NEGLECTED TROPICAL DISEASE
NGO NETWORK

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Economic Impact Model

USAID Act to End NTDs | West

Virtual Event

8th – 10th September 2020

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Economic Impact Model: Overview

Act to End NTDs | West

Introductions

AnnaMaria Shaker

- Manager at Deloitte Consulting supporting USAID and international donors to advance economic growth and sustainability
- Experience in Middle East/North Africa, West Africa, and East Africa
- Specializes in impact analysis, performance management, and data-driven process optimization
- M.S. Foreign Service

Overview of the Model

Overview	The Economic Impact Model and supporting disease-specific tools will estimate the direct and indirect economic impact, efficiencies, and societal benefits of investing in NTD Programs and interventions.
Purpose	Using the supporting tools, NTD Programs can develop investment cases to advocate for domestic resources and prioritize NTD investments in a multi-disease environment.
Use Case	With support from HKI and Deloitte, Sierra Leone's NTD Program will pilot the tools and serve as the advisor on country needs, program and financial data, user testing of the tools, and utilization of the outputs for advocacy.
Future Use	After refining based on the pilot in Sierra Leone, the tools will be available to all Act | West countries to create investment cases that enhance advocacy efforts for domestic resource mobilization to support NTD programming needs.

Why an Economic Impact Model?

National NTD programs have made significant progress, including declines in the burden of five NTDs responsive to preventive chemoprophylaxis: LF, onchocerciasis, schistosomiasis, trachoma, and soil-transmitted helminths.

With considerable external support, many affected countries have substantially reduced their NTD prevalence and reduced disease burden. These gains create both challenges and opportunities to sustain the NTD response.

The gains created requests from donors for greater local ownership of their responses and fear that governments may revert to neglecting these diseases, leading to their reemergence.

To ensure countries are pursuing a greater proportion of financing, NTD Programs require tools to understand the benefits of NTD investments so they can advocate for domestic resources as donor contributions wane.

Further, such tools should support prioritization of NTD investments in a multi-disease environment by providing an understanding of the comparative benefits of different interventions using common measurements.

Act | West Sustainability

- As countries pursue elimination and control of these diseases, they require tools to sustain the impact of their investments and transition vertical activities to the mainstream health sector systems.
- Sustainability also implies domestic resources – to the extent possible – are financing core activities such as deworming, surveillance, and morbidity management.
- Many disease programs have deployed investment case studies to support health financing decisions and domestic resource mobilization. While some investment case work has been done, no known tools are available to assist countries to estimate the economic impact of NTD interventions to provide evidence to decision-makers and stimulate domestic funding for NTD activities.

The tools will support Act | West Intermediate Result for Sustainability (IRS) outcome one: *Country has mobilized domestic funding to support NTD programing needs*

TIPAC Use with Model

The Tool for Integrated Planning and Costing or (TIPAC) allows the NTDP to review funding availability, assess major challenges facing the program, and highlight target areas for improved resource allocation and resource mobilization to ensure program's success.

TIPAC is a comprehensive tool with many functions that can help the program assess the programs' cost and funding gaps more accurately in order to effectively and accurately engage stakeholders.

- The Economic Impact Model will pull data from the TIPAC
- Given the abundance of data collection tools, the model seeks to make this work automated and effortless
- Act | West seeks for the TIPAC along with the model to be NTD program owned and led for planning and advocacy purposes

Sierra Leone Pilot

Context

- Sierra Leone, a country targeting elimination of LF and onchocerciasis, in the near future, will serve as the pilot for the development of the tools. Its government has been receptive to the use of economic impact as an incentive to mobilize domestic resources.

Economic Impact Model Intent

- Tools will estimate the direct and indirect economic benefits of the averted NTD cases. This will be guided by epidemiological estimates and clinical presentation.
- Data sources include TIPAC cost data developed through Act | West workshops with NTDPs, epidemiological data available in countries, program-level data related to stage of MDA by district, etc.

Act | West Collaboration

The U.S. Centers for Disease Control and Prevention's Division of Parasitic Diseases and Malaria (CDC/DDPM) and USAID Act | West consortium partners, Deloitte Consulting LLP and Helen Keller International have teamed up with Sierra Leone's NTD Program to develop and pilot the applied tools. Each organization is committed to strengthening the sustainability of NTD interventions in affected countries and provides a unique value proposition to this activity as described below.

