

# Tehisarukas planeering: loomine, visualiseerimine ja kommunikatsioon

Anto Aasa



# Tehisaru = *Triple A system*

- Algoritmiline
  - Autonoomne
  - Automaatne
- 
- Tehisintellekt, TI
  - AI

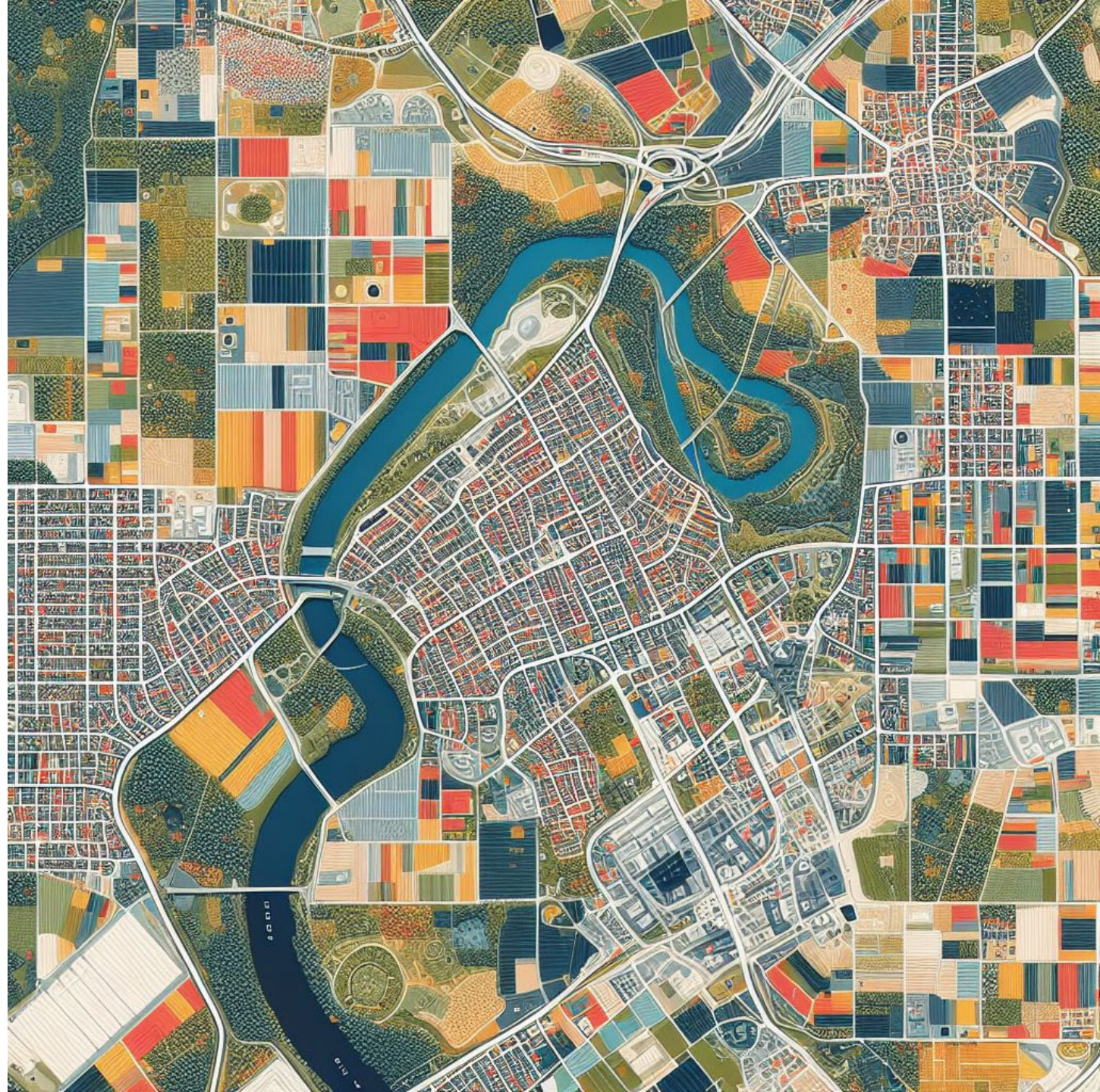




# Tehisaru

1. Pole tehislik
2. Pole arukas

Mõtlemisvõimetud  
statistilised süsteemid



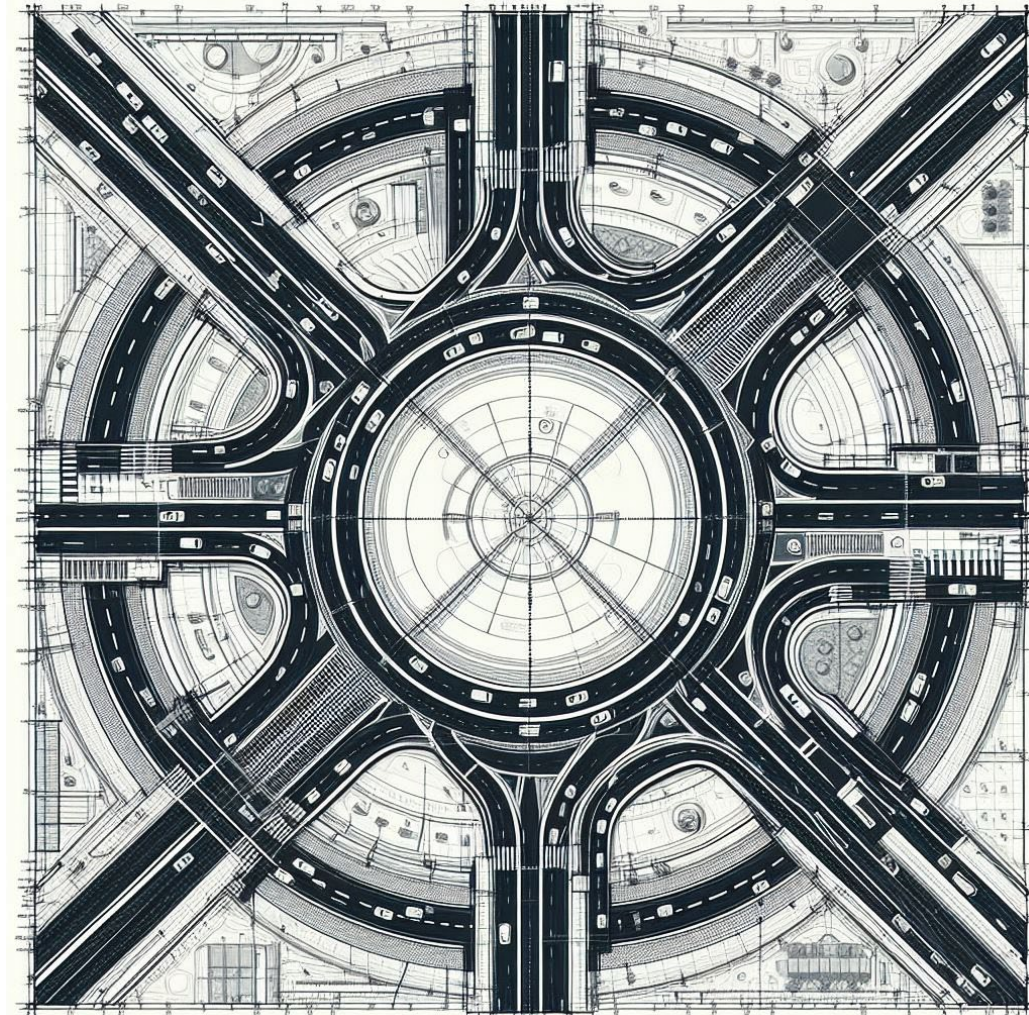


