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Funding of Cancer Research: Do Levels Match Incidence and Mortality Rates?

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Abstract

The incidence and mortality rates of the ten most prevalent cancers types in the US were compared with the National Cancer Institute's funding of clinical studies in 2012. Additionally, a sampling of print and broadcast media coverage of these ten cancer types were gathered for the same year. While funding per case and per annual death broadly matched cancer prevalence, significant exceptions existed. Breast cancer research is funded at the highest level on both a per-case and a per-death basis. Funding far exceeds that of any other cancer regardless of the measure examined. While second in prevalence in the US, actual dollars spent on breast cancer research in 2012 were more than double the dollars spent for the most prevalent cancer (prostate). Also, media mentions for breast cancers were nearly twice those for prostate cancers in 2012. Is the possible influence of public awareness, either by the media directly or through patient or specific cancer research advocacy groups, influencing the funding of cancer? Have we have reached a point where breast cancer is now overfunded by the National Cancer Institute relative to prostate cancer and other less publicly visible, yet nevertheless still deadly, cancers?

Keywords

NIH, NCI, funding, cancer research

Public funding of cancer research by the National Institutes of Health accounts for a large proportion of cancer research conducted in the US. Funding across cancer types varies greatly. Cancers of prostate, lung and bronchus, and colorectum in men and cancers of breast, lung and bronchus, and colorectum in women continue to be the most common causes of cancer death. These four cancers are known to account for more than half of the total cancer deaths in men and women.[1] It is unknown, however, whether the level of public funding for cancer research is related to disease incidence, mortality, public visibility, or some other variable. We examined these factors for the National Institutes of Health's National Cancer Institute–funded cancer trials in 2012.

For the ten most prevalent cancers in the United States, we examined new diagnoses, deaths, incidence rate, mortality rate, number of ongoing clinical trials, and National Cancer Institute funding for 2012 (Table 1). To estimate the public visibility of these cancers, we collected the number of mentions of each cancer type in both print and broadcast media in 2012. We chose media samples with wide regional or national coverage: *New York Times*, *Washington Post*, *Chicago Tribune*, and *CNN News* (Table 2).

The most prevalent cancers are usually funded at higher rates than the less prevalent cancers, even when broadly viewed on a dollars-per-case or dollars-per-annual-death basis. Likewise, the total number of media mentions broadly matched the prevalence of specific cancers.

Significant exceptions to this funding trend exist and may be of public health significance. Breast cancer research is funded at the highest level on both a per-case and a per-death basis. Funding far exceeds that of any other cancer regardless of the measure examined. While second in prevalence in the US, actual dollars spent on breast cancer research in 2012 were more than double the dollars spent for the most prevalent cancer (prostate). Also, media mentions for breast cancers were nearly twice those for prostate cancers in 2012.

Many factors may play a part in funding decisions for these two most prevalent cancer types. While the highest incidence of breast cancers occurs in the 75- to 79-year age group, all age groups above the age of 40 have an incidence of greater than

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Table 1. Cancer incidence, mortality, and funding in 2012.

	Cancer Type	Diagnoses[2]	Deaths[2]	Incidence Rate[3]	Mortality Rate[4]	No. of Clinical Trials[5]	Funding, $M[6]	Cost per Diagnosis, US$	Cost per Death, US$
1	Prostate	241,740	28,170	77	9	763	265.09	1096	9410
2	Breast	229,060	39,920	75	13	899	602.7	2631	15,098
3	Lung and bronchus	226,160	160,340	71	51	1133	314.6	1391	1962
4	Colorectal	143,460	51,690	45	17	1775	256.2	1786	4957
5	Melanoma	76,250	9,180	22	3	375	121.1	1589	13,202
6	Bladder	73,510	14,880	22	5	192	23.3	318	1571
7	Non-Hodgkin lymphoma	70,130	18,940	21	6	252	119.4	1703	6307
8	Kidney and pelvis	64,770	13,570	19	4	309	48.9	756	3609
9	Thyroid	56,460	1,780	15	1	130	16.4	291	9259
10	Endometrial	47,130	8,010	15	1	180	19.09	405	2384

Diagnoses and deaths were total in US for the year per the National Cancer Institute. Incidence rates were calculated per 100,000 people in US. For cancers that occur in only one sex, the sex-specific population was used. Number of clinical trials and funding of trials were those funded by the National Cancer Institute. All data estimated for 2012.