- U.S. Centers for Disease Control Division of Parasitic Diseases and Malaria: Lead developer of the models and tools; advisor on health economics and NTD epidemiology
- Deloitte Consulting LLP – Advisor on health financing, economic modeling, and usability; provision and interpretation of NTD program cost data; technical assistance to Act | West countries for implementation of the tool
- Helen Keller International Sierra Leone – Advisor on NTD field operations, country knowledge, program data, NTD epidemiology; liaison to Sierra Leone Ministry of Health and Sanitation
- Sierra Leone Ministry of Health and Sanitation – Advisor for country needs, program and financial data, user testing, utilization of tool outputs for advocacy and resource mobilization

What's Next?

Outputs

- One integrated Excel-based cost-effectiveness tool, pending resource availability
- Current prioritization for creating tools: LF, onchocerciasis, soil-transmitted helminths, schistosomiasis
- One user manual which covers all tools
- ASTMH symposium abstract; presentations and ASTMH participation if accepted
- Draft of one publication for PLOS-NTD or other relevant journal

Outcome

- Countries utilize evidence to advocate for mobilization of domestic resources for their NTD programing.

Economic Impact Model:
Draft LF Model

Act to End NTDs | West

Introductions

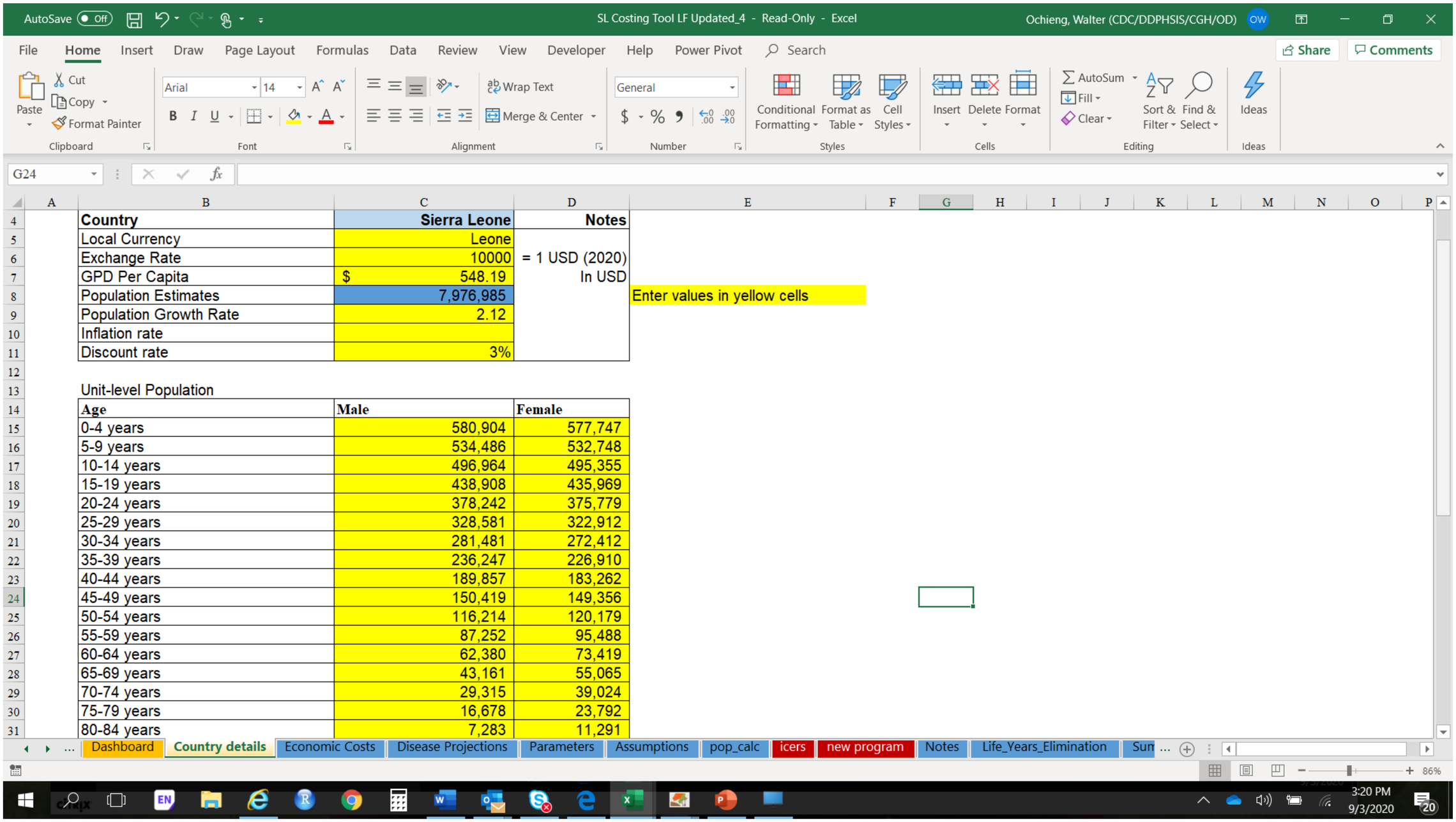
Walter Ochieng, CDC

- Health Economist CDC Center for Global Health
- Support economic work across different divisions
- Scientific Clearance
- Interests: global public health
- PhD, MBChB

Model Guiding Principles

- Pilot LF – will cover other diseases
- Simple to use tool for various levels of decision making e.g. district, sub-region, national
- Minimize user inputs by leveraging existing resources e.g. TIPAC, National Census, National Bureau of Statistics
- Reduce burden on the user – use a series of drop down menus
- Advanced user can change assumptions in the backend e.g. disease utilities, disease trajectory rates (s-shaped, linear)
- User can change perspectives to appeal to different decision makers
- Outputs in various forms e.g. clinician time saved, ROI and ICERs (QALYs) for different audiences

Background Info



AutoSave Off — SL Costing Tool LF Updated_4 - Read-Only - Excel — Ochieng, Walter (CDC/DDPHSIS/CGH/OD)

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	Country	Sierra Leone	Notes
	Local Currency	Leone	
	Exchange Rate	10000	= 1 USD (2020)
	GPD Per Capita	$ 548.19	In USD
	Population Estimates	7,976,985	
	Population Growth Rate	2.12	
	Inflation rate		
	Discount rate	3%	

Enter values in yellow cells

Unit-level Population

Age	Male	Female
0-4 years	580,904	577,747
5-9 years	534,486	532,748
10-14 years	496,964	495,355
15-19 years	438,908	435,969
20-24 years	378,242	375,779
25-29 years	328,581	322,912
30-34 years	281,481	272,412
35-39 years	236,247	226,910
40-44 years	189,857	183,262
45-49 years	150,419	149,356
50-54 years	116,214	120,179
55-59 years	87,252	95,488
60-64 years	62,380	73,419
65-69 years	43,161	55,065
70-74 years	29,315	39,024
75-79 years	16,678	23,792
80-84 years	7,283	11,291

Dashboard | Country details | Economic Costs | Disease Projections | Parameters | Assumptions | pop_calc | icers | new program | Notes | Life_Years_Elimination | Sum