- Ei pea olema masinõpe
- Ei pea olema närvivõrkude analüüs

algoritmiline

automaatne

autonoomne



# Eetiline ja usaldusväärne tehisaru

- Seaduslik
- Eetiline
- Töökindel
  - Andmed!!!

kirjeldatav

avatud lähtekoodiga

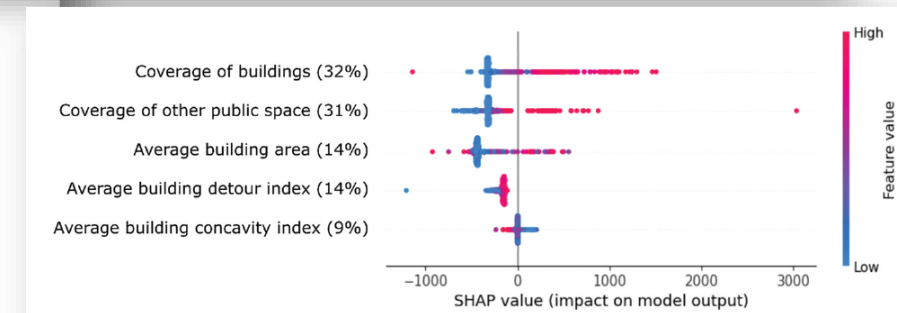
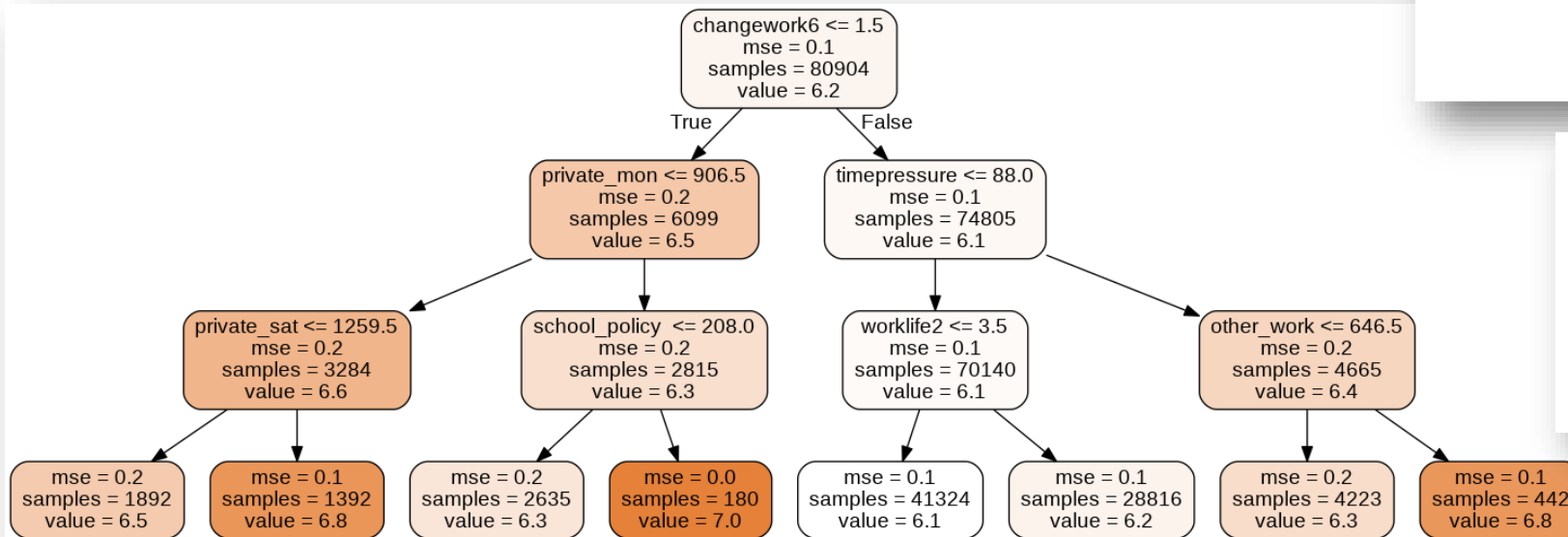
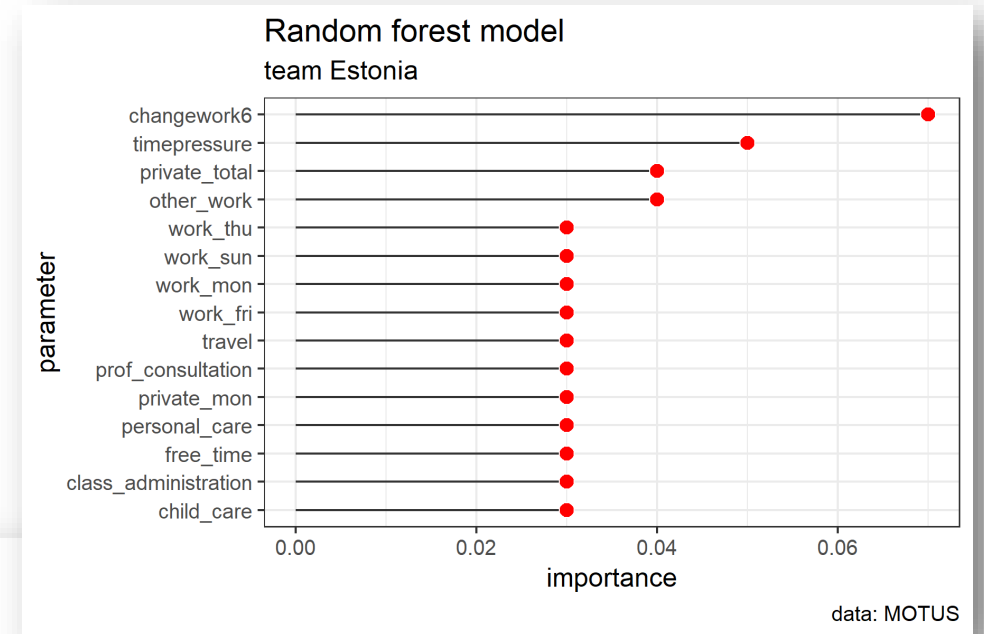
läbipaistev

