AACR Cancer Progress Report 2021: Discovery Science Driving Clinical Breakthroughs

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The *American Association for Cancer Research* (AACR) is proud to announce the release of the *AACR Cancer Progress Report 2021*. This eleventh edition of the annual report details how research is the backbone of progress across the spectrum of lifesaving cancer care. This year, the report also commemorates the 50th anniversary of the National Cancer Act of 1971 by highlighting landmark scientific discoveries and clinical breakthroughs across the continuum of cancer science and medicine that have contributed to millions of saved lives over the past five decades. The full report, and all ten prior editions, contain information of interest to the research community, the public, and our lawmakers and are freely available at https://cancerprogressreport.aacr.org/progress/.

The annual AACR Cancer Progress Report is a cornerstone of the AACR's mission to educate the public and the Congress about the latest advances against cancer and the importance of medical research, and to advocate for increased federal funding for NIH, NCI, FDA, and CDC.

As highlighted in the report, scientific discoveries and technological innovation, driven in large part by federal funding for medical research, are being harnessed to spur improvements in public health and breakthroughs in clinical cancer care. Among the advances made during the 12-month period covered in this report (August 1, 2020–July 31, 2021) are 16 new anticancer therapeutics approved by the FDA to treat a wide variety of cancer types (**Fig. 1**).

Cancer continues to be an enormous public health challenge both in the United States and worldwide. The report highlights research areas where there are significant gaps in our knowledge, such as the underlying causes of cancer health disparities and the rise in the incidence of certain young onset cancers. The report calls for the medical research community to come together and address these critical issues. These challenges have been further complicated by the Coronavirus Disease 2019 (COVID-19) pandemic, which has affected all aspects of life since March 2020, and has had a significant negative impact on cancer research and patient care.

The *AACR Cancer Progress Report 2021* has eight sections. The first section, "Cancer in 2021," provides an overview of the current state of affairs. Research has powered substantial progress against cancer, leading to a steady decline in overall cancer incidence and mortality rates and increase in the number of individuals surviving longer after a cancer diagnosis. For example, the age-adjusted overall U.S. cancer death rate, primarily fueled by progress against lung cancer and melanoma, declined by 31% from 1991 to 2018, which is the last year for which these data are available (**Fig. 1**). The section discusses major advances against lung cancer and melanoma to highlight how discovery science drives lifesaving clinical breakthroughs. Concurrently, the section points out the huge personal and financial toll of cancer both in the United States and worldwide to underscore the need for continued and consistent investment in cancer research.

The second section, "Understanding How Cancer Develops," is an overview of our current understanding of cancer biology, including genetic and epigenetic mechanisms, as well as local and systemic influences contributing to cancer initiation and progression. The section concludes with the promise and potential of precision cancer medicine.

More than 40% of U.S. cancer cases are preventable. The third section, "Preventing Cancer: Identifying Risk Factors," delineates the common modifiable cancer risk factors such as smoking, obesity, poor diet, physical inactivity, and UV exposure, among others. Also highlighted are some of the policy initiatives directed at cancer prevention. Thanks to such initiatives, cigarette smoking rates among U.S. adults have declined steadily from 42% in 1965 to 14% in 2019. The section details, in depth, how many of these cancer risk factors are related to lifestyle, and the ways by which a person can reduce his or her risk of developing certain types of cancer by modifying behaviors.

As discussed in section four, "Screening for Early Detection," there are four types of cancer—breast, cervical, colorectal, and prostate cancer—for which early detection tests have been used to screen large segments of the U.S. population who are at average risk of developing the cancer for which they are being screened. For other types of cancer (e.g., lung cancer), screening tests are used only for people who are at an increased risk for the cancer for which they are being screened. During the 12 months covered in this report, the U.S. Preventive Services Task Force (USPSTF), an independent volunteer panel of experts in prevention and evidence-based medicine, updated their guidelines for colorectal and lung cancer screening by expanding the age-based eligibility to a broader population.

The next section of the report, "Discovery Science Driving Clinical Breakthroughs," describes recent advances across the five pillars of cancer treatment. This includes the FDA approval of a first ever molecularly targeted therapeutic against a mutated form of KRAS protein (KRAS G12C) for patients with non–small cell lung cancer, as well as the first approval of a CAR T-cell therapy for patients with multiple myeloma (**Fig. 1**). The impact of selected anticancer therapeutics approved by the FDA during the 12-month period covered by the report is showcased through personal stories of patients with cancer who benefited from these therapeutics.

The subsequent section, "Supporting Cancer Patients and Survivors," highlights the fact that nearly 17 million cancer survivors are currently living in the United States. The section also underscores the many challenges, including physical, emotional, and psychosocial issues that are experienced by patients with cancer and long-term survivors. Discussed are findings of various studies showing how the use of palliative care, adoption of a healthy lifestyle, and the use of psycho-oncology interventions can help overcome some of these challenges and improve physical and mental health.

