conference for Stanford Alumni, which offered health and fitness testing, physical activity, and presentations by staff from HIP and SPRC.

HIP and International Health

As longstanding international leaders in wellness, we frequently host official delegations and visiting professors, travel abroad for speaking engagements, and also train organizations to help them see the possibilities and benefits of wellness.

35%

INCREASE IN INDIVIDUALS
PARTICIPATING IN HIP HEALTH
EDUCATION WORKSHOPS SINCE
2010

190

SECTIONS OF FITNESS CLASSES
OFFERED PER QUARTER INCLUDING
YOGA, CARDIO, STRENGTH, DANCE,
TAI CHI, MARTIAL ARTS, AND
AQUATICS.

>2,000

GROUP FITNESS CLASSES PER
QUARTER ARE TAKEN BY FACULTY
AND STAFF.

109%

INCREASE IN PARTICIPATION IN HIP
GROUP FITNESS CLASSES BETWEEN
2010 AND 2013

53

CLASS LOCATIONS BOTH ON AND
OFF CAMPUS.



PREVENTION *outcomes & practices*

Our health care system must undergo a fundamental reordering: Only by centering our efforts on prevention can we thwart the emerging epidemic of chronic disease and its tremendous personal, social, and economic burdens.

Our current health care system does not integrate prevention into daily clinical medicine, efficiently use resources, nor rapidly adopt proven practices. Our suboptimal health outcomes are obtained at great cost through inefficient use of resources that are unequally distributed. Our future prosperity is threatened by the unsustainable rise in health care costs. We must discover new, cost effective methods to deliver prevention services in order to improve health care and health outcomes.

The Vision

When we first met Maria Medina, her life was dominated by obesity, diabetes, and the likelihood that she would have a heart attack or stroke within the next decade, events that would ultimately lead to extensive health care costs. After completing our innovative *Vivamos Activos* (We're Active) program using \$10 pedometers, social support, tailored health classes, and weight loss coaching, Maria lost 30 pounds. Through adopting healthy lifestyle changes, she now needs fewer diabetes medications and has significantly reduced her heart disease risk.

The Solution

Rather than emphasize expensive high-tech treatment, prevention should be the dominant goal of health care delivery. Intensive lifestyle changes are twice as effective as drug therapies in preventing diabetes, but are still not a common part of health care practices. Dr. Randall Stafford's *Vivamos Activos* project and Dr. Lisa Goldman Rosas' studies of family interventions for adolescent and adult obesity are but two examples that focus on modifying physician and patient practices to improve health outcomes through prevention. The Program on Prevention Outcomes and Practices provides a multidisciplinary approach to problem solving that is helping to change the health care system. This includes designing new ways of delivering prevention both within doctor's offices and in the wider community. Drs. Stafford and Goldman Rosas and their team share an unwavering commitment to diminishing the burden of obesity, diabetes, and heart disease while simultaneously reducing health disparities.

> \$756
BILLION

A YEAR IS SPENT ON OBESITY AND
CHRONIC DISEASE MEDICAL COSTS
IN THE U.S.

70%

OF ALL U.S. DEATHS ARE CAUSED
BY CARDIOVASCULAR DISEASE,
CANCER, AND DIABETES

58%

DECREASE IN NEW DIABETES CASES
ACHIEVED THROUGH INTENSIVE
LIFESTYLE CHANGES COMPARED TO
31% FOR DRUG THERAPY

12-15
YEARS

IS THE TIME IT TAKES FOR A PROVEN
NEW THERAPY TO DIFFUSE INTO
WIDESPREAD PRACTICE

2.1×

MORE MONEY IS SPENT PER
PERSON ON HEALTH CARE IN
THE U.S. COMPARED TO OTHER
DEVELOPED NATIONS

21%

OF MEDICATION USE IS FOR
CLINICAL SITUATIONS NOT
APPROVED BY THE FDA AND 80%
OF THIS USE LACKS STRONG
SUPPORTING EVIDENCE



DIGITAL *prevention*

Every day, more than 200,000,000,000,000,000 bytes of data are created about our health. Hidden in these data is information about what we eat, what pills we take, how good our doctors are and, ultimately, what determines life and death.

