Conflict of Interest:

E. Babaee 1*, M. Nojomi 2, N. Nafissi 1.

The multi-state model was utilized for modeling and analyzing the survival of patients with breast cancer using a 1Preventive Medicine and Public Health Research Center, Student Research Committee, Iran University of Medical Sciences, Tehran, Iran, Islamic Republic of; 2Preventive Medicine and Public Health Research Center, Psychosocial Research Health Institute, Department of Community and Family Medicine, School of Medicine, Iran University of Medical Sciences, Tehran, Iran, Islamic Republic of

Goals: Breast cancer is the most common type of cancer in women worldwide. The multi-state models help in more closely studying the factors affecting the survival of patients with this cancer. Therefore, in this study, we aimed to analyze breast cancer data using the multi-state model.

Methods: This was a registry-based retrospective cohort study conducted on 2030 Iranian patients with breast cancer in 2020. Data were obtained from the patients’ electronic medical records. Notably, the patients’ follow-up time varied from one month to 15 years. In this regard, the initial treatment, metastasis, and death are considered as the first, second, and absorbing states, respectively. The multi-state model was utilized for modeling and analyzing the data at a 95% significance level using the MSM package in R software.

Results: The mean age (±SD) of the patients included at diagnosis time was 55.3 (±12.07) years old. The first one-year and 5-years adjusted transition probabilities for transitions from treatment to metastasis were estimated as 0.85 (0.15–0.89) and 0.45 (0.21–0.61), and for metastasis to death transitions, they were estimated as 0.15 (0.1–0.21) and 0.55 (0.41–0.69), respectively. The EBRT method [HR: 7.39, (0.19–28.74)], stage greater than or equal to II [HR: 1.14, (0.66–20.88)], and tumor grade greater than or equal to II [HR: 6.48, (0.55–28.39)] had an increased hazard on the transitions from treatment to metastasis. Moreover, the average sojourn times were estimated as 0.27 and 74.85 months for the treatment and metastasis states, respectively.

Conclusion(s): The multi-state models by providing valuable information can help to explain the factors affecting the natural course of diseases for clinical usage compared to the other survival models.

Conflict of Interest: No significant relationships.

### Predictive and prognostic factors

#### P106
The effects of prognostic factors on metastasis and survival of patients with breast cancer using a multi-state model

E. Babaee 1*, M. Nojomi 2, N. Nafissi 1.

Our work shows that within Taiwan, trastuzumab has been cost-effective in the real-world setting despite increased initial costs. Further analysis will be needed to show whether this finding holds over a lifetime horizon for patients.

Conflict of Interest: No significant relationships.

<table>
<thead>
<tr>
<th>Year</th>
<th>Patients who received &lt;17 doses of trastuzumab</th>
<th>Patients who received ≥17 doses of trastuzumab</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>883,820</td>
<td>1,052,925</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Year 2</td>
<td>277,135</td>
<td>455,912</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Year 3</td>
<td>77,078</td>
<td>81,725</td>
<td>P = 0.70</td>
</tr>
<tr>
<td>Year 4</td>
<td>57,208</td>
<td>74,413</td>
<td>P = 0.11</td>
</tr>
<tr>
<td>Year 5</td>
<td>36,365</td>
<td>35,985</td>
<td>P = 0.97</td>
</tr>
<tr>
<td>Total</td>
<td>1,260,017</td>
<td>1,632,150</td>
<td>P &lt; 0.0001</td>
</tr>
</tbody>
</table>

#### P107
Breast cancer after in vitro fecundation (IVF): can ovary stimulation and follicular response affect prognostic factors?

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Goals: The follicular response is related with estradiol level. Study in breast cancer patients after IVF if ovarian response or number of IVF cycles affects the prognostic factors.

Methods: Patients with breast cancer who underwent IVF are studied the prognostic factors (Ki67, HER2, estrogen receptor (ER), progesterone receptor (PR), oncogene p53, histologic grade) in relation to the ovary response and number of IVF cycles.

Results: 73 patients with breast cancer after IVF are studied. They performed 135 cycles of IVF; 36 (49.3%) with 1 IVF and 37 (50.7%) with more than one IVF. Hyper response was present in at least one IVF in 24 (32.9%) patients and there was no hyper response in any IVF in 49 (67.1%) patients. The prognostic factors were: Ki67 >20 in 31/91% (15/47) Ki67 ≤20 in 68/08% (32/47), HER2 >31.94% (23/72) HER2 ≤68.55% (49/72), p53 ≥45.09% (23/51), p53 < 54.90% (28/51), HG II-III 56/36% (31/55), HG I 43/63% (24/55), RE ≥87.5% (63/72), RE < 12.5% (9/72), RP ≥76.38% (55/72), RP < 23.61% (17/72). None of prognostic factors varied with the ovary response (hyper response in at least one IVF cycle, normal response, normal or low response) (p = ns). The only prognostic factor that varied with the IVF number was p53 +. Patients with p53 + (23/51), 7 (30.43%) has one IVF, and 16 (69.53%) have more one IVF (p < 0.001).

Conclusion(s): In breast cancer after IVF, the ovary response not affect Ki67, HER2, estrogen receptor, progesterone receptor, p53, and histologic grade. p53 positive is more frequent in patients with more than one IVF.

Conflict of Interest: No significant relationships.

#### P108
Predictive mathematical modelling of recurrence periods for the secondary distant metastases in patients with ER/PR/HER2/Ki-67 subtypes of breast cancer

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Goals: Previously, a mathematical model of primary tumor (PT) growth and secondary distant metastases (sdMTS) growth in breast cancer (BC) (CoMPaS), considering the TNM classification, was presented (Tyuryumina E. et al, 2018). Goal: To detect the recurrence periods for visible sdMTS via CoMPaS in patients with different subtypes ER/PR/HER2/Ki-67 of breast cancer.

Methods: The model CoMPaS is based on an exponential growth model and complementing formulas, and the model corresponds to the TNM classification and subtypes ER/PR/HER2/Ki-67 classification. CoMPaS allows calculating the tumor volume doubling time (TVDT) of the PT and sdMTSs and the earliest recurrence period of sdMTSs. The CoMPaS model reflects:

1. subtypes of BC such as ER/PR/HER2/Ki-67, where Luminal A = HR (+)/HER2(−), Luminal B = HR(+)/HER2(+), Luminal A = HR(+)/HER2(−), HR−/HER2(+), and HR−/HER2(−), depending on the TVDTs;
2. the growth processes of the PT and sdMTSs in BC patients without or with lymph node metastases (MTSs) in accordance with the 8th edition AJCC prognostic staging system for breast cancer.

Results: Critical growth periods of BC are defined via CoMPaS:

1) the non-visible growth period of the PT;
2) the visible growth period of the PT (appearance of the sdMTSs in other parts of body);
3) the non-visible growth period of the sdMTSs; and
4) the visible growth period of the sdMTSs.