

## 9.1 GENERAL INFORMATION

**Classification:** Classification of tumors into categories facilitates decision making and aeromedical disposition. The minimal requirements for return to flight status are an accurate diagnosis, indication of tumor size, differentiation and local invasion, and confirmation of the presence or absence of lymph node or distant metastases.

The American Joint Commission on Cancer (AJCC) **TNM classification** of malignant disease allows a reasonably accurate standardization of the staging of the malignancy, which should allow greater consistency in the aeromedical disposition. In review, T refers to the size of the primary tumor with subscripts to quantify the size, N with subscripts 0 or 1 identifies absence or presence of spread to the lymph nodes and M with subscripts 0 or 1 identifies absence or presence of distant spread. Other classification systems and protocols for staging cancer exist and may be used.

To provide standardization in aeromedical disposition, it is recommended that the histological diagnosis be confirmed by the Armed Forces Institute of Pathology (AFIP). Note: we have seen at least two cases where aviators were treated inappropriately due to a misdiagnosis.

**Effects of Treatment:** Aeromedical disposition requires knowledge of the primary tumor, the clinical or surgical stage, and interventions that are currently being used, or have been previously used.

Assuming complete healing, surgery itself is not disqualifying for aviation provided major organ dysfunction does not exist. The condition for which the surgery was performed may, however, be disqualifying. Surgical procedures for the removal of cancer will require a variable period of grounding. The length of grounding will depend on the chance of cure, the likelihood that recurrence will cause a flight safety hazard or otherwise interfere with the military task, and on the site and extent of operation.

Radiation therapy is generally delivered to a localized area for a limited time. The immediate side effects of nausea, neutropenia, and other dose-related effects usually disappear a few weeks after completion of therapy. Until then, the patient should be disqualified from flying. Return to flying status will then depend on other factors. Follow-up is required because of the risk of developing another primary cancer. Any complications of radiation therapy (radiation proctitis, xerostomia) may be permanently disqualifying, without recommendation for waivers.

Chemotherapy is incompatible with flying until full recovery from side effects such as anemia, thrombocytopenia, granulocytopenia, nausea, and vomiting has occurred. The use of steroids or hormone therapy for the treatment of tumors is also disqualifying, although waivers can be recommended for their use as replacement therapy. Return to flying duties after completion of drug therapy will then depend on other factors. Follow-up may be required for long term side effects of chemotherapy such as cardiac or pulmonary toxicity and the development of second malignancies.

**Waiver Consideration:** Waiver recommendation for applicants with a history of cancer is done on a **case-by-case basis**. Survivors of childhood leukemia or lymphoma are generally considered cured if their disease-free survival is for more years than their age at diagnosis. We occasionally receive requests on such individuals. Recommendation is based on the type of tumor and any residual effects of chemotherapy.

With the exception of basal cell carcinoma, all malignancies require medical board dictation. The board may find the member fit for full duty immediately, as would be expected after excisional biopsy of a low level malignant melanoma, or it may place the member in limited duty status for some period of time. **A member must be on full duty before waiver consideration for flight status or other special duty is appropriate.** Moreover, AFIP confirmation of the diagnosis is necessary. It is helpful to our reviewers if an objective assessment by the oncologist of the chances of cure, the risks, likely nature and ease of detection of recurrence, and recommendations for follow-up are included. Of particular interest is an estimate of the 5 year survival rate.

In general terms, it will be appropriate to recommend a return to restricted flying status provided there is a minimal risk of incapacitation as a result of recurrence of the malignancy. This decision will include an assessment of survival and recurrence rates, in conjunction with the tendency for recurrences to present catastrophically.

The necessity for continued follow-up will almost certainly interfere with operational requirements unless the follow-up is at greater than 6-month intervals, or the tests required for follow-up are very simple (e.g. CBC). In such cases, LIMDU is the only realistic option for these individuals, as the deployed environment may result in a recurrence being overlooked at a curable stage. Medical board dictation is the only way to achieve this restriction on deployability.

In most cases upgrading to full duty, and hence a waiver to full flight status, can be considered 2 years after completion of therapy provided there is no recurrence. Specific exceptions to this are addressed on the individual data sheets.

## **9.2 BLADDER CANCER**

**AEROMEDICAL CONCERNS:** Urinary frequency and urgency may be distracting in flight. Pain can occur if obstruction is caused by clots. Metastasis to bone can give rise to pathological fractures.

**WAIVER:** A waiver request can be considered after initial therapy, provided the tumor is confined to the epithelium. Cystectomy or the requirement for repeated catheterization results in disqualification, with no waiver recommended.

### **INFORMATION REQUIRED:**

1. Medical Board
2. Tumor Board recommendations
3. AFIP confirmation of histology
4. Full long-form flight physical
5. CXR
6. Cystoscopy
7. Contrast studies of the entire urinary tract
8. CT scanning of the abdomen and pelvis.

**FOLLOW-UP:** Annual submission to include:

1. Annual oncology/nephrology and/or urology consult

**TREATMENT:** Ongoing therapy is not compatible with flying status.

**DISCUSSION:** The overall 5 year survival rate is 67%; transitional cell tumors have a 5 year survival rate of <50% and squamous cell tumors have a worse prognosis. However, carcinoma in situ or papillary noninvasive carcinomas are associated with a high probability of cure. Recurrence is primarily local and no sudden symptoms except hematuria occur. The disease is strongly associated with cigarette smoking.

### **ICD-9 CODES:**

**188.9 Bladder Cancer**

**223.3 Benign neoplasm of the bladder**

## 9.3 BREAST CANCER

**AEROMEDICAL CONCERNS:** There is an unpredictable chance of developing brain metastases, which may cause seizures. Bone metastases may also occur.

**WAIVER:** Request for waiver may be submitted upon recovery from treatment for early stages of breast cancer. Patients with spread to lymph nodes or more distant sites will not normally be considered for waiver.

### **INFORMATION REQUIRED:**

1. Medical Board
2. Tumor Board recommendations
3. AFIP confirmation of the histology
4. Surgical/oncology consult

**FOLLOW-UP:** Annual submission to include:

1. MRI scan of the brain
2. Bone scan
3. CT scan of the liver
4. Mammography of the opposite breast are

**TREATMENT:** The patient is grounded during treatment.

**DISCUSSION:** At the time of detection, about half of breast cancers have metastasized to lymph nodes. Of those detected by screening, 42% are too small to detect by physical examination. Up to 80% of those detected by screening have negative axillary lymph nodes. Of patients with up to 3 affected nodes, 60% will relapse by 10 years. Even the earliest stage of breast carcinoma carries a relapse rate of 20% by 5 years. The average time to relapse is 3-4 years in patients with 1-3 involved nodes and 1-2 years if more nodes are involved. From the point of view of comfort when wearing restraint harnesses, it may be necessary to delay return to flying duties until after breast reconstruction has been carried out in cases where simple mastectomy rather than "lumpectomy" has been performed. The site of metastasis is bone in 27% of cases, local in 26% and pulmonary in 21%.

