THE FUNDING

Conditions that affect women more than men garner less funding. But boosting investment could reap big rewards. By Kerri Smith

iseases don't treat the sexes equally. Some illnesses, such as prostate and ovarian cancer, affect a sex-specific organ. Others take an uneventoll on men or women. For example, in 2019. 57% of people who died of strokes in the United States were women. Funding for disease research is often not proportionate to disease burden, and studies have shown that diseases that affect more women than men are chronically underfunded.

One such study¹, by US applied mathematician Arthur Mirin, an independent researcher, looked at disease research funded by the US National Institutes of Health (NIH). Mirin categorized the diseases according to whether they were female-dominant or male-dominant and examined their disease burden - a measure of how much death and disability a disease causes.

Of the conditions that are dominant in one sex, those that create the highest burden, such as depression and headaches, tend to affect women more (see 'Unequal toll').

But when Mirin looked at how much funding

each disease received from the NIH, he found that diseases that affect mainly women are underfunded compared with the burden. Migraine. headaches and endometriosis, for example, all attract much less funding in proportion to the burden they exert on the US population than do other conditions. HIV/AIDS and substance misuse, which disproportionately affect men, show the opposite pattern.

The degree of underfunding or overfunding is different for the groups of conditions, too. On average, female-dominant diseases that are underfunded are more severely so. Mirin's analysis "demonstrates that the funding of research for women is not aligned with burdens of disease", says Sarah Temkin, associate director for clinical research at the NIH Office of Research on Women's Health.

Neuroscientist Liisa Galea at the Centre for Addiction and Mental Health in Toronto, Canada, who studies depression and Alzheimer's disease, among other disorders, says women's health is about more than just female-specific conditions. "Every single organ in our body is

affected by our sex," she says. "It affects every part of our health."

What if funding for women's health increased? That was the question behind a series of reports commissioned by the nonprofit advocacy group Women's Health Access Matters (WHAM) in Greenwich, Connecticut, It worked with researchers at the non-profit RAND Corporation in Santa Monica, California, to run simulations that looked at the likely return on investment for boosting funding of women's health research².

They chose four conditions that affect women disproportionately, or in which women tend to experience different symptoms from men, and which were not related to reproductive or maternal health: rheumatoid arthritis, coronary artery disease, Alzheimer's disease and lung cancer.

Across the four diseases, the NIH budget for women-focused research was US\$350 million. The study modelled what might happen if that doubled, and assumed that this increase would deliver a slight (0.01%) improvement to health

3 000

in terms of life expectancy, disease progression and quality of life.

For coronary artery disease, for example, the budget boost was projected to save nearly 20.000 life years and almost 40.000 years with disease for women over a 30-year period.

Efforts are under way to offset the gender gap in funding. For example, in May last year, two US Democratic members of Congress from Illinois, Senator Tammy Duckworth and Representative Jan Schakowsky, introduced a bill calling for a doubling of investment in women's health research.

Galea says that funding for women's health should encourage researchers to pay more attention to the area. "If you put a pot of gold at the end of a funding rainbow, researchers are going to go for it."

Kerri Smith is a Features editor at Nature in London.

- Mirin, A. A. J. Womens Health 30, 956-963 (2021).
- 2. Baird, M. D. et al. The WHAM Report: The Case To Fund Women's Health Research (RAND & WHAM, 2022).

Losing out across the board An analysis of data from the US much disability and death National Institutes of Health they cause - measured in (NIH), which spent US\$45 billion disability-adjusted life years on biomedical research in 2022, (DALYs). If funding were **FEMALE-DOMINANT** determined only by the burden of shows that many diseases that affect more women than men are each disease, the circles below **DISEASES** underfunded compared with how would all be the same colour. Perinatal (at least 60% of those period affected are women) Fating disorders Uterine Preterm Ovarian cancer Rheumatoid Cervica arthritis Diaestive cancer diseases Anxiety Mental illness Depression disorders Multiple Endometriosi Inflammatory bowel disease The funding-to-burden HIV gets 15 times more 2022 burden of disease ratio for migranes is 0.1. funding than what is expected from its burden MALE-DOMINANT HIV/AIDS **DISEASES** (at least 60% of those 5 million affected are men) Prostate Liver Drug cancer cancer Hepatitis B Attention deficit Substance disorder Parkinson's disease Ratio of funding relative Autism Disorders with a ratio of 1 are funded in proportion to their burden.

2022 funding (US\$, millions, log scale)

500

diseases, not just to male-dominant diseases. Many diseases with the highest burden affect men and women roughly equally. The grey line represents funding in proportion with the burde Male● Female● Neutral Disability-adjusted life years How more funding would help period. In coronary artery disease, for examp disease-free years for men and women — with the Life vea

28 | Nature | Vol 617 | 4 May 2023