Estimation de l’impact économique des effets sur la santé des interventions affectant la marche et le vélo à Lausanne avec l'outil HEAT de l’OMS

Un travail de master ès sciences à l’Université de Lausanne

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Une étude de cas pour la Ville de Lausanne

- Année de référence:
  - 2015
- Collaboration avec:
  - La Ville de Lausanne:
    - Le délégué piéton, Pierre Corajoud
    - Le délégué vélo, Stéphane Bolognini,
  - Bureau 6-t, Genève:
    - Guillaume Munafò et Maxime Blatti
- Conseil:
  - Raphaël Bize
- Supervision:
  - Bengt Kayser
- Financement:
  - Interact (Unil et Ville de Lausanne)

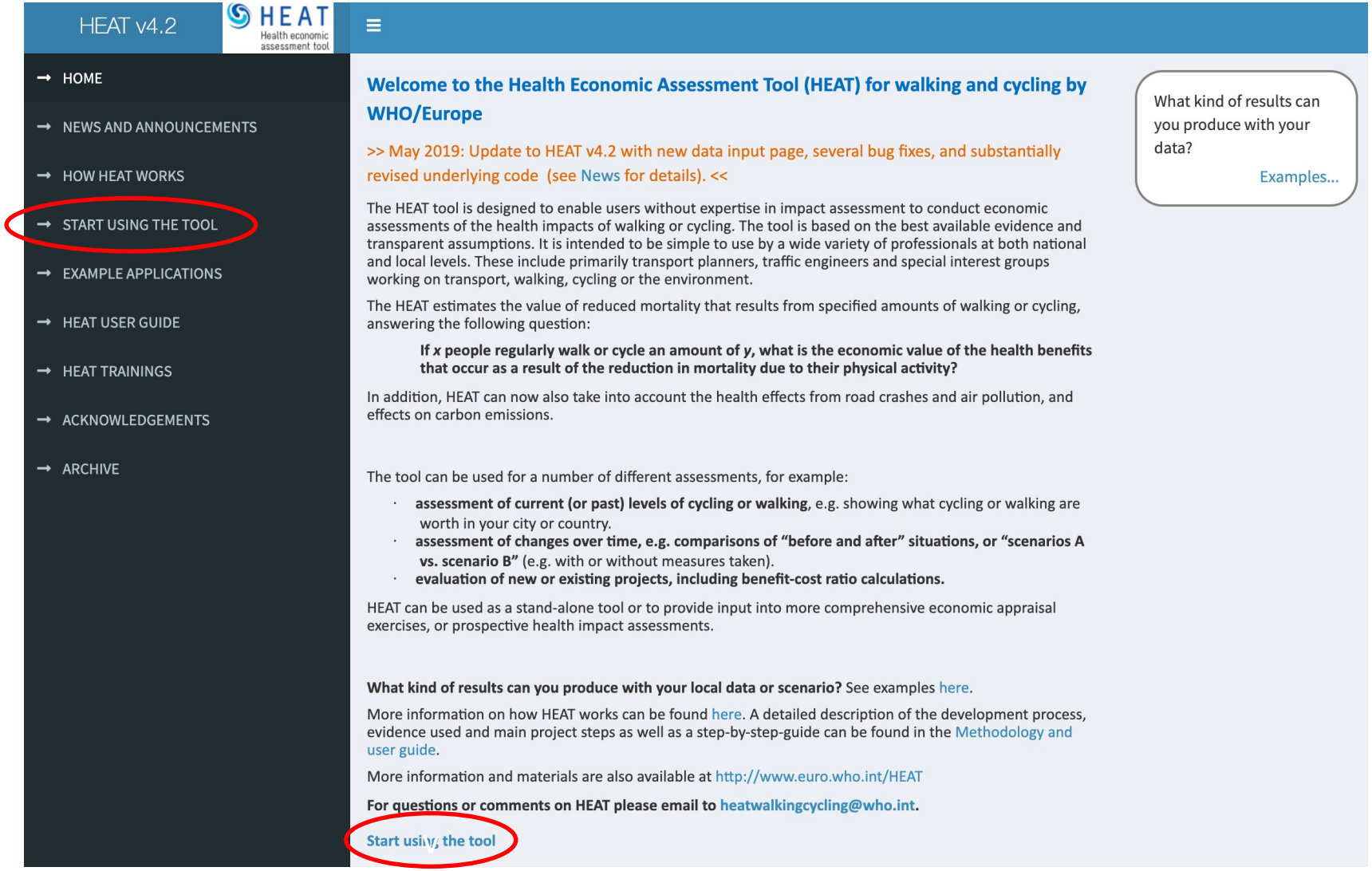
Questions étudiées

- Quels sont les bénéfices économiques des effets sanitaires grâce à la pratique de la marche et du vélo estimés par l'outil HEAT pour la Ville de Lausanne de 2000 à 2015?
- Quels sont les bénéfices économiques des effets sanitaires du vélo en 2015 et l'impact sur 10 ans en Ville de Lausanne calculés par l'outil HEAT?
- Selon l'outil HEAT, pour la Ville de Lausanne, quelle est l'estimation des bénéfices économiques des effets sanitaires et le ratio coût-bénéfice liés à une augmentation de la part modale de la pratique du vélo à 3% ou à 5%, entre 2015 et 2025, découlant de l'investissement de CHF 16,5 millions dans le développement et la sécurisation d'infrastructures pour cyclistes?
- Selon une microanalyse effectuée avec l'outil HEAT, quels sont les bénéfices économiques et le ratio coût-bénéfice des effets sanitaires avant et après la mise en place d'une bande cyclable3 à l'Avenue du Chablais à Lausanne pour le vélo?

Réponses obtenues

- Les bénéfices sanitaires de la pratique de la marche entre les années 2000 et 2015 ont permis d'éviter 183 décès sur les 15 ans et un bénéfice entre 70,9 Mio à 71,9 Mio d'euros pour toute la population lausannoise. La pratique du vélo a prévenu 2 décès en 15 ans et un bénéfice 7,57 à 7,61 Mio d'euros sur les 15 ans.
- Si la pratique du vélo constatée en 2015 reste inchangée, elle permet d'éviter 17 décès prématurés et un gain d'environ 10,8 Mio à 10,9 Mio d'euros sur les 10 années suivantes pour toute la population lausannoise. Comparé à une situation où personne ne devait faire du vélo de 2015 à 2025.