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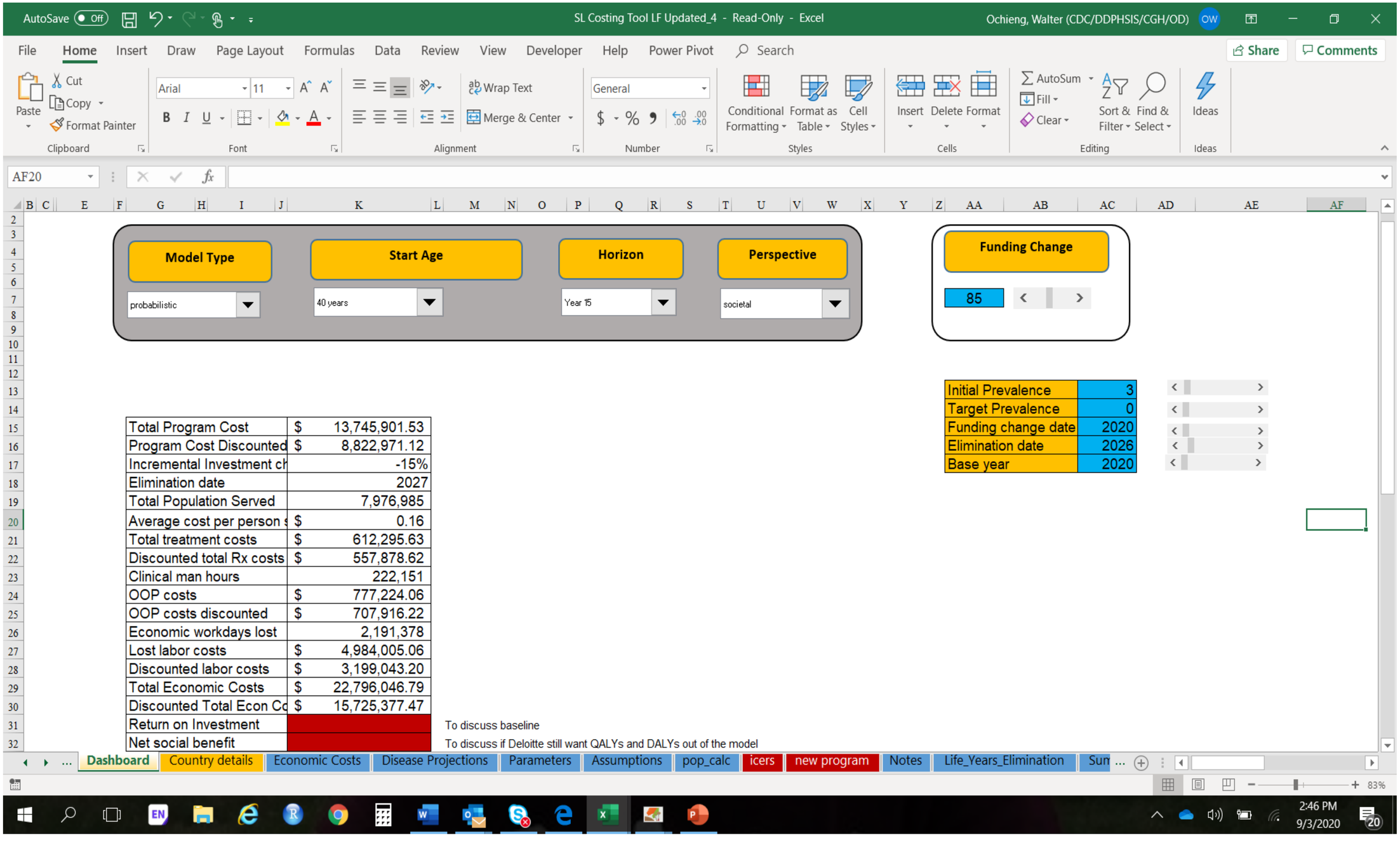