But, in spite of how much data we have, we analyze less than one percent of this information. Our society has created some of the world's most advanced microchips and computers, which we use to play videogames and email our friends. We haven't yet used their power to fight disease.

Finding Solutions through Effective Analysis

Using state-of-the-art computer models, Dr. Basu and his colleagues analyze massive amounts of information through new systems that answer fundamental questions about our health. Which community prevention programs are most effective? Which ones give us the best bang for the buck? Can we identify what nutrients and everyday hazards are the most important for our health—despite a bewildering number of claims in the news? And, when we are faced with so many people with chronic medical problems, can we find a way to optimize our healthcare system to keep people healthy into their golden years, rather than having them struggle with complex and difficult bureaucracies?

Crunching Billion of Bytes a Day

Dr. Basu and his colleagues have been working with teams around the world, including such organizations as UNICEF and the World Health Organization, to tackle the most pressing global prevention issues of our time. This includes understanding how the recent economic recession affects our health, and what prevention programs are most effective. The research team also exams what strategies for improving food systems are most effective in reducing heart disease and diabetes. The team keeps track of how effectively prevention research affects a community, producing computer systems to help public health departments keep better tabs on their progress. Using the latest tools in statistics, engineering, economics, and computer science, the team crunches billions of bytes a day to discover how we can live smarter, longer, and healthier.

over
200,000,000,000,000,000
BYTES OF DATA ARE CREATED
ABOUT HEALTH EVERY DAY

<1%
OF THESE DATA ARE ANALYZED

\$300
billion
OF HEALTHCARE COSTS COULD
BE SAVED BY USING THIS DATA TO
IMPROVE PREVENTION

1,073,741,824
BYTES OF DATA CAN BE ANALYZED
EVERY SECOND IN STANFORD'S
DISEASE PREVENTION COMPUTER
MODELS



HEALTH INEQUITIES *studies*

Disparities in income and education are two of the most consistent predictors of poor health in the United States. Even worse, these disparities are growing. The bottom line? The greater the gaps in indicators of poverty—the greater the disparities in health.

Compared to other countries, the United States continues to fare low on important health outcomes, including life expectancy and infant mortality—despite the enormous resources invested in our healthcare system.

Successfully Modifying Risk Factors

Drs. Winkleby, Stafford, and Prochaska have been identifying and addressing the social causes of health inequities for the past 25 years. Their research shows that elevated blood pressure, smoking, high cholesterol, excess body weight, a sedentary lifestyle, and diabetes are all significantly higher in low-income, lower educated populations. These risk factors have behavioral, social, cultural, and economic explanations and, while many investigators view these factors as unmodifiable, SPRC investigators believe that they can be successfully modified.

Partnering with Local and International Communities

As “barefoot epidemiologists” and interventionists, we care about research that matters. We partner with local communities that have first-hand knowledge of the health of local populations and, together, we work to promote health and prevent disease in poor neighborhoods. During our 17-year partnership with the Monterey County Health Department, we’ve implemented policy and organizational changes to address obesity, diabetes, and asthma. In a new community-academic partnership with employment service agencies, we are examining the impact of risk behaviors in future employees. Our work extends to international communities in need, including a 10-year collaboration with researchers at Lund University in Sweden on the health of immigrants, a new collaboration with Newcastle University in Australia on tobacco cessation in adults with serious mental illness, and a planned collaboration assessing chronic disease disparities in urban China.

46
million

AMERICANS LIVE IN POVERTY

TOP
5%

OF U.S. POPULATION HAS 72% OF
THE WEALTH, BOTTOM 80% HAS 5%

25%

OF U.S. STUDENTS FAIL TO
GRADUATE FROM HIGH SCHOOL;
40% OF AFRICAN-AMERICAN AND
LATINO STUDENTS.