- Si la part modale des déplacements à vélo augmente à 3% en 2025, les bénéfices perçus pour toute la population lausannoise s'élèveraient à 79,6 à 80 Mio d'euros. Ils pourraient atteindre 160 Mio d'euros si la part modale atteint les 5%.
- La microanalyse des bénéfices sanitaires entre 2002 et 2007 grâce à la mise en place d'une bande cyclable, a démontré un bénéfice de 554'000 à 558'000 euros sur les 5 ans pour la population cycliste.

https://www.heatwalkingcycling.org/



Scope for the use of HEAT

Please read these explanations carefully to make sure HEAT is applicable to your case.

- **HEAT is to be applied for assessments on a population level, i.e. in groups of people, not in individuals.**
- **HEAT is designed for habitual behaviour, such as cycling or walking for commuting, or regular leisure time activities.**

More information about how HEAT works

more...

The HEAT tool is composed of 5 main steps:

1. defining **your assessment**,
2. providing **input data**,
3. providing information for **data adjustments**;
4. review of **calculation parameters**; and
5. **results**.

Depending on the characteristics of an assessment, a varying number of questions will apply.

For questions or comments on HEAT please email to heatwalkingcycling@who.int.

Start a HEAT assessment

Knowledge of the health effects of walking and cycling is constantly evolving. The HEAT project is an ongoing consensus-based effort of translating basic research into a harmonized methodology. Despite relying on the best available scientific evidence, on several occasions the tool methodology required the advisory groups (see acknowledgements) to make expert judgements. The most important assumptions underlying the HEAT impact assessment approach are described here. Therefore, the accuracy of results of the HEAT calculations should be understood as estimates of the order of magnitude, much like many other economic assessments of health effects. HEAT is regularly being updated as new knowledge becomes available.