### **ICD-9 CODES:**

**217.0 Benign neoplasm of male and female breast**

**74.9 1Malignant neoplasm of breast, female**

**175.9 Malignant neoplasm of breast, male**

## 9.4 CERVICAL CANCER

**AEROMEDICAL CONCERNS:** Later manifestations of the disease include anemia, weakness, and weight loss. Distracting pain may be caused by invasion of the pelvic nerves.

**WAIVER:** Waiver is not required for carcinoma in situ or for those cases treated as outpatients by laser or cauterization; however, a 4 week grounding period is mandatory following these surgical treatments. For other patients without evidence of spread, waiver can be considered 6 weeks after operation. Aircrew with evidence of metastasis are grounded but may be considered for waiver 2 years after completion of therapy as long as there is no evidence of recurrence.

### **INFORMATION REQUIRED:**

1. Medical Board
2. Tumor Board recommendations
3. AFIP confirmation of the histology
4. Gynecology/oncology consult

**FOLLOW-UP:** Annual submission to include:

1. Current gynecology/oncology consult

**TREATMENT:** Continuation of therapy is incompatible with flying status.

**DISCUSSION:** For carcinoma in situ, there is an almost 100% survival rate with therapy. The 5 year survival rate for patients with localized but invasive carcinoma of the cervix is about 82% while for all groups as a whole it is 59%.

### **ICD-9 CODES:**

**180.9 Malignant neoplasm of the cervix**

**219.0 Benign neoplasm of the cervix**

## 9.5 COLORECTAL CARCINOMA

**AEROMEDICAL CONCERNS:** Carcinoma of the colon presents as an emergency (obstruction, perforation) in up to 30% of cases. Rectal carcinoma rarely presents as an emergency. Both can cause anemia to a degree that can cause problems in flight if undetected.

**WAIVER:** Waiver can be considered after successful resection of the tumor and completion of any adjuvant chemotherapy. It is suggested to wait 2 years before requesting initial waiver recommendation.

### INFORMATION REQUIRED:

1. Medical Board
2. Tumor Board
3. AFIP confirmation of the diagnosis
4. Liver scan
5. Liver enzyme tests
6. Colonoscopy
7. Serum carcinoembryonic antigen measurements

**FOLLOW-UP:** Annual submission to include:

1. GI/oncology follow-up every six months
2. Colonoscopy report

**TREATMENT:** Surgery, with or without additional radiotherapy or chemotherapy. Continuing treatment is incompatible with waiver. Colostomy is not compatible with military aviation. (Remember the balloon in the low pressure chamber?)

**DISCUSSION:** Colorectal cancer accounts for more than 12% of all carcinomas and is the most common malignancy in the USA after skin cancer. On average, 30% arise in the rectum, 30% in the sigmoid colon and 30% in the proximal colon. The distribution of metastases is liver >60%, lung >50%, peritoneum 15% and bone 15%.

There is a 20% incidence of coexisting benign or malignant neoplasm elsewhere in the colon. The overall survival for patients with Duke's Stage I/II/III (i.e. confined to mucosa or submucosa/confined to the wall of the colon or rectum/penetrating all layers including serosa) tumors has been reported as 80/50/30%. Most metastases occur within the first few years and can be predicted up to 6 months in advance by serum carcinoembryonic antigen estimation in 60% of cases. Up to 20% of single hepatic or pulmonary metastases can be cured by resection. Liver function tests (LFT) can remain within normal limits until quite advanced disease exists.

The primary care physician (the flight surgeon) plays an integral role in the detection of curable colon malignancies. Annual rectal examination with guaiac testing can provide substantial

benefits, particularly in individuals who are asymptomatic and are most likely to be cured by intervention.

**ICD-9 CODES:**

**153.9 Malignant neoplasm of the colon**

**154.1 Malignant neoplasm of the rectum**

**211.3 Benign neoplasm of the colon**

**211.4 Benign neoplasm of the rectum**

## 9.6 OTHER GASTROINTESTINAL TUMORS

**AEROMEDICAL CONCERNS:** Esophageal carcinoma carries a risk of sudden hemorrhage and aspiration. Gastric carcinoma has the risk of incapacitating hemorrhage, anemia, or metastasis to brain, bone, or lungs. Hemorrhage is also a risk in primary hepatic carcinoma. Pancreatic carcinoma is associated with a risk of developing diabetes mellitus, thrombophlebitis, and serious psychiatric illness.

**WAIVER:** Waiver may be considered for aircrew members who have survived 5 years after treatment without symptoms or recurrence.

### **INFORMATION REQUIRED:**

1. Medical Board
2. Tumor Board recommendations
3. AFIP confirmation of the histology
4. Full flight physical
5. Oncology/internal medicine review
6. CXR
7. CT scan of mediastinum and abdomen
8. Endoscopy (if indicated)

**TREATMENT:** Any treatment modality is acceptable provided the patient remains symptom-free 5 years after cessation of therapy.

**DISCUSSION:** The 5 year survival rates for the various carcinomas are as follows: esophagus 3%, stomach 12% (although 90% with early detection and resection has been reported), liver <1%, gall bladder 2%, and pancreas 1%. Three disorders occur in pancreatic carcinoma that could affect aircrew efficiency. Diabetes mellitus occurs in 10-20% of patients. Thrombotic disorders including thrombosis of the splenic vein (15% of cases) or pulmonary embolism (10%) may also occur. Serious psychiatric disorders, particularly depression, can be the presenting symptom and occur in over 75% of patients. Primary lymphoma of the bowel is treated as other lymphomas are. Colonic polyps are also considered separately.

### **ICD-9 CODES:**

**150.9 Malignant neoplasm of the esophagus**

**151.9 Malignant neoplasm of the stomach**

**157.9 Malignant neoplasm of the pancreas**

**211.0 Benign neoplasm of the esophagus**

**211.1 Benign neoplasm of the stomach**

**211.6 Benign neoplasm of the pancreas**

## 9.7 HODGKIN'S DISEASE

**AEROMEDICAL CONCERNS:** There is little risk of incapacitation with active disease or in those undergoing therapy. More advanced cases can exhibit thrombocytosis or anemia.

**WAIVER:** Waiver is possible 2 years after completion of treatment of Stage I and IIA Hodgkin's disease with no evidence of recurrence. Patients with IIB through IVB disease have a greater recurrence rate with up to 75% achieving median length of remission of 3 years, and can be considered for a waiver 5 years after completion of therapy.