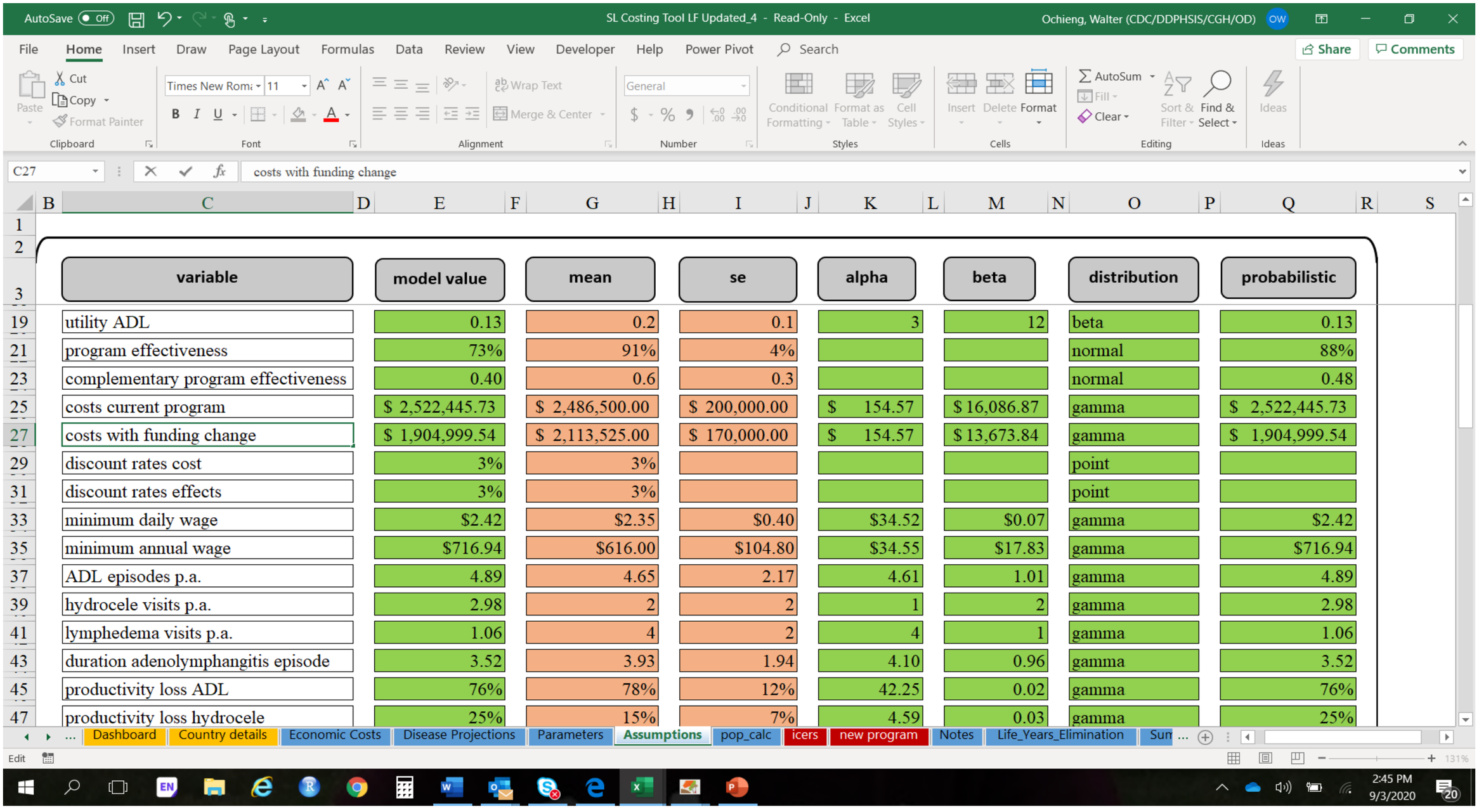
User Interface