- Explainable AI
  - XAI
  - Kasutaja mõistab tulemusi ja väljundit ning võib seda usaldada

- *Black box*
- *Closed box*
  
- Kes vastutab?
  - Tarkvara insener
  - Teenuse pakkuja, omanik
  - Riik
  
- Liigne usaldamine

# Tehisaru kaasamise tulemused

- Ilupildid
- Keerukad mudelid





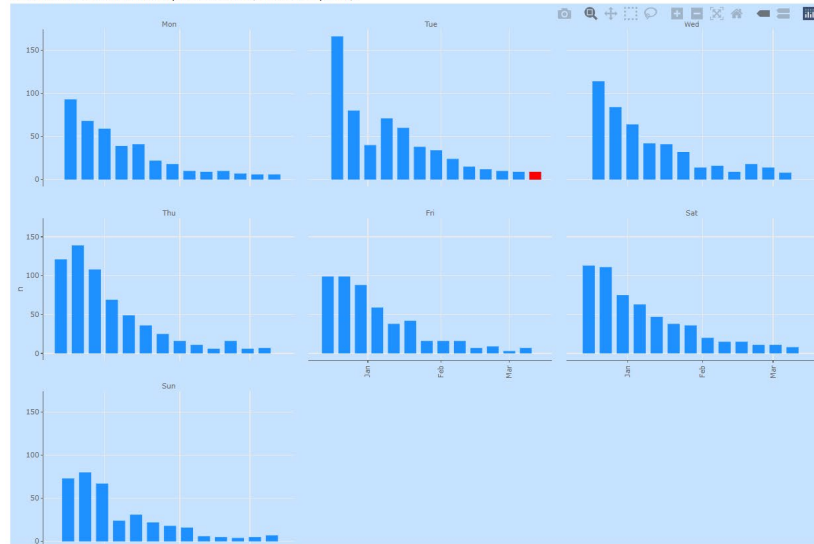
# Seirekeskkonnad

Juba 2020. aastast mõllas Eestis COVID-19    Nakatumisnäitajad    Vaktsineerimistempo    Täielikult vaktsineeritud:    Täielikult vaktsineeritud NAISED:    Täielikult vaktsineeritud MEHED:    Haiglaravil    Olukord riskimaatriksil:

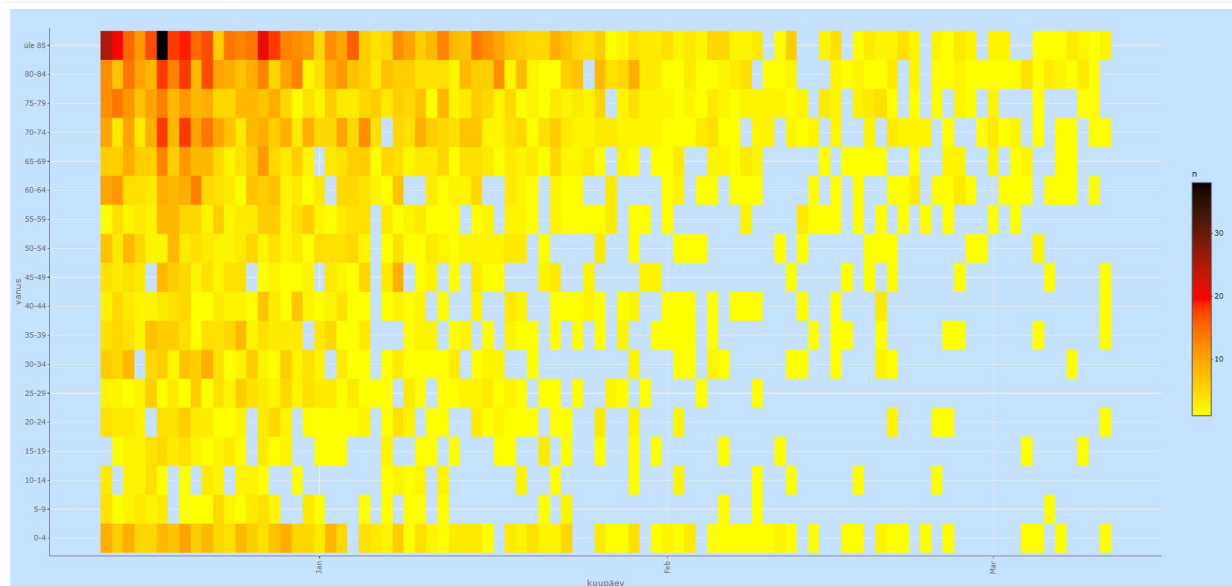
Kõik on joonistatud Terviseameti andmete põhjal: <https://www.terviseamet.ee/et/koroonavirus/avaandmed>