\$10 billion

SPENT ANNUALLY ON TOBACCO
MARKETING: LOW-INCOME YOUTH
PRIME TARGETS

>3 billion

PEOPLE (ALMOST HALF OF THE
WORLD) LIVE ON LESS THAN
\$2.50 A DAY



TECHNOLOGY FOR *healthy living*

The world we live in has “engineered” health behaviors necessary for living long, productive lives out of our daily routines. How can increasingly common mobile devices be effectively used to make healthy habits the easy choice for all?

These technologies could be strategically harnessed to overcome the physical, psychosocial, and environmental barriers driving unhealthy habits. However, there is insufficient scientific evidence supporting their effectiveness. Dr. Abby King and colleagues apply scientifically validated behavioral principles and strategies to create and test programs for helping people move more, sit less, and eat and live in healthier ways.

A Strong Commitment and Unique Advantage

For more than three decades, Dr. King has had a strong commitment to supporting the health and quality of life for midlife and older adults, low-income residents, ethnic minority groups, and people living in developing nations who could benefit most from effective health promotion programs. Stanford University’s strong ties to Silicon Valley provide a unique advantage in creating technology-based, cost-efficient solutions to increase our chances of living long, productive, and healthy lives, regardless of income, education, language, or country of origin.

Current Research Projects Include:

- Automated bilingual “virtual advisors” that provide interactive, personalized health behavior counseling via a touch-screen computer.
- Smartphone applications that tap the different human motivations behind daily behavioral health decisions.
- Human-advisor and automated tele-health solutions that deliver interactive, personalized advice and support to promote long-term healthy habits.
- GPS-enabled electronic tablets that allow residents to easily capture, through photos and audio narratives, local impediments to healthy living.

This information can be “crowd-sourced” to provide a timely source of information for local decision-makers. “Citizen scientists” of all ages are currently using these tools & strategies to promote healthy neighborhood changes in the US and internationally.

2/3

OF ALL U.S. DEATHS ARE DUE TO
NONCOMMUNICABLE DISEASES

50%

OF GLOBAL MORTALITY IS LINKED
TO BEHAVIORAL RISK FACTORS
(TOBACCO USE, PHYSICAL
INACTIVITY, UNHEALTHY DIET)

>91

COUNTRIES HAVE MORE CELL
PHONES THAN PEOPLE

5×

MORE PEOPLE USE MOBILE PHONES
THAN LAND LINES



META *research*

The scientific literature is filled with information that is misleading, exaggerated, or flat-out wrong. Is there anything we can do to improve the credibility of medical research?

Our media is constantly churning out conflicting and misleading stories about medicine and health issues. This obviously creates confusion in the general public and in the professional medical community. But it's not just the general media that exaggerates and misinforms. The scientific literature is filled with false and exaggerated claims. Is there anything we can do to improve the credibility of medical research studies? What should we believe when it comes to medical science?

Researching the Research

It's not that there's a dearth of information or studies. There are more than 20 million papers in the medical scientific literature published to date, and two million more added every year. There are also more than 10 million researchers working in the medical research field. But scientific literature is filled with findings that don't always stand the test of time or are flawed from the beginning. A majority of the studies are minor and show problems in their design, the way they were conducted, the way they were reported, and the way they are interpreted. It's critical to scrutinize all aspects of the research process in order to more accurately understand the credibility of each piece of medical evidence. Only by doing that, will we have a real chance to decrease cost, improve efficiency, enhance health, and save lives.

Dr. Ioannidis is recognized as the leading clinical research methodologist of his generation. As a researcher of research—or a meta-researcher—he has reshaped the scientific community's approach to clinical investigation and created new paradigms in genomic medicine, medical statistics, clinical epidemiology and evidence-based medicine. Today, Dr. Ioannidis' team continues to get to the truth of the matter—with solid data, clear reasoning, and good statistical analysis.

