

Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our [Editorial Policies](#) and the [Editorial Policy Checklist](#).

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed
☐	☒ The exact sample size (<i>n</i>) for each experimental group/condition, given as a discrete number and unit of measurement
☐	☒ A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐	☒ The statistical test(s) used AND whether they are one- or two-sided <i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i>
☐	☒ A description of all covariates tested
☐	☒ A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☐	☒ A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☐	☒ For null hypothesis testing, the test statistic (e.g. <i>F</i> , <i>t</i> , <i>r</i>) with confidence intervals, effect sizes, degrees of freedom and <i>P</i> value noted <i>Give P values as exact values whenever suitable.</i>
☒	☐ For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☒	☐ For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☐	☒ Estimates of effect sizes (e.g. Cohen's <i>d</i> , Pearson's <i>r</i>), indicating how they were calculated

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

Policy information about [availability of computer code](#)

Data collection	N/A
Data analysis	R v4.1.1 RStudio R package tidyverse (v1.3.2) R package ggplot2 (v3.5.1) R package dplyr (v1.0.10) R package readxl (v1.4.0) R package cowplot (v1.1.1) R package stringi (v1.7.12) R package ggsurvfit (v0.2.0) R package survival (v3.5-5) R package cvequality (v0.2.0) Custom code (https://github.com/nccmo/C-CAT_actionability_2025)

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

The data that support the findings of this study are available from C-CAT (https://www.ncc.go.jp/en/c_cat/about) under controlled access due to ethical and privacy restrictions. The application process for data access is described on the C-CAT website under 'Steps from application to data utilization' (https://www.ncc.go.jp/en/c_cat/use/flow/index.html) and consists of the following steps: (1) a principal investigator submits the C-CAT data use application form with a research protocol and a copy of the approval from their research ethics committee and the head of their institution to C-CAT (c-cat_use@ml.res.ncc.go.jp), which is expected to respond within approximately 1 week; (2) the application is reviewed by the C-CAT data utilization review board; (3) once approved, an 'Agreement on Utilization of C-CAT Data' is concluded between National Cancer Center Japan (governing C-CAT) and the institution of the principal investigator; (4) after the agreement is signed and the access fee is paid (with academic institutions generally exempt), the access license to the 'C-CAT Research-Use Portal site' is granted; and (5) upon obtaining access, registered data licensees can connect to the portal using their registered computers over Transport Layer Security (TLS). The granted access is valid for 1 year, after which renewal of both the agreement and the access license is required. The data available to registered data licensees include: (1) deidentified data from individual patients, including patient background, treatment details (before and after CGP) and clinical outcomes, and (2) somatic alteration calls with clinical evidence levels, drug approval status and clinical trial availability in Japan. C-CAT prohibits data licensees from offering, selling or reselling relevant data to any third parties.

At present, principal investigators are restricted to individuals affiliated with hospitals for cancer genomic medicine, industries and research institutes in Japan. Therefore, researchers outside Japan may access the C-CAT data by collaborating with investigators based in Japan. In such cases, the same procedure, including the approval from the C-CAT data utilization review board, is required. Although the timeframe is yet to be determined, direct data access is expected to become available to researchers/applicants outside Japan in the near future. The 'Number-of-Records Search site' (<https://simplesearch-use.c-cat.ncc.go.jp/en/>), which provides the number of the registered records of interest in the C-CAT cohort, is publicly available.

Research involving human participants, their data, or biological material

Policy information about studies with [human participants or human data](#). See also policy information about [sex, gender \(identity/presentation\), and sexual orientation](#) and [race, ethnicity and racism](#).

Reporting on sex and gender

Among 54,185 patients, there were 27,844 females, 26,336 males, and five patients with missing sex information. Sex was based on self-reporting. The number of patients by sex for each cancer type is described in Supplementary Table 1. Sex was adjusted for in the multivariable Cox proportional hazard model for the prognostic analysis.

Reporting on race, ethnicity, or other socially relevant groupings

Information on race was not collected; however, as the data were obtained from a Japanese nationwide database, almost all patients were considered Japanese.

Population characteristics

Included patients were those with advanced or recurrent solid tumors who had completed or were about to complete standard treatment, and who received CGP under Japan's national insurance system. Age at CGP ranged from 0 to 99 years (capped at 99), with a median age of 63 years. A total of 1,153 patients were younger than 20 years, and 2,087 were aged 80 years or older.

Recruitment

Almost all patients who received CGP under Japan's National Health Insurance system have been registered in the C-CAT database, with written informed consent from each patient.

Ethics oversight

This study was approved by the institutional review board at the National Cancer Center (approval number: 2021-249). The secondary utilization of the C-CAT data for academic research purposes was approved by the C-CAT data utilization review board (C-CAT proposal control number: CDU2022-003).

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☒ Life sciences ☐ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

Sample size

No statistical methods were used to predetermine sample size. We enrolled all patients receiving CGP using the FoundationOne CDx (F1CDx).

Data exclusions

No patient was excluded.

Replication	This study utilized clinicogenomic data from the C-CAT database. Since the database was derived from real-world clinical practice, replication of the data is not applicable.
Randomization	No randomization was performed, as this was an observational study based on real-world clinicogenomic data. In survival analyses, covariates including sex and age category were controlled for in multivariable Cox proportional hazard analyses, both within each tumor type and across the overall cohort.
Blinding	Blinding was not relevant to the study, as no control or treatment arms were involved.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☒	☐ Animals and other organisms
☒	☐ Clinical data
☒	☐ Dual use research of concern
☒	☐ Plants

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Plants

Seed stocks	N/A
Novel plant genotypes	N/A
Authentication	N/A