### **INFORMATION REQUIRED:**

1. Staging using Ann Arbor classification
2. AFIP confirmation of histology
3. Tumor Board report
4. Medical Board
5. Confirmation that the chemotherapy has not caused residual toxicity
6. Full pulmonary functions testing including DLCO and an echocardiogram with ejection fraction to confirm lack of pulmonary and cardiac toxicity (A gated radionuclide cardiac study can also be provided)
7. Neurological exam for peripheral neuropathy

### **FOLLOW-UP:** Annual submission to include:

1. Oncology/internal medicine evaluations
2. CBC
3. Sedimentation rate
4. CXR are required

**NOTE:** Formal neuropsychological testing may be required in some cases, as there is an effect of chemotherapy on cognition.

**TREATMENT:** Patients must be grounded when undergoing therapy.

**DISCUSSION:** The incidence of Hodgkin's disease is bimodal, with one peak in the mid 20s. Because of the risks of long term complications of therapy, patients should be followed at least quarterly for the first 2 years, then every 6 months for the next 8 years and annually thereafter. After 3 years of remission, there is an 80% chance of permanent cure, which rises to 96% after 5 years. Second malignancies are not unheard of, especially in patients that have received alkylating agents in their initial therapy.

### **ICD-9 CODES:**

201.9 Hodgkin's Disease

## 9.8 KIDNEY TUMORS

**AEROMEDICAL CONCERNS:** Renal cell carcinoma tends to metastasize to the brain, with seizure as the initial presentation. Bone metastases carry a risk of pathological fracture.

**WAIVER:** Waiver recommendations may be considered 2 years after successful resection of a renal carcinoma provided that the disease was confined to the kidney and that there has been no recurrence. Since applicants for flight training with congenital absence of one kidney are rejected, it follows that applicants with a history of nephrectomy for Wilms tumor will be treated the same way.

### **INFORMATION REQUIRED:**

1. Medical Board finding the member fit for full
2. Tumor board appraisal
3. AFIP confirmation of the histology
4. Full flight physical
5. Oncology/nephrology consult
6. CXR
7. CT scan of abdomen and retroperitoneum
8. MRI scan of the brain

### **FOLLOW-UP:** Annual submission to include:

1. Flight physical
2. Oncology/nephrology consult
3. CXR
4. CT scan of abdomen and retroperitoneum
5. MRI scan of the brain

**TREATMENT:** Ongoing therapy is not compatible with flying status. Chemotherapy results for treatment of renal cell carcinoma have been dismal.

**DISCUSSION:** With localized disease, the 5 year survival rate is reported as 72%. The smallest tumors that exhibit minimal caliceal distortion and are surrounded by normal renal parenchyma have a good prognosis after surgery but they are at risk for relapse. One third of patients already have disseminated disease at diagnosis, involving the lung in 50% of cases, bone in 30%, liver in 30%, and brain in 25%. Brain metastases from kidney cancer are reported to be particularly susceptible to hemorrhagic degeneration with abrupt onset of headache and neurological compromise. Hypertension occurs in about 30% of cases with renal cell carcinoma (hypernephroma) and a polycythemia syndrome occurs in 2-3%. Hematuria may be the only manifestation of renal tumors, and as such renal tumors should enter into the differential diagnosis of protracted hematuria.

### **ICD-9 CODES:**

**189.0 Kidney Tumors**  
**223.9 Benign neoplasm of the kidney**

## **9.9 LARYNGEAL CANCER**

**AEROMEDICAL CONCERNS:** Airway compromise and speech difficulties.

**WAIVER:** Early diagnosis (T1N0M0) and treatment not involving laryngectomy, with no evidence of recurrence or speech dysfunction, will be considered for a waiver 12 months after completion of treatment.

### **INFORMATION REQUIRED:**

1. Surgical and/or radiation reports
2. Medical Board
3. Tumor Board recommendations
4. AFIP confirmation of histology
5. Current ENT/oncology consult

**FOLLOW-UP:** Annual submission to include:

1. ENT/oncology consult

**TREATMENT:** Laryngectomy is CD, no waiver considered, but other types of treatment will be considered once treatment is completed and there is no airway compromise or speech dysfunction. Treatment, depending on site of lesion and its extent, can range from local laser excision to total laryngectomy with neck dissection and post-operative radiation therapy. Pre-operative chemotherapy is also used in selected advanced cases.

**DISCUSSION:** Overall, early laryngeal cancer carries a 5 year survival of 76%, but localized glottic cancer has a figure of 90%. Recurrence is primarily local. Early laryngeal carcinoma (all sites) has a 5 year survival of 76% while localized true vocal cord carcinoma has a 5 year survival of 90%. Recurrence is primarily local.

### **ICD-9 CODES:**

**161.9 Laryngeal Cancer**

**212.2 Benign neoplasm of the larynx**

## 9.10 LEUKEMIA

**AEROMEDICAL CONCERNS:** Most of the leukemias present with lethargy, malaise, infection, anemia or hemorrhage. Disseminated intravascular coagulation as a complication of acute lymphocytic leukemia (ALL) can give sudden, fatal cerebral hemorrhage or disabling bone pain. A relapse of ALL can present in the CNS. Prophylactic CNS radiation in cases of ALL can produce leukoencephalopathy, the symptoms of which can include ataxia and confusion.

**WAIVER:** A history of ALL as a child is compatible with waiver. Patients with other leukemias may be considered for waiver recommendation, provided they have been free of symptoms and off treatment for 2 years. Aircrew with satisfactory response to treatment for early hairy cell leukemia may be considered for waiver on completion of treatment.

### **INFORMATION REQUIRED:**

1. Tumor Board recommendations
2. Medical Board disposition
3. AFIP confirmation of the diagnosis
4. Neuropsychological review and testing (in patients who have had prophylactic CNS radiation)

**FOLLOW-UP:** Annual submission to include:

1. Oncology consultation.

**TREATMENT:** Ongoing therapy is not compatible with waiver. Patients who have had bone marrow transplantation are not likely candidates for waiver, unless they are asymptomatic and on no medications.

**DISCUSSION:** Overall, the requirement for frequent assessment may interfere with military mobility. Adult ALL has a high relapse rate and long term survival is uncommon. CNS relapse occurs in 50% of cases, although this figure is reduced to 5% with chemical or radiation prophylaxis. Although 60-80% of cases of acute myelogenous leukemia (AML) go into remission, this is short (15 months on average) and there is a high relapse rate, particularly to the CNS. Long term survival without bone marrow transplant is rare but the addition of this technique to the therapeutic armamentarium has increased long term survival of AML to 50%. Chronic myelogenous leukemia (CML) usually requires cytotoxic therapy during the chronic phase; the development of a blast crisis is unpredictable and may be sudden. Chronic granulocytic leukemia (CGL) is rare; 10% of patients exhibit an accelerated progression with death occurring in weeks. Bone marrow transplant can produce long term survivors. Patients with chronic lymphocytic leukemia (CLL) may progress unpredictably from one stage to another; cytotoxic therapy is often needed and the risk of incapacitation from cytopenia is serious. Up to 20% of patients with CLL have another, coexisting malignancy. Hairy cell leukemia, on the other hand, may be clinically benign; patients may live for many years without impairment although the results of chemotherapy can range from disappointing with some drugs

to a relapse rate of <1% in 5 years with pentostatin; splenectomy can also increase long term survival. Relapse in hairy cell leukemia can usually be identified by regular CBC.