20
million+

PAPERS HAVE BEEN PUBLISHED IN
THE MEDICAL LITERATURE

50%+

OF NEW RESEARCH FINDINGS
ABOUT HEALTH AND MEDICINE GET
REFUTED OR ARE FOUND TO BE
GROSSLY EXAGGERATED

80

PEOPLE IS THE AVERAGE SIZE OF
A TRIAL FOR A DRUG THAT MAY
BE USED BY MILLIONS, ONCE IT IS
LICENSED

~\$1 trillion

PER YEAR IS SPENT ON LARGELY
USELESS HEALTHCARE IN THE
UNITED STATES



PREDICTIVE *health*

Can we predict reliably who will get what disease in the future—and do something about it? Why do some people suffer from cancer, diabetes, heart attacks, depression, Parkinson's disease, fractures, osteoarthritis, and others do not? Can we predict reliably who will get what disease in the future—and also do something about it?

Using one-size-fits-all approaches and treating all individuals as if they are the same person makes little sense. Instead, we need to tailor specific interventions to high-risk people and abort the onset of disease. A better understanding of the determinants of disease susceptibility and of response to specific preventive measures may lead to more focused and efficient preventive efforts in specific populations.

Revolutionary Research Tools

The determinants of disease risk are a complex mix of genetic factors, lifestyle, everyday hazards, and socioeconomic risks. Dr. Ioannidis and his colleagues head up numerous research efforts to identify genetic and non-genetic factors that predispose to disease. The team explores how these factors interplay, which of them may be potentially easy to modify, and whether obtaining information on these factors can improve the health of people who better understand their risks. This research has been revolutionized by the availability of newer technologies of measurement. For example, instead of measuring one gene at a time, it's now possible to measure more than 10 million variants in the genome where one individual differs from another. It's also now possible to measure non-genetic risks in massive scale. Finally, it's possible to perform rigorous studies to understand the utility and impact of this rapidly accumulating information.

Making Sense of the Maze

Dr. Ioannidis and his colleagues use the latest tools in molecular biology and genetics, population sciences, and rigorous mathematical statistical methods to make sense of the highly challenging maze of predictive information.

10
million+

DIFFERENCES MAY EXIST IN THE
GENOME OF TWO INDIVIDUALS

70%+

OF DISEASES HAVE STRONG
GENETIC COMPONENTS THAT WE
HAVE THE MEANS OF DISCOVERING

~100%

OF DISEASES SHOW LARGE
DIFFERENCES IN RISK IN DIFFERENT
TYPES OF PEOPLE AND SETTINGS

1 million-
fold

INCREASE IN THE AMOUNT OF
GENOMIC AND PREDICTIVE DATA
THAT WE HAVE ASSEMBLED IN THE
LAST DECADE



SOLUTIONS *science*

Children and families live in a world full of threats to their health and healthy development. Practical, effective solutions are within reach. We envision a world where the leading causes of illness, suffering, disability and death are prevented in childhood rather than treated in adults.

We conduct creative, solution-oriented research to answer the questions that will most efficiently and effectively improve health and wellbeing; what works and how to do it? We explore new ways to design and conduct research to more directly inform public policy, public health, and medical practice.

Designing Solutions to Meet Global Needs

The Solutions Science Lab is part of the Stanford Prevention Research Center (SPRC) and the Department of Pediatrics at Stanford University School of Medicine. The Lab develops and rigorously tests theory-driven strategies to prevent obesity, improve nutrition, increase physical activity, enhance psychological well-being, and promote environmental sustainability. The Lab specializes in applying innovative behavioral, social, technological, environmental and policy strategies to improve children's and families' health. We design solutions to meet global needs and emphasize work with low-income, ethnic-minority families and communities—the fastest growing and highest-risk segments of the population.