Table 2. Mentions in US media in 2012.

Type of Cancer	*New York Times*[7]	*Washington Post*[8]	*Chicago Tribune*[9]	*CNN News*[10]	Total (Rank)
Prostate	869	195	115	102	1281 (2)
Breast	985	755	315	265	2320 (1)
Lung and bronchus	332	197	187	190	906 (3)
Colorectal	52	24	15	19	110 (6)
Melanoma	130	38	55	20	243 (4)
Bladder	44	39	40	18	141 (5)
Non-Hodgkin lymphoma	23	66	1	17	107 (7)
Kidney and pelvis	29	7	17	20	73 (9)
Thyroid	36	12	15	27	90 (8)
Endometrial	6	4	3	6	19 (10)

Number of stories which mentioned the cancer type and included in the source's website for 2012.

100 per 100,000 women.[11] The overall 5-year survival rate in breast cancer is 89.5%.[12] Prostate cancer, while highest in incidence in the 70- to 74-year-old group, has an incidence greater than 100 per 100,000 men above only the age of 50.[13] The overall 5-year survival rate in prostate cancer is 99.4%.[14] Thus, breast cancer likely occurs more often in younger patients and appears less successfully treated than prostate cancer. Therefore, a higher funding level may be appropriate.

Another exception to higher funding of the most prevalent cancers is the case of lung and bronchus cancer. While this cancer has the highest mortality rate of the ten most prevalent cancers and is the third-most prevalent cancer diagnosis, trial funding per death in 2012 was only ninth of the ten most prevalent cancers. Over seven times more research dollars were spent, on average, on a death from breast cancer than for lung cancer. It could be argued that lung cancer funding should be and is focused on prevention rather than treatment, but the gap between the two cancer types is large. Additionally, bladder cancer, the sixth-most prevalent cancer type, has the lowest funding of the ten most prevalent cancers when examined on a per-death basis and second lowest on a per-case basis.

It would be of concern if research funding decisions were based on anything other than the merits of a particular trial and the need to address the medical needs of all Americans fairly. Appropriate funding for cancer research is clearly a complex issue dependent on many factors, including the suitability of products to be tested and the availability of appropriate patients. It is also difficult to compare if and why investigators may be choosing to study certain cancers over others. Nonetheless, from a public health perspective, the question must be asked whether the most prevalent diseases should be funded at per-patient levels significantly greater than less prevalent diseases. Of more concern is the possible influence of public awareness, either by the media directly or through patient or specific cancer research advocacy groups. Our summary of media mentions of cancer types would have captured news coverage of research findings but also coverage of public awareness campaigns, ''celebrity cancers'' and

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fund-raising events. It would not have captured commercial messages sponsored by disease advocacy groups. It is likely that the public's relative exposure to the breast cancer message is even higher than that shown in Table 2. Are some cancers underfunded because they are less visible?

Further research will need to determine if this apparent underfunding is due to a differential success rate in grant requests, differential investigator interest due to desire to work in a more visible field, or simply the difficulty in treating specific cancer types. Perhaps we have reached a point where breast cancer is now overfunded by National Cancer Institute relative to prostate cancer and other less publicly visible, yet nevertheless still deadly, cancers. More information is needed before any hypotheses may be proposed, but we feel that the discussion should be started and that a careful analysis of grant success rate and funding decisions be made available by the National Cancer Institute. The impact of these decisions on the public health is significant, and they must therefore be completely transparent.

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