**ICD-9 CODES:**

**204.9 Lymphoid leukemia**

**205.9 Myeloid leukemia**

**206.9 Monocytic leukemia**

## 9.11 LUNG CANCER

**AEROMEDICAL CONCERNS:** The major concern for aviators is the risk of cerebral metastasis with the development of seizures. There is also the likelihood of diminished pulmonary function producing symptoms in flight or, more rarely, hemorrhage leading to incapacitation. Chest discomfort is a presenting feature in 40% of cases and this may be exacerbated by the pressure of a restraint harness. Depending on the tumor subtype, there may also be associated neuropathies or endocrine disturbances.

**WAIVER:** Aviators with carcinoma of the lung are CD, no waiver. Patients with successful resection of early stage carcinoma could be considered for waiver recommendation after 5 years without recurrence.

### **INFORMATION REQUIRED:**

1. Tumor Board recommendations
2. Medical Board
3. AFIP confirmation of the diagnosis
4. Oncology consult
5. CXR
6. MRI of the brain
7. Full physical exam
8. Pulmonary function testing

**TREATMENT:** Patients who have had lobectomy may be considered for waiver provided the criteria listed above are met. Pneumonectomy will inevitably result in permanent disqualification.

**DISCUSSION:** Overall, lung cancer has a 5 year survival rate of 9%; between 17-20% survive 1 year after diagnosis. Even those who have curative surgery for localized cancer of the lung, and in whom all disease is confined to the lung without any spread to any lymph nodes, have a 5 year survival rate of only 42% and a 10 year survival rate of 16-18%. The 5 year survival rate for resected Stage I carcinoma has been reported as 70%. However, most recurrences are distant suggesting that micrometastasis has already occurred by the time of diagnosis. The rate of cerebral metastasis for the varying types of lung carcinoma has been reported to range from 14-30%.

### **ICD-9 CODE:**

**162.9 Lung Cancer**

## 9.12 MALIGNANT MELANOMA

**AEROMEDICAL CONCERNS:** Melanoma has become an epidemic cancer. Incidence has increased over 300 percent in the last 40 years. Of the cancers causing mortality in the 15-34 year old age group, melanoma ranks fourth. There is a risk of visceral metastases to lung, liver, brain, bone and gastrointestinal tract, in order of decreasing occurrence. Brain metastases may present as a seizure disorder, raising concerns of acute in-flight incapacitation. There is no specific evidence that melanoma sequelae have been directly implicated in any aviation mishap. However, in an examination of 584 AJCC stage III patients, one third of metastases were noted to be in the brain or liver. The CNS frequently appears as a sanctuary for melanoma because immune defenses have difficulty crossing the blood-brain barrier. In clinical series, the CNS is involved in 12-20% of the time, and this incidence increases to 36-54% in autopsy series. Other research shows that 75% of lesions found at autopsy are asymptomatic in the clinical setting. Behavioral changes are most frequently seen, followed by focal neurological deficits. Due to the vascular nature of melanoma, these tumors hemorrhage easily, at a rate of 19% in one study of head CT features in 28 brain metastatic melanoma patients. Asymptomatic screening contrast MRI represents a necessary screening tool for safety of flight concerns in our population.

**WAIVER:** Malignant melanoma or a history of malignant melanoma is disqualifying for aviation duties. Applicants are generally not considered for waivers, but may be evaluated on a case-by-case basis if greater than 5 years disease-free. Waivers may be considered for designated personnel after treatment is complete, using the AJCC staging system as a guide.

### **T-category:**

- 1.00 mm (T1) a= no ulceration
- 2.00 mm (T2) b = ulceration
- 4.00 mm (T3)
- > 4.00 mm (T4)

**AJCC Stage IA (T1a < 1.00 mm, Clark II or III):** 95% 5-year survival. Return to SG I flight status when surgical wounds are healed, provided no interference with function or flight equipment as determined by local flight surgeon or aerospace physiologist. Follow up mucocutaneous skin examinations submitted every six months for two years, then annually. Examinations should be done annually by a Dermatologist and should include a careful history and physical with emphasis on skin, lymph node, and neurological exams. All semi-annual exams may be submitted with the annual physical.

**AJCC Stage IB (T1b < 1.0 mm, T2a: 1.0 - 2.0 mm, Clark IV or V):** 91% 5-year survival. Same as above, but mucocutaneous skin examinations should be every six months for three years, then annually. Examinations should be done annually by a Dermatologist and should

include a careful history and physical with emphasis on skin, lymph node, and neurological exams. All semi-annual exams may be submitted with the annual physical.

**AJCC Stage IIA (T2b, T3a: 2.0-4.0 mm):** 60-80% 5-year survival. Because of increased morbidity and mortality associated with these lesions, additional diagnostic information should be applied. Analysis of sentinel node for melanoma metastasis has been shown to predict nodal involvement in 96% of cases, and should be obtained prior to consideration for return to flight. The pathologic indicators of mitotic rate, tumor-infiltrating lymphocytes, and histological regression have been shown to alter the probabilities of long-term survival and should be obtained in these intermediate cases if possible. Readily available clinical data such as age, gender, anatomic site, ulceration of the lesion, and growth pattern can also be submitted, as they have been shown to more accurately predict outcomes than tumor thickness alone. Lesions that are classified as IIA without evidence of ulceration or nodal involvement may be considered for waiver for SG I after complete excision. A semi-annual physical exam with specific attention to the skin and lymph nodes for three years then annually, with an annual dermatology consultation, is required. All semi-annual exams may be submitted with the annual physical.

**AJCC Stage IIB (T3b, T4a > 4.0 mm):** 60-80% 5-year survival. Because of increased morbidity and mortality associated with these lesions, additional diagnostic information should be applied. Analysis of sentinel node for melanoma metastasis has been shown to predict nodal involvement in 96% of cases, and should be obtained prior to consideration for a return to flight. The pathologic indicators of mitotic rate, tumor-infiltrating lymphocytes, and histological regression, have been shown to alter the probabilities of long-term survival and should be obtained in these intermediate cases if possible. Readily available clinical data such as age, gender, anatomic site, ulceration of the lesion, and growth pattern can also be submitted, as they have been shown to more accurately predict outcomes than tumor thickness alone. Consideration of SG III status can be entertained in aviators with predicted greater than 80% disease free five-year survival. Otherwise, a downing period of at least five years is appropriate prior to consideration to SG I. Follow up examinations submitted semi-annually for five years, then annually thereafter. Annual Dermatology consult is required. All semi-annual exams may be submitted with the annual physical. All aviators with a diagnosis of Stage IIB need an MRI with and without contrast prior to consideration to return to flight status (SG I – SG III).