The section "Looking to the Future" highlights the new wave of scientific and technological breakthroughs that have the potential to transform cancer research and clinical care. Among other topics

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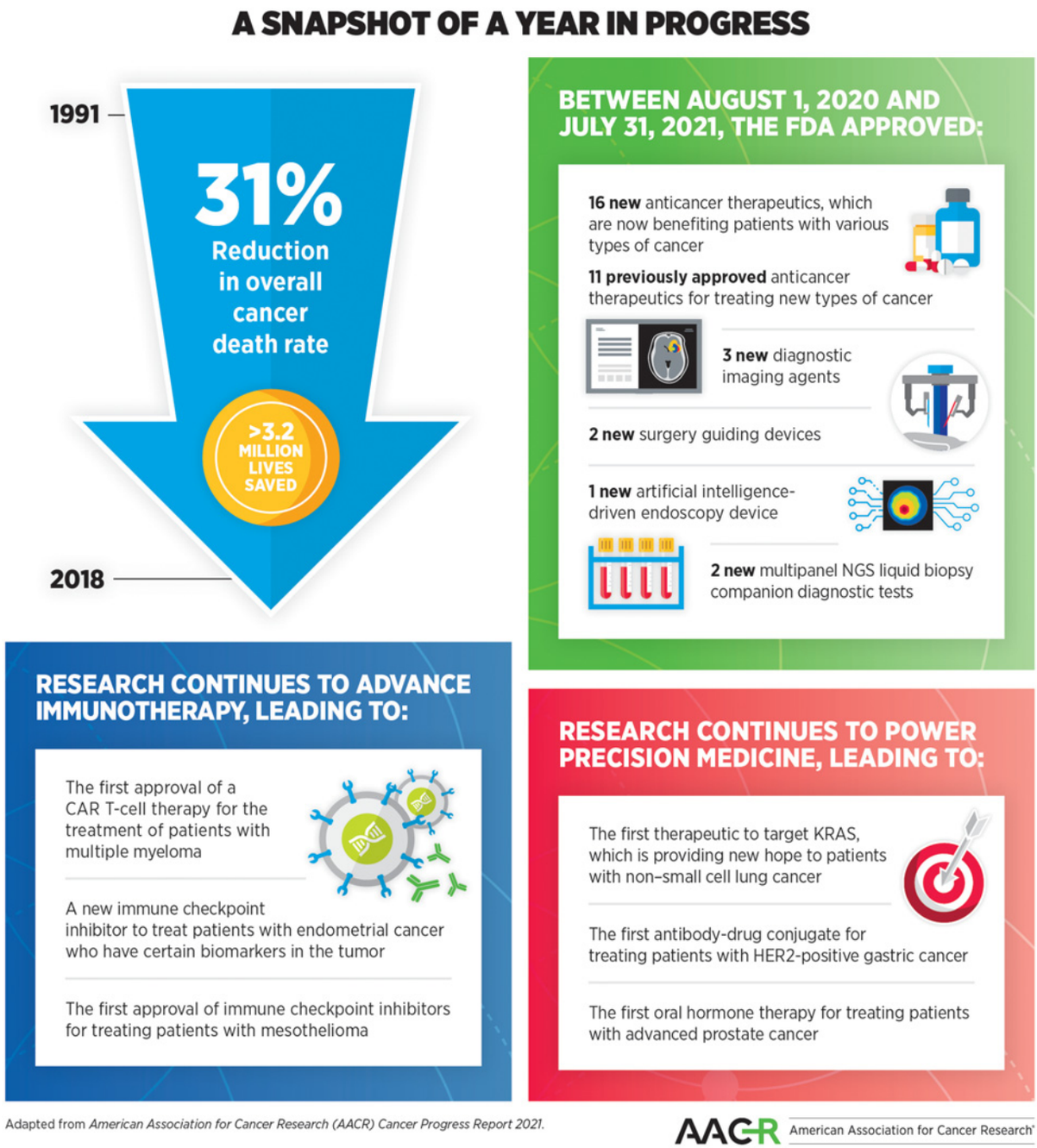

Figure 1.
A snapshot of the year in progress. From *AACR Cancer Progress Report 2021* (Available: https://cancerprogressreport.aacr.org/progress/); used with permission.

discussed are cutting-edge technologies such as artificial intelligence and its uses in cancer diagnosis and treatment, and progress toward targeting cancer-causing proteins that have long been considered "undruggable."

As noted in the final section, "Combating Cancer through Science-based, Patient-centered Policies," many advances discussed in this and previous editions of the AACR Cancer Progress Report have been possible, in large part, through federal investments that support a diverse research workforce, advance regulatory science initiatives, and allow us to pursue policies that promote cancer control. The section discusses a series of policy initiatives that, when implemented, will continue to contribute to our progress against cancer.

Federal support for NIH and NCI has made possible much of the remarkable progress against cancer detailed in the current as well as the ten prior editions of the report. Thus, the *AACR Cancer Progress Report 2021* concludes with a call to action to our elected leaders to pursue an appropriations strategy that provides robust, sustained, and predictable annual funding increases for NIH, NCI, FDA, and CDC.

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