Backend (Assumptions)



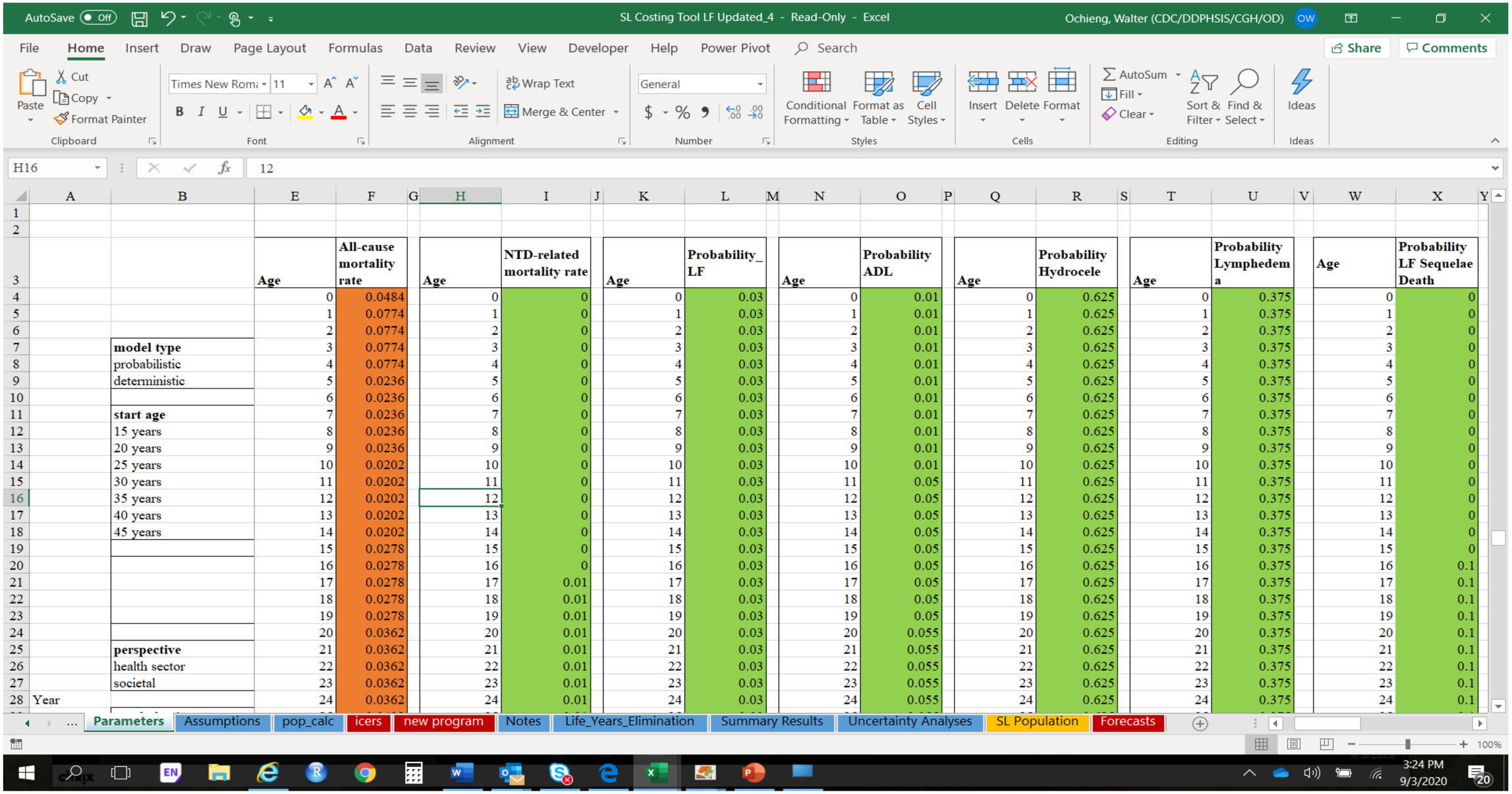
SL Costing Tool LF Updated_4 - Read-Only - Excel