**AJCC Stage IIC, III A/B/C (IIC: T4b > 4.0 mm, III: regional nodes):** All aviators with the diagnosis of Stage IIC or Stage III A/B/C will be considered for a waiver on a case-by-case basis after a minimum of 5-years disease free from completion of treatment. All required follow up care is in accordance with the guidelines for Stage IIB.

**AJCC Stage IV (distant metastasis, elevated serum LDH):** 5-25% 5-year survival. Because of the relatively poor prognosis and high likelihood of recurrent disease over time, waivers will not be routinely entertained.

#### **INFORMATION REQUIRED:**

1. Complete mucocutaneous examination performed by a dermatologist and lymph node exam with particular attention to the primary draining nodal area

2. Neurological exam (performed by the flight surgeon for Stage IIA and lower)
3. Serum chemistries
4. CBC
5. CXR
6. Tissue examination performed by a dermatopathologist. If a dermatopathologist is not available then tissue specimens should be sent to AFIP for confirmation of diagnosis. Must include comment about presence or absence of ulceration and Breslow depth
7. Tumor board report and medical board report returning the member to full duty (if applicable)
8. All patients with a diagnosis of Stage IIB and higher tumors require MRI with and without contrast and a full Neurology exam performed by a neurologist

**TREATMENT:** The treatment of primary non-metastatic melanoma consists of complete local surgical excision to the underlying muscle fascia with a margin of normal appearing skin, usually 1-3cm.

**DISCUSSION:** The most common clinical presentation is a pigmented lesion changing in size, shape, or color. The diagnosis is based on an excisional biopsy whenever possible (i.e. the entire lesion is removed down to the subcutaneous fat). For disease confined to the skin at presentation, the treatment, prognosis, and follow-up recommendations are most accurately based on the tumor thickness and presence or absence of tumor ulceration (see average 5-year survivals above). However, other factors such as increasing age, male gender, and tumors of the palms or soles are associated with a worse prognosis. Pathologic factors that are associated with worsening survival are high mitotic rate, absent tumor-infiltrating lymphocytes, and presence of histological regression. These modifiers can be used in various mathematical models to more accurately predict outcomes and to make better aeromedical decisions.

Aviation-specific studies of morbidity and mortality are scarce, but there are many large studies derived from the general population that are the basis for these waiver guidelines. It should be noted that Stage I cases and Stage II cases associated with a favorable prognosis will in general be recommended for a waiver. Close follow-up as outlined above is required because recurrence rates have a linear slope over time and are not negligible (1-7% per year) even after a 10-15 year period. There is no point where it is safe to conclude that a melanoma patient is "cured." Aviation personnel on melanoma waivers and their flight surgeons must be cognizant of the potential for recurrence and maintain close follow-up.

Patients should be taught how to examine their own skin for the "ABCD" characteristics of melanoma and should be encouraged to do so on a monthly basis. **A** stands for asymmetry, **B** for border irregularity, **C** for differences in color within the lesion, and **D** for increasing diameter (>5 mm or about the size of a pencil eraser). Avoidance of midday sun, use of sunscreens with sun protection factor 15 or higher, and the use of protective clothing are all-important preventive measures.

**ICD-9 CODE:**

**172.9 Malignant Melanoma**

## 9.13 NEUROLOGICAL TUMORS

**AEROMEDICAL CONCERNS:** Brain tumors carry a risk of seizures and disability due to both tumor location and therapy. There is a risk of sudden dysfunction in tumors of the spinal cord.

**WAIVER:** Tumors of the spinal cord may receive a waiver recommendation 5 years after therapy provided there is no recurrence or sequelae. Waiver may be granted for tumors of the peripheral nervous system if there is no impairment of function. All tumors involving the brain or meninges, irrespective of therapeutic outcome, are CD with no waiver recommended.

### **INFORMATION REQUIRED:**

1. Medical Board
2. Tumor Board recommendations
3. AFIP confirmation of the histology
4. All imaging studies performed
5. NAMI evaluation of the patient

**TREATMENT:** For those conditions that are waiverable, the aviator should be grounded during treatment.

**DISCUSSION:** Approximately 33% of all patients with malignant brain tumors experience unexpected and incapacitating seizures. Survival rates for malignant gliomas approach 20% after one year. The survival rates for other tumors vary, with some reaching as high as 90%, but in most there is a greater than 10% chance of recurrence. Those tumors with the best prognosis (i.e. the least chance for subsequent seizure disorders or loss of neurological function) are subtentorial, axial, and encapsulated. Those with the greatest chance of subsequent seizure disorder are the opposite (i.e. supratentorial, extra-axial and unencapsulated).

### **ICD-9 CODES:**

**171.9 Malignant Neoplasm of the peripheral nervous system**

**191 Malignant neoplasm of the brain**

**192.2 Malignant neoplasm of the spinal cord**

**225.0 Benign neoplasm of the brain**

**225.3 Benign neoplasm of the spinal cord**

**225.4 Benign neoplasm of the spinal meninges**

**215.9 Benign neoplasm of the peripheral nervous system**

## 9.14 NON-HODGKIN'S LYMPHOMA

**AEROMEDICAL CONCERNS:** The major concern is that of poor prognosis, particularly in lymphocytic lymphoma, histiocytic lymphoma, and T-cell diffuse histiocytic lymphoma. Occasionally, patients present with CNS disease. Acute incapacitation is rare.

**WAIVER:** Waiver recommendations may be possible for aircrew with low-stage, non-Hodgkin's lymphomas if treated in the early stages of the condition. Interestingly, more aggressive disease carries a better chance for cure than indolent lymphomas. The low-grade lymphomas are not yet considered curable and do not normally warrant waiver recommendation, although waiver may be possible after 5 years of remission.

### **INFORMATION REQUIRED:**

1. Medical Board
2. Tumor Board appraisal
3. AFIP confirmation of the histology
4. Oncologist/hematologist opinion
5. CT scans of the chest and abdomen
6. Confirmation that the chemotherapy has not caused residual toxicity
7. Full pulmonary functions testing including DLCO and an echocardiogram with ejection fraction to confirm lack of pulmonary and cardiac toxicity (A gated radionuclide cardiac study can also be provided)
8. Neurological exam for peripheral neuropathy

**FOLLOW-UP:** Annual submission to include:

1. Hematology/oncology consultation

**TREATMENT:** All forms of treatment are acceptable provided the patient remains symptom-free with no recurrence. Ongoing treatment is not compatible with flying.

**DISCUSSION:** Extranodal presentation occurs in 20-30% of patients. Primary lymphoma of the stomach represents up to 10% of all gastric cancers, with the presenting symptom being pain in 80% of cases and hemorrhage in 20%. Surgery with postoperative radiotherapy or chemotherapy yields a 5 year survival of 50%. Generally, the 5 year survival for low grade non-Hodgkin lymphomas is about 45% compared to 35% for high grade tumors.