The Solutions Science Lab excels at merging perspectives from across disciplines to produce novel, synergistic solutions, benefiting from discoveries from basic biomedical research, psychology and neuroscience, behavioral economics and marketing, product design, media and communications, sociology and education.

today's
children

MAY BE THE FIRST GENERATION
TO LIVE SHORTER LIVES
THAN THEIR PARENTS

one third

OF U.S. CHILDREN ARE OVERWEIGHT
OR OBESE (15% WORLDWIDE)

1 in 3

OF TODAY'S CHILDREN WILL
ACQUIRE DIABETES IN THEIR
LIFETIMES (1 IN 2 AFRICAN-
AMERICAN AND LATINA GIRLS)

25%

OF POTENTIAL U.S. MILITARY
RECRUITS ARE TOO OVERWEIGHT OR
TOO UNFIT TO SERVE

>\$150
billion

THE MEDICAL COSTS OF OBESITY
PER YEAR IN THE U.S.



NUTRITION *studies*

The most widespread and daunting public health issue and concern in the U.S. of this decade, and likely many to follow, is obesity, particularly childhood obesity.

On the food supply side of the obesity equation exists a long list of inextricably connected, multidimensional problems that includes social injustices, corporate irresponsibility, animal rights and welfare abuses, and environmental sustainability – problems so complex, interconnected, and daunting as to make someone bury their head in the sand (or perhaps a vat of sugar, fat and salt). The Nutrition Studies group, led by Christopher Gardner, is attacking diet-related health problems and the underlying failed food systems that have led to these problems on two fronts.

Strong Foundation of Federally Funded Human Nutrition Studies

The first of these approaches is built on a strong foundation of 15 years of federally funded, randomized, controlled, human nutrition studies involving more than 1,700 study participants that have tested the potential health benefits of garlic, soy, omega-3 fats, antioxidants, ginkgo biloba, vegetarian diets, and low-carb vs. low-fat weight loss diets. Dr. Gardner and his colleagues and staff have built a strong national reputation for rigorously designed nutrition studies. He recently served on the American Heart Association's Nutrition Committee, and now serves on the Scientific Advisory Board of the Culinary Institute of America.

NEW INITIATIVE: Interdisciplinary Food Systems Research and Education Center

A second and more recent initiative led by Dr. Gardner and colleagues has been to begin to develop a campus-wide interdisciplinary Stanford Food Systems Initiative. This initiative began in 2010 with the first Stanford Food Summit, and has continued with annual Food Summits since then (see <http://foodsummit.stanford.edu>). These five summits have connected faculty and students from all seven of Stanford's schools (Medicine, Business, Law, Earth Sciences, Humanities and Sciences, Education and Engineering). The long-term objective is to build a world-class multidisciplinary research and teaching program at Stanford focused on developing and implementing solutions that address our nation's failing food systems, including food production, distribution, and consumption, with an emphasis on Community-Based Participatory Research.

2/3

OF AMERICANS ARE
OVERWEIGHT OR OBESE

THE AVERAGE
AMERICAN CONSUMES

>80 lbs

OF SUGAR PER YEAR:
-1/4 LB PER DAY!

<25%

OF AMERICANS EAT
THE RECOMMENDED
5 OR MORE SERVINGS OF
VEGETABLES AND FRUITS/DAY

70%

OF THE WORLD'S FISHERIES
ARE NOW EXPLOITED
OR HAVE COLLAPSED

11M

POUNDS OF ANTIBIOTICS ARE FED
TO OTHERWISE HEALTHY CHICKENS
EVERY YEAR VERSUS
3 MILLION POUNDS
PRESCRIBED TO HUMANS

FACTORY FARMED ANIMALS
IN THE UNITED STATES PRODUCE

130×

MORE WASTE THAN HUMANS:
APPROXIMATELY 87,000 POUNDS OF
POOP PER SECOND