Andmete avaldamise päev: 2024-03-12 / Joonis: A. Aasa

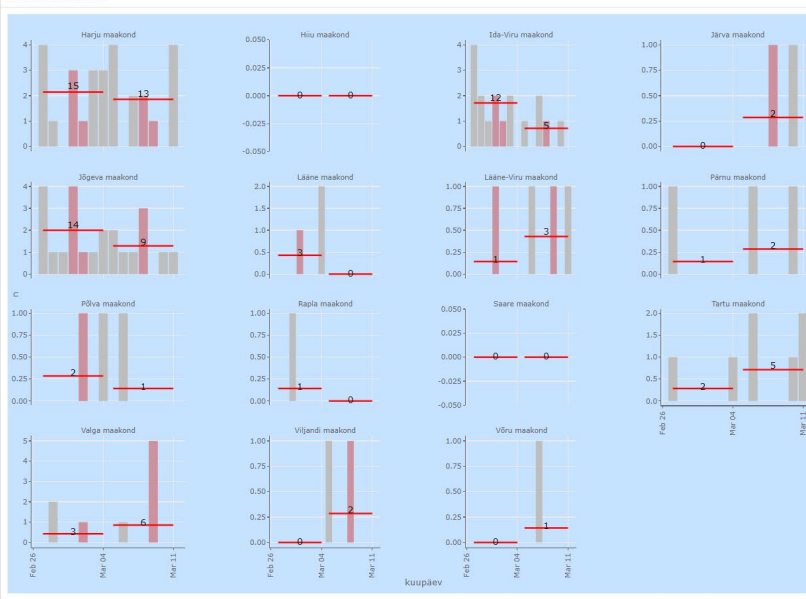
Positiivsete testide hulk nädalapäevade lõikes (viimased 90 päeva):



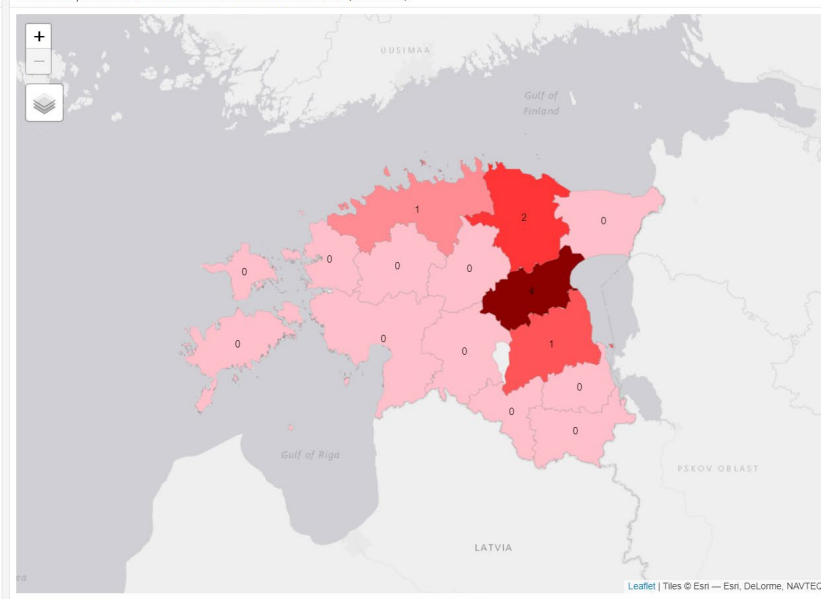
Positiivsed proovid vanusegruppide lõikes (viimased 90 päeva):



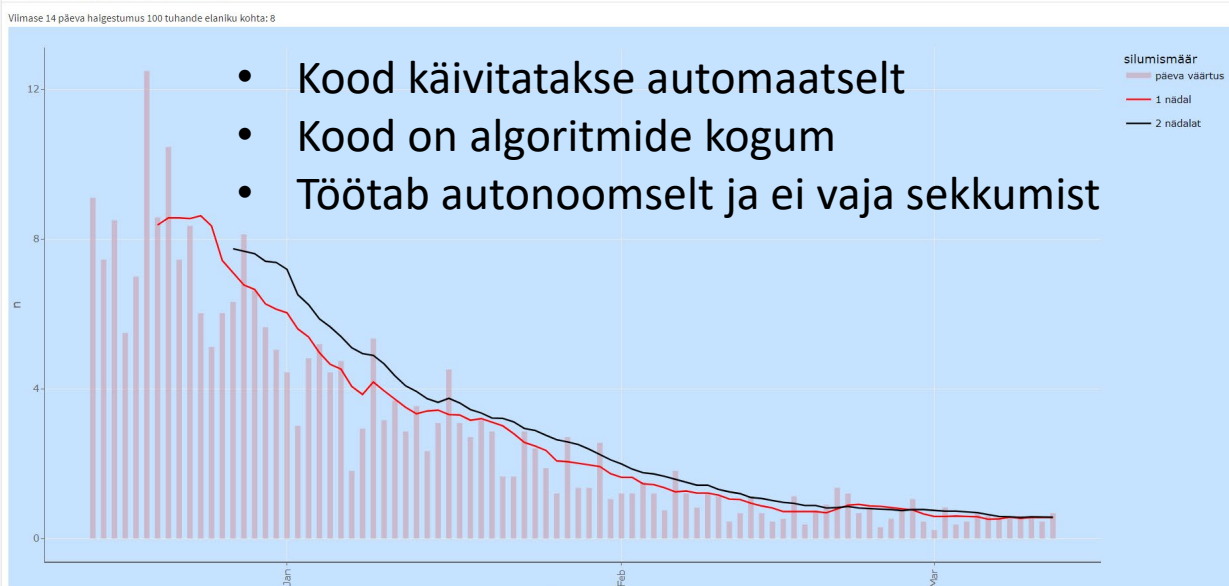
Viimased 2 nädalat:



Positiivsete proovide hulk 100 tuhande elaniku kohta maakondades (2024-03-11):



Positiivsed testid 100 tuhande inimese kohta:



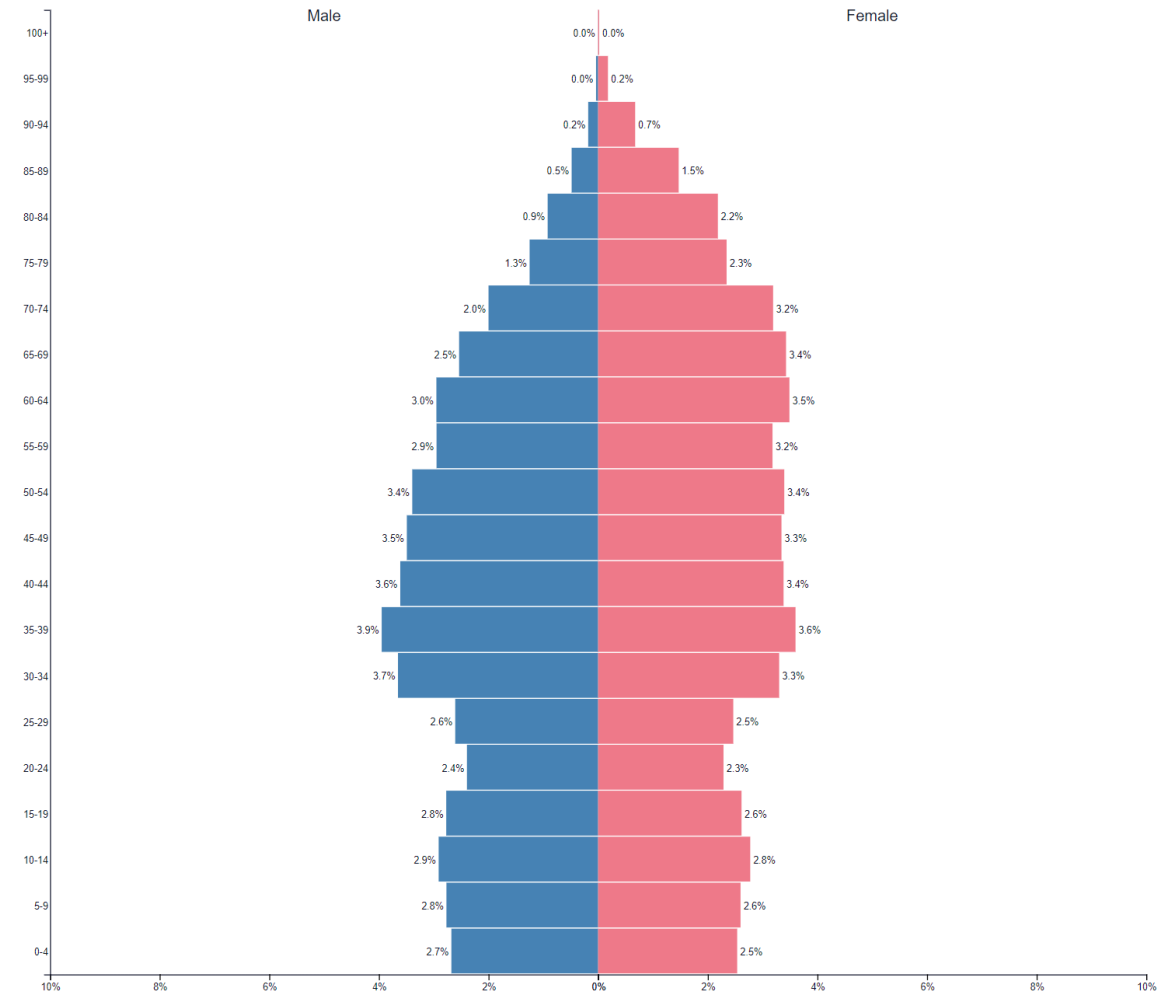


# Mõned näited

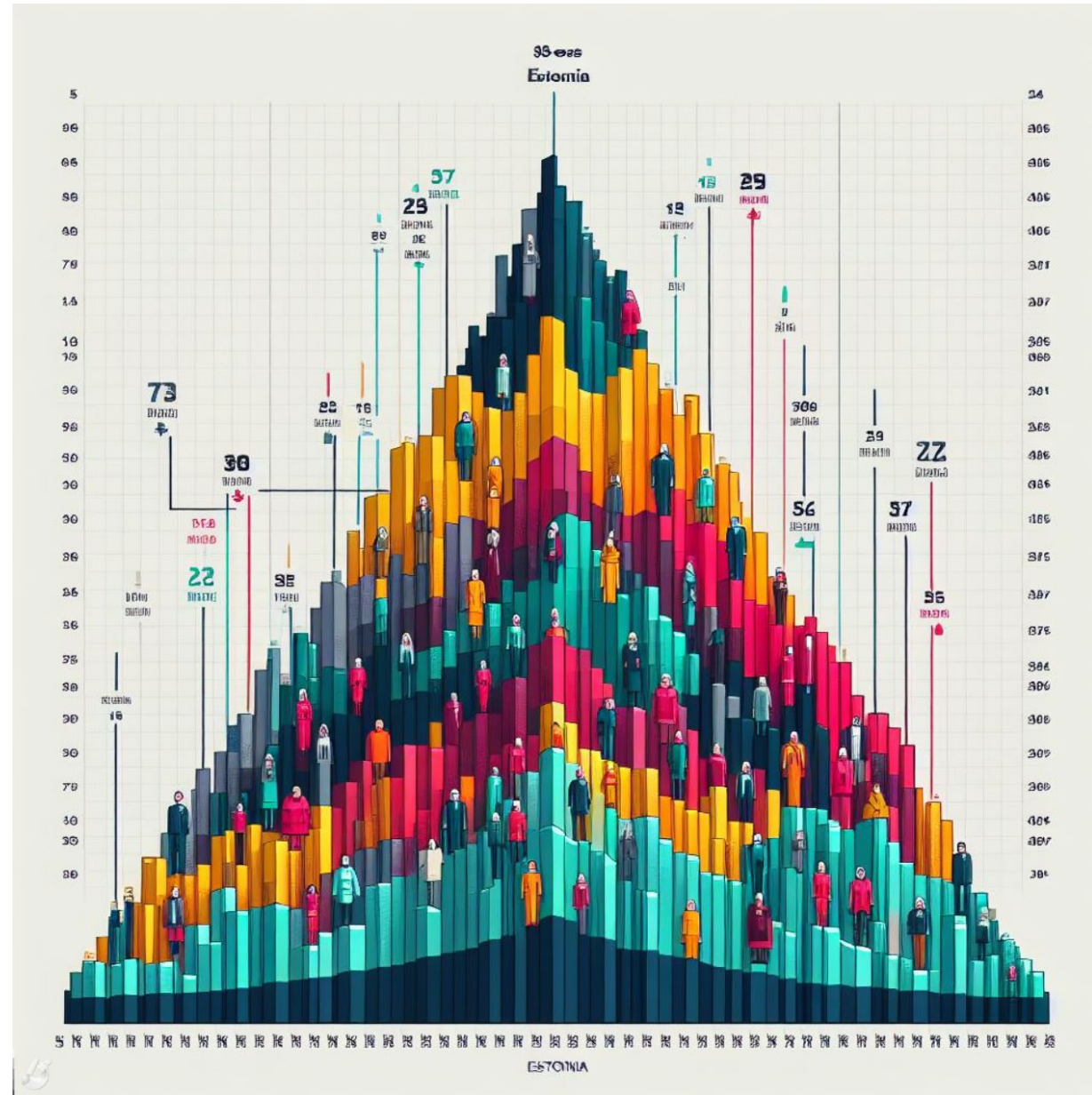
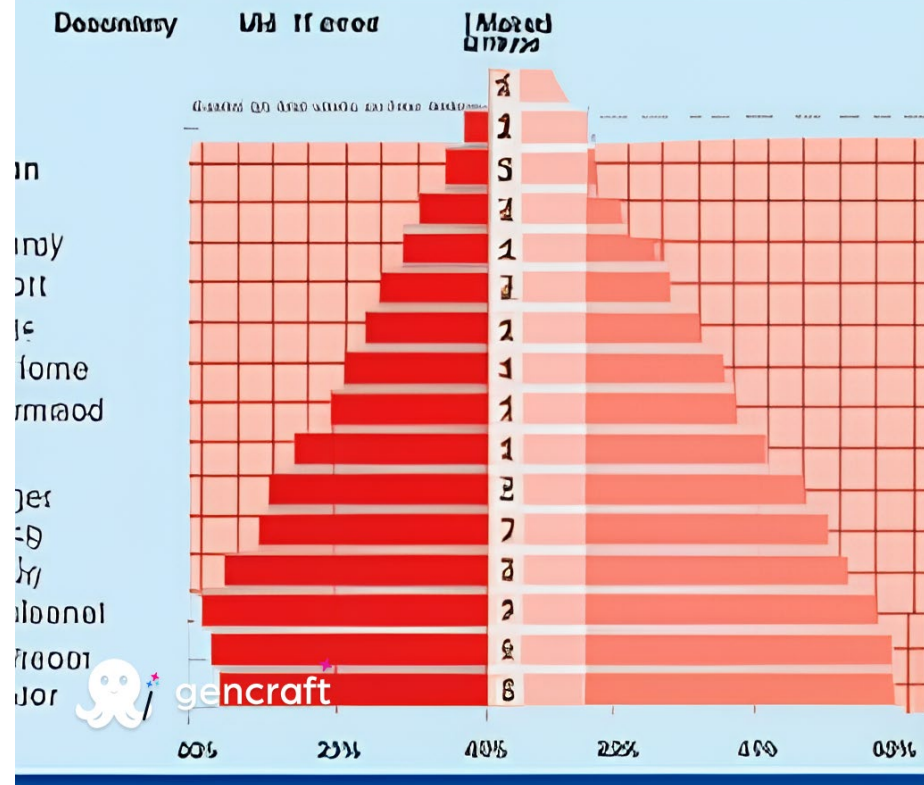
- Koosta rahvastikupüramiid
  - Copilot Designer
  - Gencraft
  - Copilot
  - Chat-GPT
  - Gemini

Estonia ▼  
2023

Population: 1,322,765



# al Numelrs Prinnulliohtulin, 001.8





# Copilot, anna mulle R-script, mis looks Eestis rahvastikupüramiidi!



**You**  
Give me R script to create population pyramid of Estonia

**Copilot**  
Your personal and company data are protected

Certainly! To create a population pyramid for Estonia using R, you can follow the steps below:

1. First, let's generate some sample data for Estonia. We'll assume age groups from 0 to 100 and randomly assign population values for both males (M) and females (F). Here's an example of how to create the data:

```
R

# Load necessary libraries
library(ggplot2)
library(plyr)

# Create sample data for Estonia (age, gender, population)
data <- data.frame(
  age = rep(1:100, 2),
  gender = rep(c("M", "F"), each = 100)
)

# Add population variable (you can adjust the population values)
data$population <- 1 / sqrt(data$age) * runif(200, 10000, 15000)

# Convert population to percentage
data$population <- data$population /
sum(data$population) * 100

AI-generated code. Review and use carefully. More info on FAQ.
```

