**INTRODUCTION**

- Osteosarcoma is the most common primary malignant bone cancer in children.  
- It frequently develops in fast growing bones such as the distal femur or proximal tibia.  
- The median age of patients is 20 years old.  
- 10%-20% of cases are metastatic at diagnosis, with the lungs being the most common metastatic site.  
- There is a lack of information about the cost of metastatic unresectable osteosarcoma.

**OBJECTIVES**

- To estimate resource utilization and anticipated costs to a health plan during the diagnosis, treatment, and surveillance, of a patient with metastatic unresectable osteosarcoma using national guideline recommendations.

**METHODS**

- An economic disease model was developed based on recommendations from the 2013 NCCN Clinical Practice Guidelines in Oncology for bone cancer.  
- The model quantified resource use for diagnosis, 12 months of treatment, and 12 months of surveillance of a metastatic unresectable osteosarcoma patient.  
- Chemotherapy dosing was based on NCCN recommended treatment regimens.  
- Costs in 2014 dollar value were derived from publicly available sources for reimbursement of CPT codes, HCPCS codes, and generic WAC prices for medications.

**ASSUMPTIONS**

- The model assumes the patient has a stable disease, and does not progress within the 12 months of chemotherapy.  
- Generic drug prices were used to calculate the cost of chemotherapy.  
- Chemotherapy was administered in the outpatient setting.  
- The patient was completely adherent with treatment.  
- Cost of supportive care used to treat side effects was not included.

**RESULTS**

**Summary of the Average Cost of Metastatic Unresectable Osteosarcoma per Patient**

<table>
<thead>
<tr>
<th>Treatment Stage</th>
<th>Cost</th>
<th>Description of Treatment</th>
</tr>
</thead>
</table>
| Diagnostics     | $1,705 | • Imaging of primary site, metastatic sites, chest, and bone  
|                 |      | • Serum LDH and ALP levels accessed  
|                 |      | • Performed once |
| Stereotactic radiosurgery | $2,755 | • Treatment planning, simulation, delivery and  
|                 |      | • Dosimetry and devices  
|                 |      | • Performed once |
| Chemotherapy    | $49,485 | • Varied widely across regimen  
|                 |      | • Performed over 12 months |
| Drug monitoring | $5,899 | • Metabolic panel, blood count, urinalysis, uric acid, audiometry and  
|                 |      | • Varied across regimen  
|                 |      | • Performed over 12 months |
| Surveillance    | $4,204 | • Physical exam, imaging of primary and metastatic sites,  
|                 |      | • bone scan  
|                 |      | • Performed 4 times over 12 months |

*The chemotherapy regimens were the major cost components associated with this disease.  
- Cisplatin, ifosfamide, and epirubicin cost $38,936 per patient.  
- Doxorubicin, cisplatin, high-dose metrotexate, and ifosfamide cost $38,404 per patient.  
- Doxorubicin and cisplatin cost $17,549 per patient.  
- Doxorubicin, cisplatin, and high-dose metrotexate cost $103,051 per patient.

**Cost Breakdown of Chemotherapy Regimens**

<table>
<thead>
<tr>
<th>Chemotherapy Regimen</th>
<th>Total Cost</th>
<th>Chemotherapy Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cisplatin, ifosfamide, and epirubicin</td>
<td>38,936</td>
<td>38,936</td>
</tr>
<tr>
<td>2. Doxorubicin, cisplatin, high-dose metrotexate, ifosfamide</td>
<td>38,404</td>
<td>38,404</td>
</tr>
<tr>
<td>3. Doxorubicin, cisplatin</td>
<td>17,549</td>
<td>17,549</td>
</tr>
<tr>
<td>4. Doxorubicin, cisplatin, high-dose metrotexate</td>
<td>103,051</td>
<td>103,051</td>
</tr>
</tbody>
</table>

**CONCLUSIONS**

- A guideline-based disease model can assist health plans to better understand and anticipate the resources required and the expected cost of diagnosis, treatment, and surveillance of unresectable metastatic osteosarcoma patients. Further research is needed to determine the real-world cost and the cost effectiveness of chemotherapy regimens.

**REFERENCES**