Active travel modes

Which active travel mode would you like to assess?

You can assess the impacts of walking, cycling, or both.

- [ ] Walking
- [ ] Cycling

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Geographic scale

Do you want to assess impacts at a national, city, or sub-city level?

- ○ Country level
- ◉ City level
- ○ Sub-city level

Choose your country

Switzerland

Choose your city

If your city is not listed, choose a similar city in the same country, or switch back to "country level".

Lausanne

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Comparison and time scale

Would you like to assess just one specific situation, or compare two cases?

In a "single case" assessment, you only provide data on the so called "reference case". This is then compared to an implicit "comparison case" of "no walking or cycling".
In a "two case" assessment you have to specify both cases, the "reference case" and the "comparison case". Typical examples are "before and after" an intervention, or comparisons of alternative "scenarios A and B".

- ○ Single case ⓘ
- ◉ Two cases ⓘ

What is the year for your reference case?

By default, assessments are set to 10 years from the current year. If you would like to calculate impacts over a different period of time, you may adjust reference year, comparison year and assessment time below.

2000

What is the year for your comparison case?

2015

Over how many years should the impacts be calculated?

15

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Impacts

Which impacts would you like to consider in your assessment?

You can select only one impact pathway (e.g. physical activity like the previous versions of HEAT), or select several impacts to be taken into account simultaneously in your assessment.
If "carbon emissions" are selected, you will be asked additional questions on motorized modes.

- [x] Physical activity
- [ ] Air pollution
- [ ] Carbon emissions

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Walking data for the reference case

Data source	Walking data	Population data
Population survey		

Data unit or type

Minutes

Walking data for the comparison case

Data source

Population survey

Data unit or type

Minutes

Walking data
Amount

*Must be in specified unit **per person, per day**.*

27.29

Population data
Population type

This specifies what type of population the volume data is based on.

General population

Age range of the assessed population

If the walking or cycling assessed stems predominantely from younger or from older subjects, select the age range accordingly.

Adult population (20-74 years)

Population size

Must correspond to population type and age range.

110904

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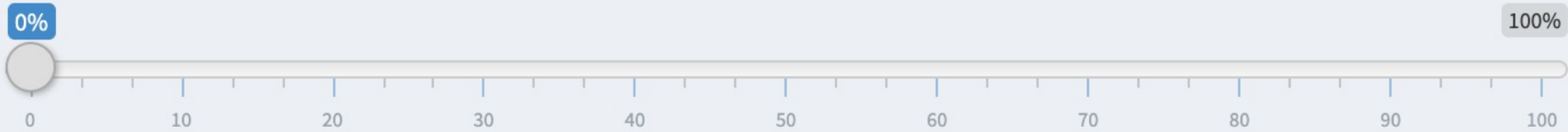
General adjustments

Walking

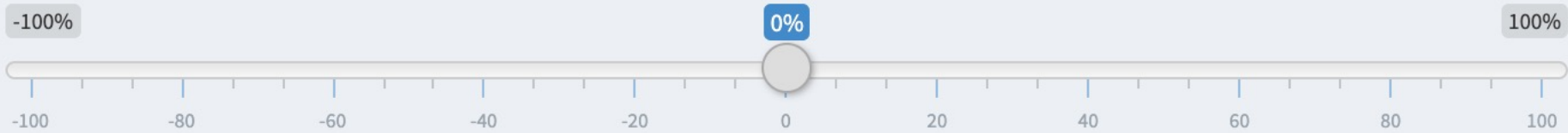
Proportion excluded

Exclude walking or cycling due to factors unrelated to your assessed intervention or scenario here.



Temporal & spatial adjustment

Adjust your data as necessary to reflect longterm averages. Find out more about data adjustment in HEAT here



Take-up time for travel demand

Specify how many years it takes until maximum volume of active travel is reached.