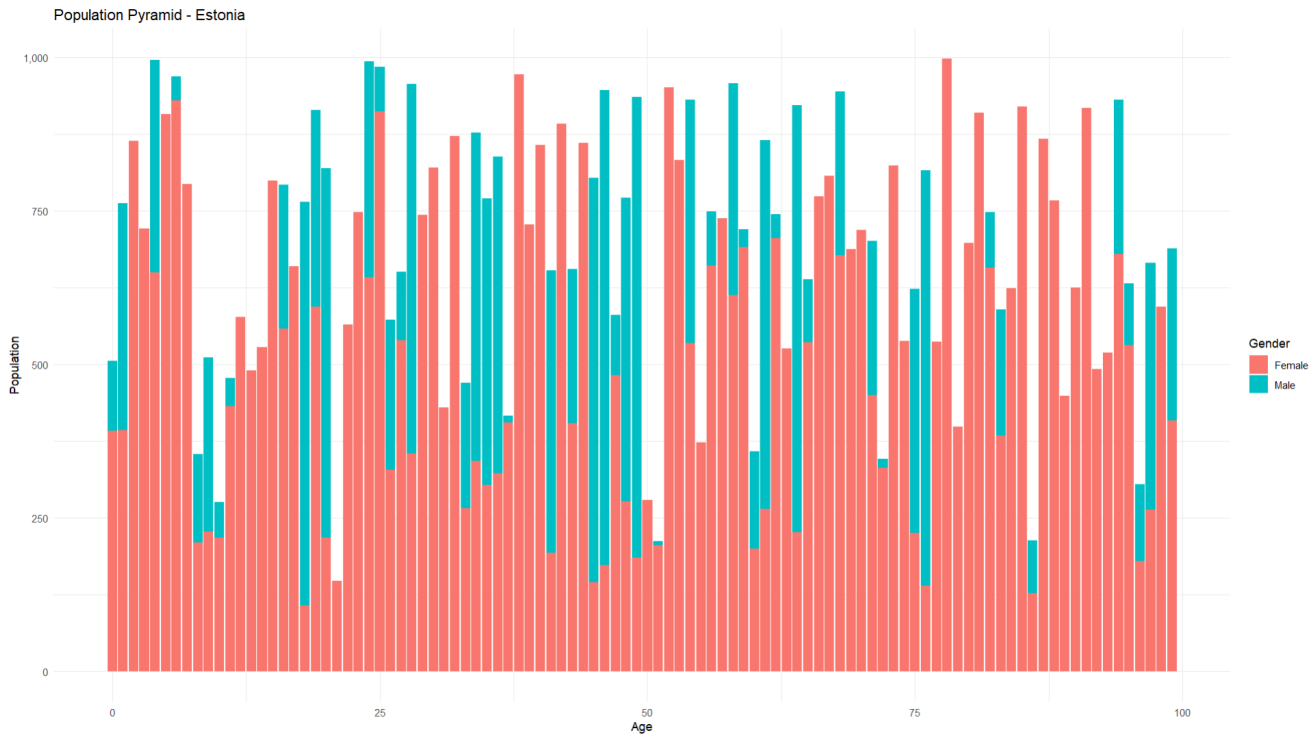
2. Next, let's create the population pyramid plot using `ggplot2`. We'll use two separate `geom_bar()` calls for each gender, with the male population values multiplied by -1 to get bars in the opposite direction. We'll also use `coord_flip()` to make it horizontal:

```
R

# Create the population pyramid plot
ggplot(data, aes(x = as.factor(age), fill = gender))
+
  geom_bar(subset = .(gender == "F")) +
  geom_bar(subset = .(gender == "M"), aes(y =
  ..count.. * (-1))) +
  scale_y_continuous(breaks = seq(-40, 40, 10),
  labels = abs(seq(-40, 40, 10))) +
  coord_flip() +
  labs(x = "Percentage of Population", y = "Age",
  title = "Population Pyramid of Estonia")

AI-generated code. Review and use carefully. More info on FAQ.
```

# Chat-GPT 3.5



AN You

Give me R script to create population pyramid of Estonia

ChatGPT

Creating a population pyramid in R typically involves using the `ggplot2` package. However, to generate a population pyramid for Estonia, you'll need access to demographic data specific to the country. Unfortunately, I don't have real-time internet access to fetch the latest data.

I'll provide you with a basic template for creating a population pyramid in R using simulated data.

You can replace the data with actual demographic information for Estonia.

R

Copy code

```
# Install and load necessary packages
install.packages("ggplot2")
library(ggplot2)

# Simulated data (replace this with actual demographic data for Estonia)
data <- data.frame(
  Age = rep(c(0:99), each = 2),
  Gender = rep(c("Male", "Female"), times = 100),
  Population = sample(100:1000, 200)
)

# Create population pyramid using ggplot2
ggplot(data, aes(x = Age, y = Population, fill = Gender)) +
  geom_bar(stat = "identity", position = "identity") +
  scale_y_continuous(labels = scales::comma) +
  labs(title = "Population Pyramid - Estonia",
       x = "Age",
       y = "Population",
       fill = "Gender") +
  theme_minimal()
```

In this example, replace the `data` dataframe with real demographic data for Estonia, ensuring it has columns for age, gender, and population size. You can obtain demographic data from official sources like Statistics Estonia (<https://www.stat.ee/>) or other reliable databases.