C27: costs with funding change

variable	model value	mean	se	alpha	beta	distribution	probabilistic
utility ADL	0.13	0.2	0.1	3	12	beta	0.13
program effectiveness	73%	91%	4%			normal	88%
complementary program effectiveness	0.40	0.6	0.3			normal	0.48
costs current program	$ 2,522,445.73	$ 2,486,500.00	$ 200,000.00	$ 154.57	$ 16,086.87	gamma	$ 2,522,445.73
costs with funding change	$ 1,904,999.54	$ 2,113,525.00	$ 170,000.00	$ 154.57	$ 13,673.84	gamma	$ 1,904,999.54
discount rates cost	3%	3%				point	
discount rates effects	3%	3%				point	
minimum daily wage	$2.42	$2.35	$0.40	$34.52	$0.07	gamma	$2.42
minimum annual wage	$716.94	$616.00	$104.80	$34.55	$17.83	gamma	$716.94
ADL episodes p.a.	4.89	4.65	2.17	4.61	1.01	gamma	4.89
hydrocele visits p.a.	2.98	2	2	1	2	gamma	2.98
lymphedema visits p.a.	1.06	4	2	4	1	gamma	1.06
duration adenolymphangitis episode	3.52	3.93	1.94	4.10	0.96	gamma	3.52
productivity loss ADL	76%	78%	12%	42.25	0.02	gamma	76%
productivity loss hydrocele	25%	15%	7%	4.59	0.03	gamma	25%

Dashboard | Country details | Economic Costs | Disease Projections | Parameters | Assumptions | pop_calc | icers | new program | Notes | Life_Years_Elimination | Sum

Backend 2 (model selection)



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H16 | 12

	B	E	F	H	I	K	L	N	O	Q	R	T	U	W	X
3		Age	All-cause mortality rate	Age	NTD-related mortality rate	Age	Probability_ LF	Age	Probability ADL	Age	Probability Hydrocele	Age	Probability Lymphedema	Age	Probability LF Sequelae Death
4		0	0.0484	0	0	0	0.03	0	0.01	0	0.625	0	0.375	0	0
5		1	0.0774	1	0	1	0.03	1	0.01	1	0.625	1	0.375	1	0
6		2	0.0774	2	0	2	0.03	2	0.01	2	0.625	2	0.375	2	0
7	**model type**	3	0.0774	3	0	3	0.03	3	0.01	3	0.625	3	0.375	3	0
8	probabilistic	4	0.0774	4	0	4	0.03	4	0.01	4	0.625	4	0.375	4	0
9	deterministic	5	0.0236	5	0	5	0.03	5	0.01	5	0.625	5	0.375	5	0
10		6	0.0236	6	0	6	0.03	6	0.01	6	0.625	6	0.375	6	0
11	**start age**	7	0.0236	7	0	7	0.03	7	0.01	7	0.625	7	0.375	7	0
12	15 years	8	0.0236	8	0	8	0.03	8	0.01	8	0.625	8	0.375	8	0
13	20 years	9	0.0236	9	0	9	0.03	9	0.01	9	0.625	9	0.375	9	0
14	25 years	10	0.0202	10	0	10	0.03	10	0.01	10	0.625	10	0.375	10	0
15	30 years	11	0.0202	11	0	11	0.03	11	0.05	11	0.625	11	0.375	11	0
16	35 years	12	0.0202	12	0	12	0.03	12	0.05	12	0.625	12	0.375	12	0
17	40 years	13	0.0202	13	0	13	0.03	13	0.05	13	0.625	13	0.375	13	0
18	45 years	14	0.0202	14	0	14	0.03	14	0.05	14	0.625	14	0.375	14	0
19		15	0.0278	15	0	15	0.03	15	0.05	15	0.625	15	0.375	15	0
20		16	0.0278	16	0	16	0.03	16	0.05	16	0.625	16	0.375	16	0.1
21		17	0.0278	17	0.01	17	0.03	17	0.05	17	0.625	17	0.375	17	0.1
22		18	0.0278	18	0.01	18	0.03	18	0.05	18	0.625	18	0.375	18	0.1
23		19	0.0278	19	0.01	19	0.03	19	0.05	19	0.625	19	0.375	19	0.1
24		20	0.0362	20	0.01	20	0.03	20	0.055	20	0.625	20	0.375	20	0.1
25	**perspective**	21	0.0362	21	0.01	21	0.03	21	0.055	21	0.625	21	0.375	21	0.1
26	health sector	22	0.0362	22	0.01	22	0.03	22	0.055	22	0.625	22	0.375	22	0.1
27	societal	23	0.0362	23	0.01	23	0.03	23	0.055	23	0.625	23	0.375	23	0.1
28	Year	24	0.0362	24	0.01	24	0.03	24	0.055	24	0.625	24	0.375	24	0.1