### **ICD-9 CODE:**

**202.8 Non-Hodgkin's Lymphoma**

## 9.15 ORAL CAVITY CANCER

**AEROMEDICAL CONCERNS:** Localized and referred pain can occur. Difficulties with speech or with the wearing of an oxygen mask are possible. Salivary control may be marginal. Cancer of the tongue can give rise to local pain and to earache.

**WAIVER:** Waiver will be considered on a case by case basis 12 months after completion of therapy for localized disease without recurrence, speech dysfunction, or airway obstruction. Pharyngeal cancer is CD, with no waiver recommended.

### **INFORMATION REQUIRED:**

1. Surgical report
2. Pathology report
3. ENT consult
4. Oncology consult
5. Medical Board
6. Tumor Board recommendations
7. AFIP confirmation of the histology

**TREATMENT:** Ongoing treatment, such as chemotherapy or radiation therapy, is not compatible with waiver.

**DISCUSSION:** Cancer of the lower lip has the best prognosis of the oral cancers, with a 10 year survival rate for early cases of over 95%. Most recurrences (to the lip in 43% and cervical nodes in 43%) occur in the first 2 years. Up to 12% of patients with lip cancer develop a second primary lesion, usually of the mouth or pharynx. Cancers of the upper lip carry a 5 year survival rate of 58-73%. Stage I (T1N0M0) and Stage II (T2N0M0) cancers of the oral cavity carry 5 year survival rates of 76% and 65% respectively, but overall the 5 year survival rates are 25-35% for tongue, 20-40% for the floor of the mouth, 30-50% for cheek and 25% for oropharynx, palate and gingiva. Recurrence is primarily local, but up to 15% will metastasize while the local lesion is controlled. Up to 86% of those who have recurrence will manifest their metastases within 12 months. Between 15-35% of patients develop a second squamous carcinoma (head and neck 10-20%, esophagus 2-10%, bronchus 3-10%). Of those patients who have had a radical neck dissection, 30% develop a dropped shoulder because of sacrifice of the 11th cranial nerve causing weakness of the trapezius muscle; this may preclude flying duties. Pharyngeal cancers are usually diagnosed late and carry a 5 year survival of 33%.

### **ICD-9 CODES:**

**145.9 Oral Cavity Cancer**

**528.6 Leukoplakia of oral soft tissues**

**210.4 Benign neoplasm of the oral cavity**

## 9.16 OVARIAN TUMORS

**AEROMEDICAL CONCERNS:** The vast majority of ovarian tumors are benign, and waivers are not necessary for benign ovarian disease. Because the majority of ovarian carcinomas have already metastasized by the time of diagnosis, the prognosis is usually grim.

**WAIVER:** Waiver may be considered 2 years after cessation of therapy provided the patient is symptom-free and has no evidence of recurrence. Waiver is not required for excised benign ovarian tumors.

### **INFORMATION REQUIRED:**

1. Medical Board
2. Tumor Board recommendations
3. AFIP confirmation of the histology
4. Full physical exam
5. Gynecology/oncology consult
6. CT scan of the abdomen, retroperitoneum and pelvis
7. Intravenous pyelogram
8. Tumor markers (if obtained)

**TREATMENT:** Hormone replacement therapy after bilateral oophorectomy is acceptable for service members in aviation billets.

**DISCUSSION:** Almost 75% of ovarian tumors are benign. Of those with malignant disease, 80% will have metastases by the time of diagnosis. Metastasis of breast or colonic carcinoma to the ovary is more common than primary carcinoma of the ovary. The 5 year survival of early ovarian carcinoma can reach 90%.

### **ICD-9 CODES:**

**183.0 Malignant neoplasm of the ovary**

**220 Benign neoplasm of the ovary**

## 9.17 PITUITARY TUMORS

**AEROMEDICAL CONCERNS:** The aeromedical complications largely center on the consequences arising from hormone hypersecretion. These include heat intolerance, diabetes mellitus, diabetes insipidus, hypercalciuria, hypothyroidism, nerve entrapment syndromes, hypertension, cardiomyopathy and spondylosis. Local effects from the tumor can also cause headache, cranial nerve palsies, and visual field defects.

**WAIVER:** Waiver may be considered provided sequelae are within acceptable limits. Diabetes insipidus (either as a result of posterior pituitary tumor or following surgery or Yttrium-90 implant) is not waivable.

### **INFORMATION REQUIRED:**

1. Medical Board disposition
2. Tumor Board recommendations
3. AFIP confirmation of the histology (in those cases where surgical removal has been carried out)
4. Endocrinology consult
5. Postoperative visual field studies

**FOLLOW-UP:** Annual submission to include:

1. Endocrinology consult

**TREATMENT:** Surgical removal of the tumor and insertion of Yttrium-90 implant are both compatible with aviation duties. Ongoing treatment with bromocriptine is not waivable.

**DISCUSSION:** Cure rates of up to 80% for anterior pituitary tumors resulting in acromegaly can be expected with any of the treatment modalities. Prolactinomas have an even better success rate.

### **ICD-9 CODES:**

**227.3 Benign neoplasm of the pituitary**

**194.3 Malignant neoplasm of the pituitary**

## 9.18 PLASMA CELL DYSCRASIAS

**AEROMEDICAL CONCERNS:** Plasma cell dyscrasias require frequent toxic therapy. They are also associated with side effects that can lead to sudden incapacitation, such as neurological impairment. Vertebral involvement is common in myelomas, giving rise to severe backache and increased susceptibility to injury on ejection. These individuals are immunocompromised, and are thus prone to life threatening infections.

**WAIVER:** Aviators who remain free of recurrence 3 years after treatment for a single plasmacytoma may be considered for waiver. Personnel with monoclonal gammopathy of unknown significance (MGUS) may be considered for waiver provided that the monoclonal spike comprises <2 g/dl of protein, there are fewer than 5% plasma cells in the bone marrow, the serum viscosity is normal, and there is no hematopoietic compromise or osteolytic lesions. Other plasma cell dyscrasias are not waiverable. These include amyloidosis associated with plasma dyscrasia, heavy chain disease, cold agglutinin disease, and cryoglobulinemia.

### **INFORMATION REQUIRED:**

1. Oncology/hematology consult
2. Medical Board disposition
3. Tumor Board recommendations
4. AFIP confirmation of diagnosis

**FOLLOW-UP:** Annual submission to include:

1. Hematology/oncology consult

**NOTE:** Patients with benign monoclonal gammopathy require assessment every six months by hematology/oncology, and waiver request submission every six months.

