Report prepared by the Hawai'i Tumor Registry for the Hawai'i State Department of Health:
Kaua'i Cancer Cases

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This report has been prepared in response to numerous community inquiries received by the Hawai'i State Department of Health and the University of Hawai'i Cancer Center, Hawai'i Tumor Registry (HTR) regarding suspected elevated rates of cancer among residents of Kaua'i. In the U.S., the overall incidence of cancer declined over the last decade. Declines have specifically been observed for malignancies of the colon-rectum, prostate, stomach, cervix, and larynx. Increases have been observed for some cancers including malignancies of the liver and kidney as well as non-Hodgkin lymphoma and melanoma. These national trends have also been observed in Hawai'i. A specific cause for concern for a community would be to find substantially elevated risk beyond the trends exhibited in the state and country.

An evaluation was undertaken to assess the incidence of cancer diagnosed among residents of Kaua'i compared to the entire state of Hawai'i. Standardized incidence ratios (SIRs) with 95% confidence intervals (CIs) were computed comparing the observed number of cancer cases diagnosed among Kaua'i residents to the number of cancer cases expected based on statewide incidence rates. The observed number of cases included Kaua'i residents diagnosed with cancer during 2000-2009. The expected numbers of cases were obtained by applying the most recent sex-race-age specific cancer incidence rates for the state of Hawai'i (1995-2000, adjusted to account for changes from 2000-2009) to the population counts for Kaua'i, and each census tract within Kaua'i. Population numbers by sex, race and age group were computed based on census data in 2000 and 2010 and interpolated for 2001-2009. Cancer cases were evaluated over two time periods, 2000-2004 and 2005-2009. SIRs were computed for all cancers combined and for each major cancer site. The evaluation included the island of Kaua'i and each of its census tracts (Figure 1).

Table 1 shows the SIRs for Kaua'i (data not shown for individual census tracts). SIRs (including confidence intervals) above 1.00 reflect elevated incidence rates and those below 1.00 are indicative of decreased rates compared to the state. The key findings are summarized below:

- In general, cancer incidence on Kaua'i was similar to or lower than that of the entire state of Hawai'i.
- Overall cancer incidence rates (all cancers combined) were significantly lower on Kaua'i compared to the entire state of Hawai'i for both time periods (2000-2004 and 2005-2009).
- Cancer incidence rates on Kaua'i were lower for the following cancers during one or both time periods: breast cancer (2000-2004 and 2005-2009), endometrial cancer (2005-2009), Hodgkin lymphoma (2005-2009), liver cancer (2005-2009), ovarian cancer (2000-2004 and 2005-2009), prostate cancer (2000-2004), and thyroid cancer (2000-2004 and 2005-2009).
- The incidence of melanoma on Kaua'i was significantly elevated for the time period 2000-2004.
- Within individual census tracts of Kaua'i, cancer incidence was generally lower or comparable to that of the state.
- The incidence of melanoma for census tract 401 was significantly elevated for the time period 2000-2004.
- No other census tract showed elevated rates of cancer.

We conclude that that there is no evidence of higher incidence of cancer on the island of Kaua'i overall or for specific geographic regions of the island, as compared to the state of Hawai'i. Melanoma was the exception whereby there is evidence of higher incidence on the island of Kaua'i for the period 2000-2004. These elevated rates for the island appear to be primarily driven by the increased risks of melanoma among residents of census tract 401 during this time period. Notably, during the subsequent time period 2005-2009, the rates of melanoma for Kaua'i and census tract 401 were no longer elevated. The primary risk factor for melanoma is exposure to ultraviolet radiation. It should be noted that in the state of Hawai'i, individuals of Caucasian ancestry have the highest incidence of melanoma compared to other ethnic groups. Census tract 401 has the highest proportion of Caucasians compared to other areas of Kaua'i. The incidence of melanoma is increasing in Hawai'i as well as for the U.S. overall indicating that both increased sun exposure and increases in the diagnosis of melanoma cases may be contributing to this trend.