Parameters | Assumptions | pop_calc | icers | new program | Notes | Life_Years_Elimination | Summary Results | Uncertainty Analyses | SL Population | Forecasts

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Bibliography

Article	Source
Investment Cases for LF & Oncho	American Journal of Public Health
Health & Econ Benefits of Global Programme to Eliminate LF	Infectious Diseases of Poverty
Global Burden of Disease Study 2010	PLoS NTD
NTD: Epidemiology & Global Burden	Tropical Medicine & Infectious Disease
Econ Loss due to treatment costs & work loss to individuals with chronic LF, India	Acta Trop
Treatment costs and work time loss due to episodic adenolymphangitis in LF patients, India	Tropical Medicine Int Health
LF: economic aspects of the disease	Trans R Soc Trop med Hyg
Economic evaluations of LF interventions	Parasites & Vectors
LF mapping & baseline microfilaria in SL	Parasites & Vectors
Progress on eliminatio nof LF in SL	Parasites & Vectors
Achievements & challenges of LF elimination in SL	Not yet published; Mary H. reviewing; Confidential
Health & econ burdens of LF prior to MDAs	Clinical Infectious Diseases
WHO Training Manual on Lymphodema (see pgs 11-14)	WHO
Burden of mental health in LF	Infectious Diseases of Poverty
Global Program to Eliminate LF Health Impact after 8 years	PLoS NTD
Investment Success in Public Health	Clinical Infectious Diseases

Economic Impact Model: Sierra Leone Pilot

Act to End NTDs | West

Introductions

Dr. Mary Hodges

- Country Director, Helen Keller Intl, Sierra Leone
- Experience in Pediatrics, Parasitology, Nutrition, Public Health
- Specializes in evidence based programming and bringing programs to scale within existing government/civil society platforms
- MBBS, MRCP, Hon DSc Glasgow

Sierra Leone NTD Background

- Sierra Leone's NTDP aims for sustained elimination of LF by 2024 and of OV by 2025, as well as sustain control of SCH and STH.
- To date, Sierra Leone has made impressive strides towards its NTD elimination and control goals.

- In the last 12 years, LF MDA has stopped in nine of 14 districts and eight of these districts have also passed TAS2.
- Over the last 10 years, no new cases of blindness from OV have been reported. In addition, control of STH was achieved in 2016.
- As of 2019, the NTDP achieved epidemiological coverage of 81 percent for LF, 78 percent for OV, and programmatic coverage of 90 percent for SCH, and 83 percent for STH.