**TREATMENT:** Continuing therapy is CD, no waiver.

**DISCUSSION:** The risks of benign monoclonal gammopathy are progression to multiple myeloma and increased serum viscosity leading to neurological impairment. The median survival for patients with gamma heavy chain disease is 12 months. Neurological involvement is insidious and, although usually a condition of older patients, has been reported in those as young as 23. Alpha heavy chain disease is associated with progressive and fatal abdominal lymphoma. There is a risk of sudden hemolysis in cold agglutinin disease, and a risk of sudden vascular accidents and neurological dysfunction in cases of cryoglobulinemia. Up to 60% of patients with myeloma present with skeletal pain, while anorexia and depression associated with hypercalcemia are present in 30%. About 10% present with paraplegia while others exhibit mental impairment or visual disturbance resulting from hyperviscosity. Amyloidosis is encountered in 5-10% of myeloma patients. Two year survival ranges from 9-76% depending on the stage of the disease at the time of diagnosis.

**ICD-9 CODE:**  
**203.1 Plasma Cell Dyscrasias**

## 9.19 PROSTATE CANCER

**AEROMEDICAL CONCERNS:** Advances in screening for prostate cancer have resulted in most cases being asymptomatic at the time of diagnosis. In rare cases, a variety of symptoms capable of affecting safety of flight and/or mission completion may be present. These include hesitancy, urgency, frequency, urinary retention, dysuria, hematuria, and acute obstruction. Furthermore, metastatic disease can affect bony sites, most often the spine, which can result in pain and/or pathological fracture. In the military aviation population, which is relatively younger, healthier, and with better access to health care when compared to the general population, symptom occurrence as described above would be less likely.

**WAIVER:** Waivers are considered on a case by case basis. Waiver may be considered as early as six months post-treatment (radical prostatectomy or radiation therapy) for tumors staged as T2, Gleason 3+3. Individuals with lesions staged as T3 or higher or Gleason score greater than or equal to 7 may submit a waiver request, but due to their having a greater chance of local recurrence, the urology/oncology consult must specifically mention the likelihood of disease progression. Treatment by "watchful waiting" with quarterly PSA and biannual urology consultation and follow-up may be considered for waiver, however, member shall be restricted to current command and CONUS-only. In all cases, the member must be fully recovered, off all medications including estrogen compounds, and have no urinary incontinence. The wearing of absorbent undergarments (Depends) or intermittent self-catheterization is not compatible with full or special duty.

### INFORMATION REQUIRED:

1. Initial history, with details of the presentation and treatment course
2. Medical Board disposition
3. Tumor Board recommendations
4. Pathological reports
5. AFIP confirmation of the histology (must include Gleason grade)
6. Primary definitive treatment reports (surgical or radiation as applicable)
7. Post-treatment urology or oncology consult
8. Renal function testing (including serum BUN and creatinine)
9. IVP (only required if BUN or creatinine are elevated)
10. Pre-treatment and serial PSAs every three months post-treatment
11. Remarks affirming that the member is free of symptoms/side effects and physical limitations, and retains full bladder continence and function
12. Remarks concerning future required follow-up (as per urology or oncology recommendations)
13. Bone scan (if recommended by the urologist/oncologist)

**NOTE:** Any residual or unresolved treatment complications or side effects (incontinence, anesthesia, DVT/PE) will make the waiver request more complex and will have to be considered separately as part of the complete waiver package. All individuals approved for a waiver will be required to have DRE and PSA every three months for the first post-treatment year, followed by

every six months indefinitely. A yearly follow-up by a flight surgeon will be required to ensure this is being performed.

**TREATMENT:** The choices for the treatment of prostate cancer involve multiple factors. The disease itself is most often slowly progressive, and when coupled with a number of well-documented side effects of therapy, recommended treatment options can be variable and are often individualized. Both surgery and radiation therapy offer the potential for complete cure, with surgery having a higher cure rate. Radiation, if not curative, will likely halt the progression of disease. Both therapies have their associated benefits, risks and side effects. Watchful waiting, which is not curative, is less often preferred but remains an acceptable choice in certain cases if the patient and specialist are in agreement. This therapy requires closer follow-up for progression of disease. Special cases involving newer therapies such as cryotherapy will be handled on a case by case basis. Individuals requiring chemotherapy/estrogen therapy will be considered NPQ/WNR.

**DISCUSSION:** Carcinoma of the prostate is the second leading type of cancer in men next to skin cancer. Increased incidence is seen with increasing age and in African American populations. Over their lifetime, approximately 15 percent of men in the United States will be diagnosed with prostate cancer, with the vast majority being over the age of 65 at the time of diagnosis. Being that the disease is usually slow growing, and that most treatment modalities are associated with significant risks and side effects, patients and health care providers are often left with no one definitive treatment decisions. Very low-grade tumors have an approximately 95% 15-year survival. Young African American individuals tend to have more poorly differentiated tumors and do less well than older African American patients. This age/severity correlation has not been definitively recognized in Caucasian males. The presence of related symptoms, rarely seen anymore, suggests locally advanced or metastatic disease. Hormonal therapy, when indicated, is known to have significant side effects. Patients must be made aware of the specific risk related to each agent being considered.

**ICD-9 CODES:**

**185 Malignant prostate cancer**

**233.4 Prostate carcinoma in situ**

**222.2 Benign neoplasm of the prostate**

**600 Benign prostate hypertrophy**

**H605 Status post radical prostatectomy**

## **9.20 SKIN CANCERS (NON-MELANOMA)**

**AEROMEDICAL CONCERNS:** The lesion may be irritated by the wearing of protective equipment or, if it is on the face, may prevent adequate mask seal.

**WAIVER:** Waiver is not required for adequately treated basal cell carcinoma. Waiver may be required if grafting has been necessary, once the graft has settled adequately to allow wear of flight clothing or equipment and provided that there is no disability. Squamous cell carcinoma is CD, with waivers considered on a case-by-case basis.

### **INFORMATION REQUIRED:**

1. AFIP confirmation of diagnosis is required
2. Dermatology consult

**TREATMENT:** The aircrew member should be grounded during treatment.

**DISCUSSION:** The incidence of metastasis varies. Primary cutaneous squamous cell carcinomas have a secondary rate of 3%, compared to 11% with mucocutaneous lesions and 10-30% with tumors secondary to inflammatory and degenerative processes. Metastases tend to be in the regional lymph nodes.

### **ICD-9 CODES:**

**173.0 Skin Cancers (Non-Melanoma)**

**M8091 Multicentric Basal Cell Carcinoma**

**M809B Basal Cell Carcinoma**

**M8070 Squamous Cell Carcinoma**

## 9.21 TESTICULAR TUMORS

**AEROMEDICAL CONCERNS:** Treatment with bleomycin-based chemotherapy can lead to compromised pulmonary function. This is significantly exacerbated by breathing high concentrations of oxygen. Pulmonary metastases may eventually cause respiratory symptoms, which could be exacerbated by hypoxia. Very rarely, cardiac or cerebral metastases have been reported.