Figure 1. Kaua‘i County, Census Tracts Divisions

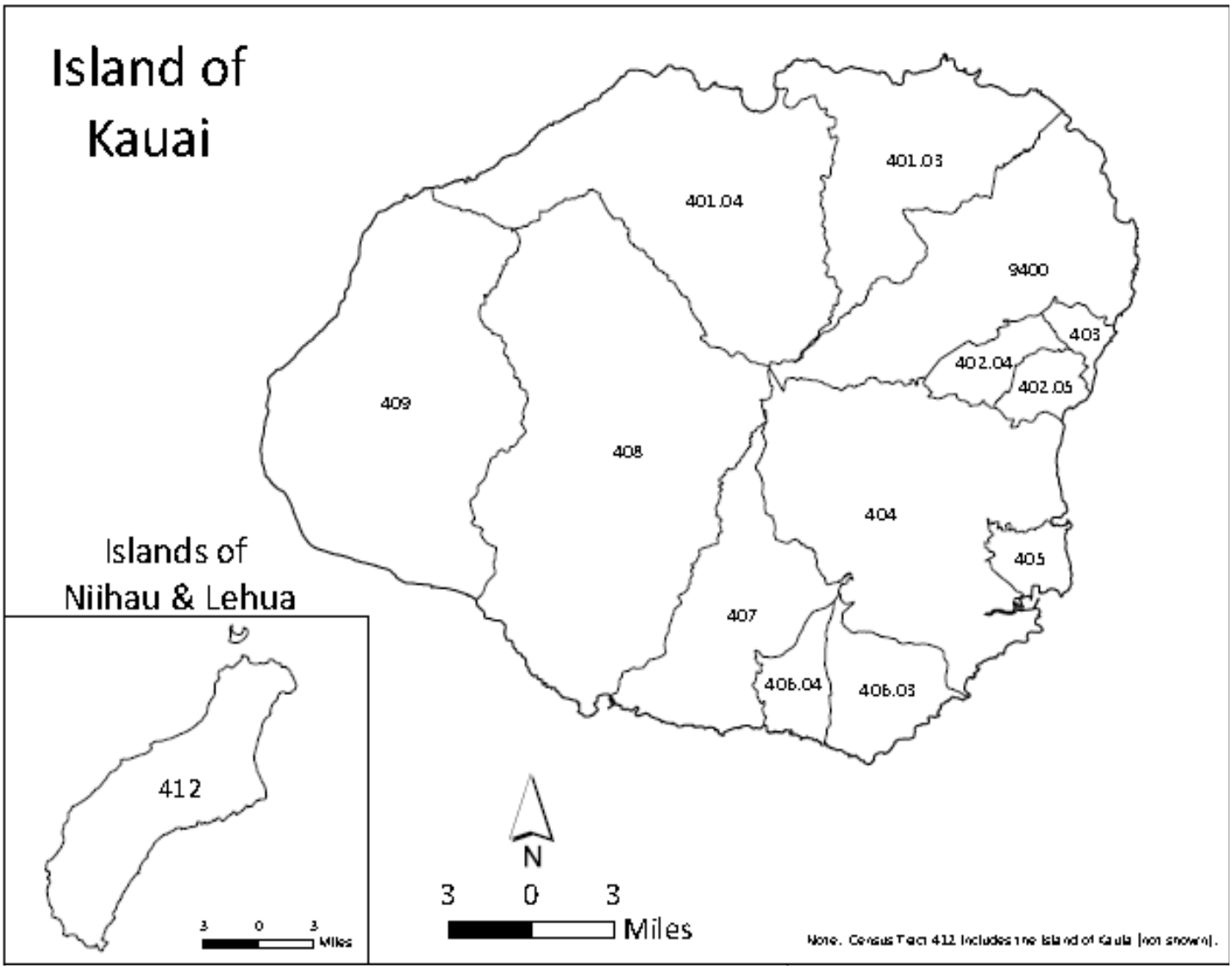

Table 1. Comparison of observed to expected number of invasive cancer cases, Kaua'i, 2000-2009

Cancer Site	2000-2004 SIR (95% CI)	2005-2009 SIR (95% CI)
All	[1]0.91 (0.86-0.95)	[1]0.91 (0.87-0.95)
Bladder	0.71 (0.39-1.03)	0.88 (0.55-1.20)
Breast (female)	[1]0.86 (0.75-0.98)	[1]0.84 (0.72-0.95)
Cervix	1.41 (0.81-2.01)	1.28 (0.71-1.85)
Colon	0.99 (0.82-1.17)	1.01 (0.83-1.18)
Endometrial	1.05 (0.75-1.34)	[1]0.74 (0.52-0.96)
Hodgkin lymphoma	1.02 (0.22-1.82)	[1]0.42 (0.00-0.87)
Kidney	0.83 (0.55-1.11)	0.93 (0.68-1.19)
Leukemia	0.76 (0.45-1.06)	1.29 (0.90-1.68)
Liver	0.90 (0.57-1.23)	[1]0.73 (0.46-0.99)
Lung	0.89 (0.76-1.02)	0.93 (0.80-1.05)
Melanoma	[2]1.41 (1.13-1.68)	0.89 (0.70-1.08)
Non-Hodgkin lymphoma	0.88 (0.64-1.13)	1.14 (0.88-1.39)
Ovary	[1]0.65 (0.31-0.99)	[1]0.64 (0.32-0.97)
Pancreas	0.84 (0.57-1.11)	0.85 (0.60-1.10)
Prostate	[1]0.72 (0.61-0.83)	0.90 (0.78-1.02)
Rectum	1.24 (0.96-1.52)	0.85 (0.63-1.07)
Stomach	0.93 (0.66-1.20)	0.99 (0.70-1.29)
Thyroid	[1]0.46 (0.24-0.69)	[1]0.39 (0.22-0.57)

[1] Significant lower incidence
[2]Significant higher incidence

Glossary: SIR= Standardized Incidence Ratio(s); CI= Confidence Interval(s)