Domestic Resource Mobilization

Economic Impact Model

- The proposed tools will be used by Sierra Leone and other countries with NTD endemicity to estimate how their NTD interventions such as MDAs and morbidity management will positively impact the population and efficiencies in the health and collaborating sectors
- Model variables under consideration include: school attendance, school performance, school achievement, workforce participation, wage-earning capacity, health sector resource efficiencies, gross domestic product and income tax base

NTD Program Support

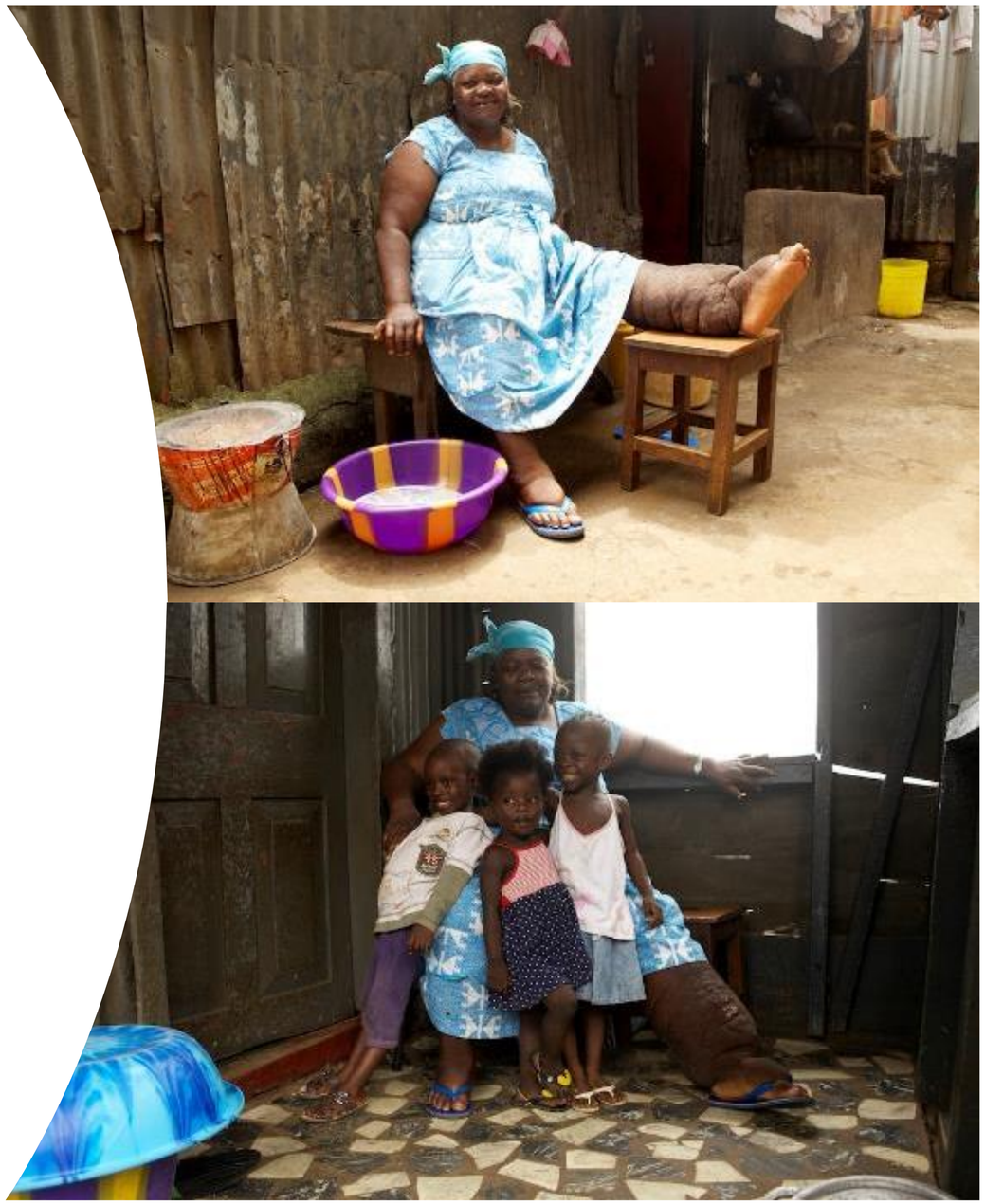
- Act | West will support turning TIPAC data and the results from the Economic Impact Model into information that can be used for advocacy
- Financial and operational sustainability are key priorities for both the NTDP and USAID, and therefore capacity building support will be ongoing

Government Engagement

- Parliamentarians have demonstrated interest in allocating government finances to NTDs
- Depending on the audience, the NTD Program will package results for advocacy for key goals such as a budget line

Telling the Story

- The Economic Impact Model aims to use economic, demographical, and epidemiological data to tell a human story
- Act | West aims to show the impact on people and communities and the financial incentives for investing in NTDs to government officials



I don’t let my condition press heavily on my heart. It can be painful, frustrating, and depressing, you can’t wear shoes, it’s hard to walk, but if you allow yourself to feel depressed, you will die very quickly.
~ Hannah Araba Taylor

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