### **WAIVER:**

**Seminoma:** Patients with Stage I or IIA seminomatous tumors treated by orchiectomy and/or external beam radiation may be considered for waiver after completion of radiation, provided tumor markers are absent. Stage IIB or III treated with orchiectomy plus chemotherapy must complete a 2 year LIMDU board, during which time no waiver will be considered. After completion of LIMDU, waiver may be considered provided patient is free from recurrence (normal physical exam, tumor markers negative) and pulmonary function tests show no evidence for oxygen toxicity/hypersensitivity.

**Non-Seminomatous Germ Cell:** Clinical Stage I or low volume Stage II treated with orchiectomy and retroperitoneal lymph node dissection and confirmed to be pathological Stage I or low volume Stage II may be considered for waiver after 6 months LIMDU board, provided patient is free from recurrence. If pathology is upstaged to Stage IIB, adjuvant chemotherapy is required, as well as a 2 year LIMDU board. Waiver may then be considered after completion of the 2 years of LIMDU. Patients with Stage III disease treated with orchiectomy and chemotherapy require a 2 year LIMDU board. After completion of LIMDU, waiver may be considered if the patient is free from recurrence (normal exam, tumor markers negative, abdominal CT scan free from residual masses) and pulmonary function tests are normal.

### **INFORMATION REQUIRED:**

1. Medical Board disposition
2. Tumor Board recommendations (if available)
3. AFIP confirmation of histology
4. CXR and/or CT scan reports

### **FOLLOW-UP:** Annual submission to include:

1. Urology consult
2. CXR, chem panel, tumor markers and physical exam as follows:
  - a. Monthly for first year
  - b. Bimonthly for second year
  - c. Every 6 months for third year
  - d. Annually after third year

**TREATMENT:** Treatment by orchiectomy with or without prosthetic implant, with or without surgical staging, radiotherapy, or chemotherapy can all be considered for waiver as described above.

**DISCUSSION:** Overall cure rate for all stages of testicular cancer is 98%. Seminoma is the most common cell type, seen in 40% of cases, with a peak incidence between the ages of 30 and 39 years. Embryonal carcinoma or teratocarcinoma is present in another 45-55% with a peak incidence of 25-35 years. 25% of seminomas and 50-70% of nonseminomatous tumors will have metastatic nodes at time of diagnosis. The addition of radiation therapy decreases the relapse rate for Stage I seminomas from 30% down to 5-10%. Retroperitoneal lymph node dissection results in a recurrence rate of 5% for pathological stage I and 5-20% for pathological low volume stage II nonseminomatous tumors. Two cycles of adjuvant chemotherapy for pathological stage IIB tumors lowers the recurrence rate from 30-40% down to <10%. Except in the cases of pure teratoma, where recurrence may occur out to five years, it is rare to see recurrence beyond two years.

**ICD-9 CODES:**

**186.9 Malignant testicular tumor**

**222.0 Benign neoplasm of the testes**

## 9.22 THYROID CARCINOMA

**AEROMEDICAL CONCERNS:** There is almost inevitable hypothyroidism after surgical treatment. The condition also carries a small risk of damage to the recurrent laryngeal nerves either from local invasion of the tumor and/or surgical damage. The parathyroid glands may also be involved, resulting in hypoparathyroidism.

**WAIVER:** Waiver will be considered after treatment of papillary or follicular carcinoma of the thyroid. Medullary or undifferentiated thyroid tumor will normally lead to permanent disqualification, with no waiver recommended. This is a reflection of the differing prognoses of the varied histologies.

### INFORMATION REQUIRED:

1. Medical Board disposition
2. Tumor Board recommendations
3. AFIP confirmation of the histology
4. Confirmation of clinical and chemical euthyroid status
5. Evidence of TSH suppression
6. Endocrinology consult

### FOLLOW-UP: Annual submission to include:

1. Confirmation of clinical and chemical euthyroid status
2. Evidence of TSH suppression
3. Endocrinology consult

**TREATMENT:** Surgery is generally the first line of therapy. Some authorities prefer to use radioiodine treatment. Surgical procedures have the risk of injuring the recurrent laryngeal nerve, resulting in voice changes. In addition, removal of the parathyroid glands may lead to symptomatic hypoparathyroidism.

**DISCUSSION:** Generally, men over 40 years old and women over 50 have a poorer prognosis. Another poor prognostic indication is a primary tumor over 5 cm. Papillary carcinoma is slow growing, spreading locally to the strap muscles of the neck, lymph nodes, and occasionally trachea, but it may metastasize to lungs or bone. Some 20% are said to be multicentric. Overall 5 and 10 year survivals of better than 95 and 90% respectively can be achieved. Because the growth rate is slow, there is no particular trend to early recurrence (recurrence rates from 10-24% have been reported); patients should be able to return to flying as soon as they are euthyroid. Follicular carcinoma tends to metastasize to lungs and bone rather than infiltrate locally. A major determinant of outcome is the extent of microinvasion. The usual treatment of choice is total thyroidectomy, because there is an 87.5% chance of the opposite lobe containing microscopic follicular carcinoma. For patients treated with total thyroidectomy and radioactive iodine, the death rate at 5 years is quoted as 11%, rising to 30% when treatment is by incomplete thyroidectomy alone. This can be largely explained by the fact that only total thyroidectomy

allows subsequent accurate localization and treatment of distant metastases by Iodine-131. Medullary carcinoma and undifferentiated carcinomas have a 10 year survival of 50 and 20% respectively.

**ICD-9 CODES:**

**193 Malignant neoplasm of the thyroid**

**226 Benign neoplasm of the thyroid**

## 9.23 UTERINE CANCER

**AEROMEDICAL CONCERNS:** Some cases develop anemia, but there are otherwise very few specific aeromedical concerns in carcinoma of the uterus.

**WAIVER:** Waiver may be considered 6 weeks after hysterectomy provided that there has been a full recovery and there is no indication of metastasis. Waiver may be requested 2 years after treatment of disseminated disease provided there is no evidence of sequelae or recurrence. Leiomyosarcoma of the uterus is not waiverable.

### **INFORMATION REQUIRED:**

1. Medical Board disposition
2. Tumor Board recommendations
3. AFIP confirmation of the histology
4. Gynecology/oncology consult
5. Intravenous pyelogram
6. CT scan of the abdomen, retroperitoneum and pelvis

**FOLLOW-UP:** Annual submission to include:

1. Gynecology/oncology consult

**TREATMENT:** Aircrew are grounded during treatment and during the immediate postoperative period.

**DISCUSSION:** The earliest truly invasive carcinoma of the endometrium has a cure rate of 90%. Spread is usually slow and recurrence is usually local for long periods of time. However, recurrence for all stages is unpredictable. The incidence of leiomyosarcoma arising in uterine fibroids has been reported to be 0.1-0.6%, with a 5-year survival rate of 31%.

### **ICD-9 CODES:**

**179 Malignant neoplasm of the uterus**

**219.9 Benign neoplasm of the uterus**