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Monetization parameters

Walking

Investment costs

To calculate a benefit-cost ratio, provide a cost estimate for investments that led to the assessed active travel (in Euros).

Discount year

Specify the year to which you want discount (or inflate) future (or past) economic values to.

2021

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Calculation parameters

The table below provides an overview of the default values used for your assessment. If you would like to use other values, you can edit column "Editable value".

	Parameter description	Default value	Editable value	Unit	Paran
1	Discount rate	5	5	%	discrate
2	Average walking speed	5.3	5.3	km/h	speed_walk
3	Value of statistical life in euro by country (value for Switzerland in 2015)	6457011.0484	6457011.0484	euro/death	vsl
4	All cause mortality rate for reference case (value for Switzerland and age group 20-74)	330.3782	330.3782	deaths/inhab	mortality_rates_walk_ref
5	All cause mortality rate for counterfactual case (value for Switzerland and age group 20-74)	330.3782	330.3782	deaths/inhab	mortality_rates_walk_cf

The table below shows the background values that the tool uses for your assessment. These cannot be modified.

	Parameter description	Background value	Unit	Parameter name
1	Time needed to obtain full health impacts in two cases assessment	5.00	years	builduptime_twocases
2	Relative risk for walking	0.89	ratio	RR_walk

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General results

Results for your assessment

Summary of your input data

The volume data you have entered corresponds to an increase of 4 min. per person and day.
Your assessed population is 110 904.

Summary of impacts for mortality

As a result, 12 premature deaths are prevented per year.
Over the full assessment period of 15 years, 183 premature deaths are prevented.

Economic value of impacts for mortality

Mortality is monetized using value of statistical life (VSL) of 6 460 000 EUR/death. This corresponds to an economic value of EUR 78 700 000 per year.
Over the full assessment period of 15 years, the total economic impact is EUR 1 180 000 000.
Discounted to 2021 value at an annual discount rate of 5%, the total economic impact is EUR 2 120 000 000.

Disclaimer
Please bear in mind that HEAT does not calculate risk reductions for individual persons but an average across the population under study. The results should not be misunderstood to represent individual risk reductions. Also note that the "value of statistical life" does not assign a value to the life of one particular person but refers to an average value of a “statistical life”.
It is important to remember that many of the variables used within HEAT are estimates and therefore liable to some degree of uncertainty. You are reminded that the HEAT tools provide you with an approximation of the order of magnitude of the impacts. To get a better sense for the robustness of the results, you are strongly advised to rerun the model, entering low and high values for variables where you have provided a “best guess”.

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Detailed Results - >

Download exported data

Extra data:

HEAT export session id: 2021-10-10_15-05-29_13765307269_4-2-0

Click any link below to download selected dataset in csv format:

Input data: input_data_std_units.csv

Input data after qualifiers: input_data_after_qualifiers.csv

Results: results.csv

webapp_input (expert): webapp_input.rds

Note that is a beta-feature in development. Files will be exported as raw, comma-separated-value files, which will need further processing. More polished export files will be available in a future HEAT version.

OK

Forces / faiblesses

- Ancré dans de l'évidence scientifique
- Simple à utiliser
- Permets de calculer des effets obtenus, des retours sur investissement, de projeter des effets futurs …

- Besoin de données fiables
- Uniquement basé sur mortalité (morbidité non-incluse)
- Utilisation d'une donnée difficile à appréhender (valeur statistique d'une vie)

Conclusions

- HEAT
  - C’est gratuit
  - Ca marche
  - Ce n’est pas sorcier
  - C’est robuste
  - Permets d’obtenir des données quantifiées
  - Peut être utilisé par des acteurs publiques
  - Permets d’alimenter le débat avec des chiffres

Pour les intéressé·e·s

- Travail de master de Noémie Schürmann
  https://serval.unil.ch/resource/serval:BIB_S_28019.P001/REF
  (recherche avec nom et/ou titre possible)

- HEAT
  https://www.heatwalkingcycling.org