

ChemoGlobe

Background:

ChemoGlobe is a cloud-based dynamic visualization model designed to help stakeholders plan drug procurement and explore potential policy interventions relevant to their setting. The model was developed in response to the need for better costing data to plan interventions such as the [Global Platform for Access to Childhood Cancer Medicine](#) recently announced by St. Jude Children’s Research Hospital and the World Health Organization.

To maximize dissemination of data generated from the ChemoGlobe model, the team at St. Jude has developed a web-based tool to allow users access to contextually relevant data visualizations. The tool presents chemotherapy costs across 14 childhood cancer categories by WHO regions, World Bank income groups and United Nations subregions. The estimates can be adjusted dynamically based on six parameters and 32 options. Visualizations to allow point-and-click analyses of drug-specific costs, country estimates and temporal trends in case-finding are in development for future iterations of the tool.

Additional information regarding the methodology, data sources, and analytics are detailed in the following sections.

Methodology:

We developed a mathematical model to estimate the global cost of cytotoxic medicines for children with cancer by location, drug type, and cancer type from 2015-2030. The model was designed by investigators at St. Jude Children’s Research Hospital. Costing data to inform the model were analyzed by investigators at the University of North Carolina, Chapel Hill.

ChemoGlobe Data Sources:

	Incidence		Medication		Cost
Incidence	<ul style="list-style-type: none"> Ward et al 2019 	Type & Dose	<ul style="list-style-type: none"> ARIA Regimens St. Jude Regimens COG NCCN 	Region	<ul style="list-style-type: none"> WHO Subregions UN Subregions World Bank Income Groups
Stage	<ul style="list-style-type: none"> SEER Literature* 	Cumulative dose per patient	<ul style="list-style-type: none"> Mosteller BSA CDC Growth Charts WHO Growth Charts 	Price	<ul style="list-style-type: none"> MSH Partner Sites through ALSAC IQVIA
Survival	<ul style="list-style-type: none"> Ward et al 2019 			Inflation	<ul style="list-style-type: none"> World Bank inflation

*Traoré et al 2011; Rajagopal et al 2016; Strother et al 2012; Fabian et al 2020; Yasmin et al 2015; Agarwala et al 2017; Friedrich et al 2013; Friedrich et al 2013; Friedrich et al 2013; Krenciute et al 2017; SIOP Abstracts, 45th Congress of The International Society of Paediatric Oncology (SIOP) 2013.

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ChemoGlobe Model Development:

The results are based on 84,672,000 simulations. We followed the steps described below to develop the mathematical model used to estimate the global cost of cytotoxic medicines for children with cancer by location, drug type, and cancer type from 2015-2030:

- Step 1: Diagnosed Cancer Cases Burden Estimation
- Step 2: Distribution of Incidence Cases by Stage/Risk
- Step 3: Calculate Absolute Number of Incident Cases by Stage/Risk
- Step 4: Calculate Amount of Drug Needed by Regimen
- Step 5: Standardization of Drug by Ideal Patient
- Step 6: Calculate Absolute Amount of Drug Required
- Step 7: Sync Between Drug Regimens and Burden
- Step 8: Create Costs Dataset
- Step 9: Convert Absolute Amount of Drug to Units
- Step 10: Costing Analysis