A Prediction Algorithm for Determining the Optimized Cost-Effectiveness of Advanced Tumors Treatment

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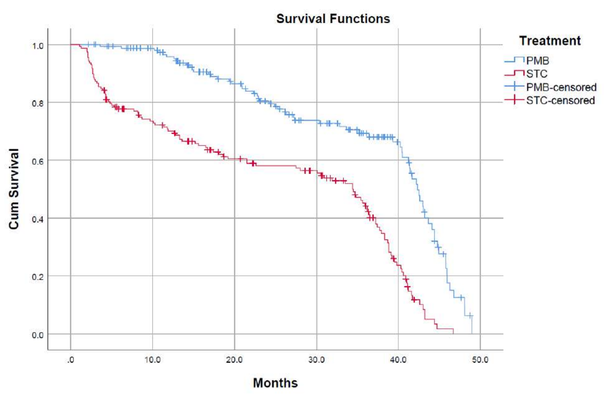
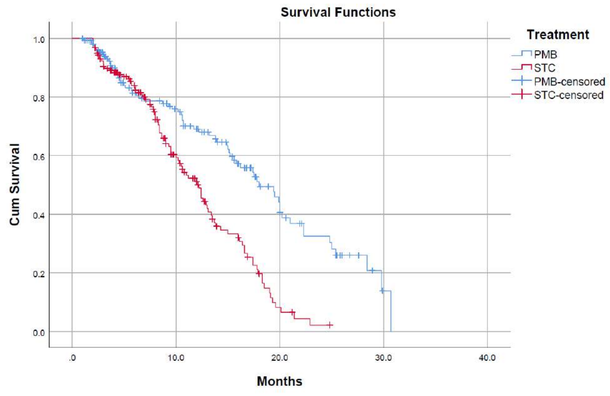
One of the most critical problems in the area of therapeutic interventions for cancer patients has been the choice of the therapeutic regimen that has been ineffective in the long-term complications in the patient's treatment path. On the one hand, this matter has led to the disease progression and declined the patients' quality of life because of lacking sufficient effectiveness, and on the other hand, it has caused numerous other problems in the patient's quality of life due to the extensive range of complications, particularly in the long-term use of the relevant regimen. Information and communication technology (ICT) allocated in treatment plans and paths related to health promotion, including therapeutic guidance or patient monitoring compliance associated with drug regimens and clinical interventions, as well as ICT assigned in the paths of diagnosis, simulation, and data mining of medical studies, for the purpose of health assessments and individual risks are among the objectives of the invention. For improving the listed problems, the claimed invention investigated the methods and prediction algorithms based on cost-effectiveness parameters using precision medicine reference models for optimizing the cost and subsequently, achieving the highest level of effectiveness in patients with cancers, especially patients involved with a more advanced type of cancer characterized by mismatch repair deficiency.

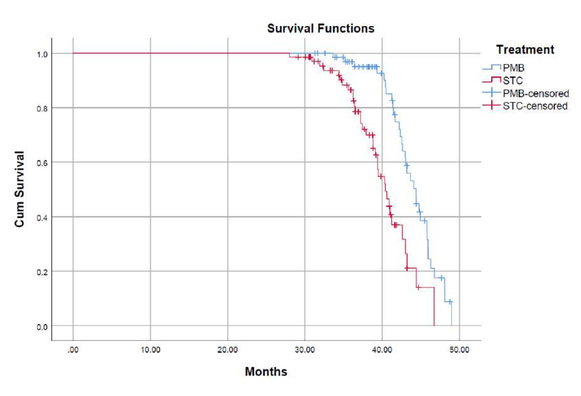
The multivariable cost-effectiveness prediction algorithm is employed for the choice of the type of interventions, therapeutic approach, and therapeutic regimen in severe, chronic, and life-threatening diseases, such as cancer, designed with a precision medicine approach. this algorithm is applicable to advanced diseases with progressive, life-threatening characteristics, limited statistical population, heavy, expensive, chronic therapeutic regimens with low effectiveness and low probability to reach the complete response phase (full recovery), such as malignancies and cancerous tumors. this algorithm is composed of two general parts: effectiveness function and treatment cost function. In the case of a small statistical population in the clinical trials conducted to check the effectiveness of the target drug with a precision medicine approach, to increase the population, integrating and expanding the results and clinical data of various trials carried out by the claimed drug, in different cancers, with the commonality in connection with the presence of the claimed biomarker and subsequently, the similarity in the amount and effect of this claimed variable in the effectiveness of the treatment will be employed.



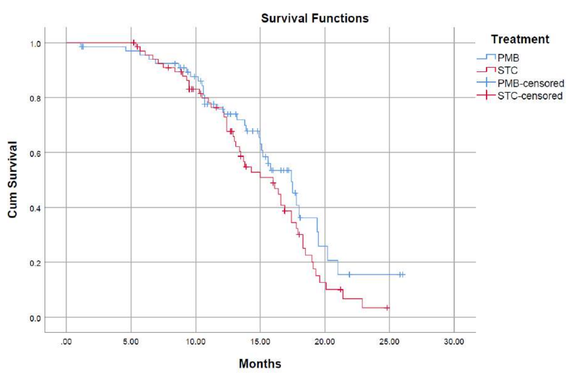
Pem vs Aggregated SoC								
OS	mean (month)	LL	UL	A	B	Median	A	Patient survival probability
Pem	37.084	34.928	39.24	68.10%	31.90%	42.34	B	Patient mortality probability
SoC	25.931	23.36	28.503	57.80%	42.20%	34.5		



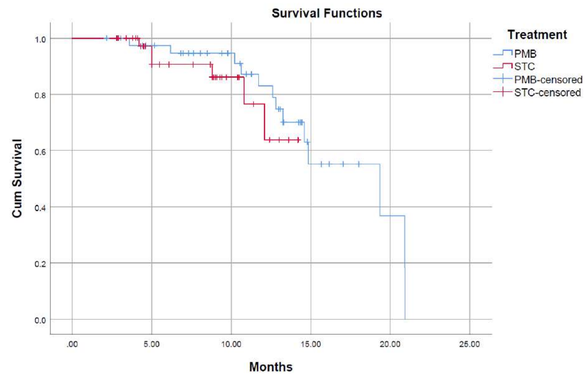
Pem vs Aggregated SoC								
PFS	mean (month)	LL	UL	C	D	Median	C	Patient Complete Responded probability
Pem	17.851	15.931	19.771	57.24%	42.76%	18	D	Patient not Responded probability
SoC	12.098	11.023	13.173	44.35%	55.65%	12.2		



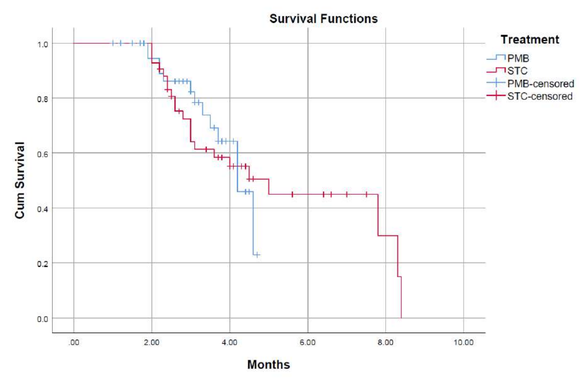
Pem vs SoC in Endometrial cancer								
OS	mean (month)	LL	UL	A	B	Median	A	Patient survival probability
Pem	43.951	42.941	44.961	58.72%	41.28%	44.374	B	Patient mortality probability
SoC	40.264	38.997	41.532	56.70%	43.30%	40.4		



Pem vs SoC Endometrial cancer								
PFS	mean (month)	LL	UL	C	D	Median	C	Patient Complete Responded probability
Pem	16.573	14.833	18.312	53.46%	46.54%	17.4	D	Patient not Responded probability
SoC	15.03	13.809	16.25	48.89%	51.11%	16		



Pem vs SoC in Gastric cancer								
OS	mean (month)	LL	UL	A	B	Median	A	Patient survival probability
Pem	16.65	14.666	18.634	55.19%	44.81%	19.342	B	Patient mortality probability
SoC	12.48	11.287	13.673	76.56%	23.44%			



Pem vs SoC Gastric cancer								
PFS	mean (month)	LL	UL	C	D	Median	C	Patient Complete Responded probability
Pem	3.928	3.6	4.257	64.27%	35.73%	4.2	D	Patient not Responded probability
SoC	5.379	4.458	6.3	55.50%	44.50%	5		

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