# Gemini



Give me R script to create population pyramid of Estonia

Show drafts



Here's the R script to create a population pyramid for Estonia:

## Code snippet

```
# Install required packages (if not already installed)
if (!require("ggplot2")) install.packages("ggplot2")
if (!require("dplyr")) install.packages("dplyr")

# Simulate data (replace with actual data source)
# You can obtain data from official sources like Statistics Estonia http
estonia_data <- data.frame(
  age_group = seq(0, 100, by = 5),
  male = rnorm(length(seq(0, 100, by = 5)), mean = 10000, sd = 2000),
  female = rnorm(length(seq(0, 100, by = 5)), mean = 9000, sd = 1500)
)

# Data wrangling with dplyr
estonia_data_tidy <- estonia_data %>%
  mutate(total = male + female) %>%
  pivot_longer(cols = c(male, female), names_to = "sex", values_to = "population")

# Define age group labels (modify based on actual data)
age_labels <- paste0(estonia_data_tidy$age_group, "-",
  estonia_data_tidy$age_group + 4) %>%
  c(tail(age_labels, 1) = "100+")

# Create
ggplot(estonia_data_tidy, aes(x = age_group, y = population, fill = sex)) +
  geom_bar(position = position_dodge(width = 0.9)) +
  scale_x_discrete(labels = age_labels) +
  coord_flip() +
  theme_minimal()

```

```
# Simulate data (replace with actual data source)
# You can obtain data from official sources like Statistics Estonia https://www.stat.ee/en
estonia_data <- data.frame(
  age_group = seq(0, 100, by = 5),
  male = rnorm(length(seq(0, 100, by = 5)), mean = 10000, sd = 2000),
  female = rnorm(length(seq(0, 100, by = 5)), mean = 9000, sd = 1500)
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age_labels <- paste0(estonia_data_tidy$age_group, "-",
  estonia_data_tidy$age_group + 4) %>%
  c(tail(age_labels, 1) = "100+")
```

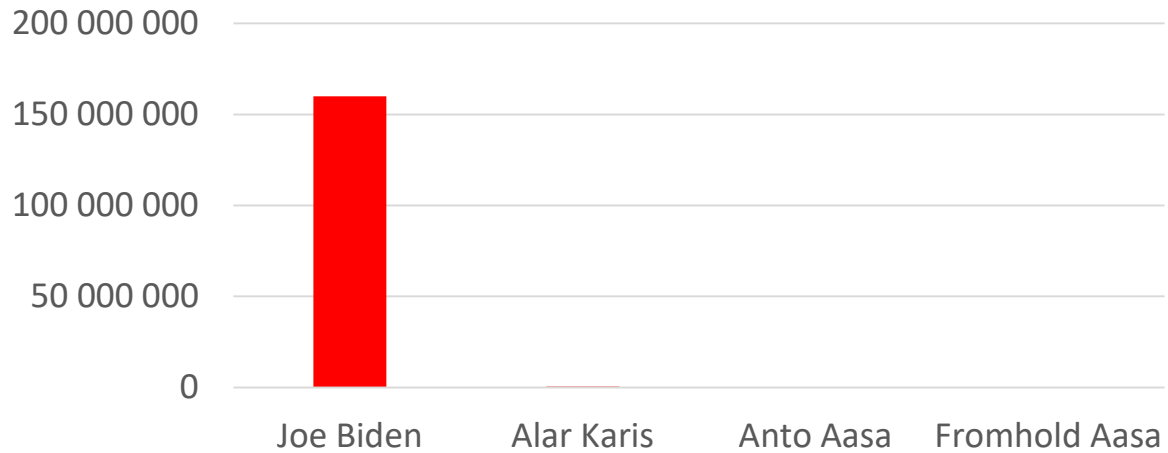
```
# Create
> ggplot(estonia_data_tidy, aes(x = age_group, y = population, fill = sex)) +
  geom_bar(position = position_dodge(width = 0.9)) +
  scale_x_discrete(labels = age_labels) +
  coord_flip() +
  theme_minimal()
> # Data wrangling with dplyr
> estonia_data_tidy <- estonia_data %>%
+   mutate(total = male + female) %>%
+   pivot_longer(cols = c(male, female), names_to = "sex", values_to = "population")
>
> # Define age group labels (modify based on actual data)
> age_labels <- paste0(estonia_data_tidy$age_group, "-",
+   estonia_data_tidy$age_group + 4) %>%
+   c(tail(age_labels, 1) = "100+")
Error: unexpected '=' in:
"
      estonia_data_tidy$age_group + 4) %>%
  c(tail(age_labels, 1) ="
```

Use code [with caution](#).

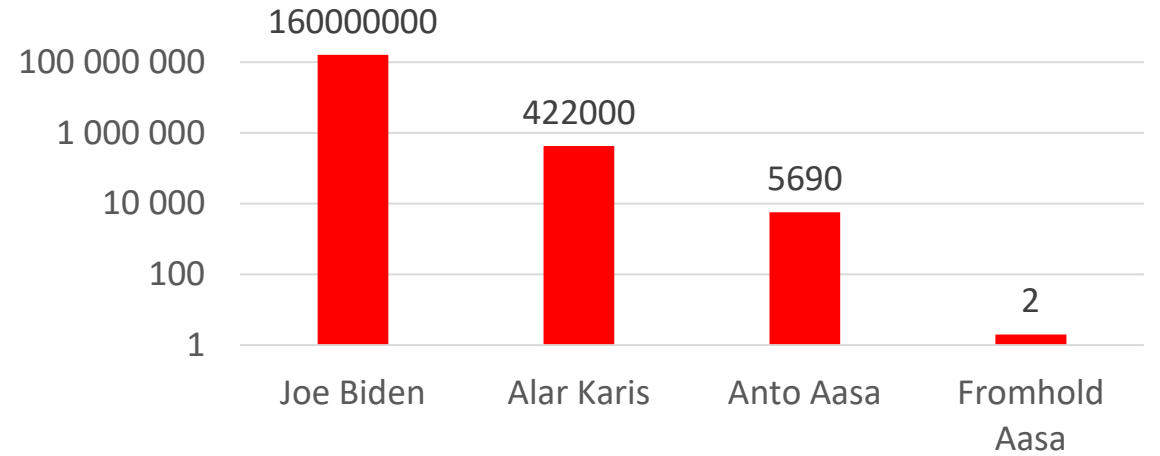


# Kelle kohta on lootust õiget vastust saada?

Google'i vasteid:



Google'i vasteid:

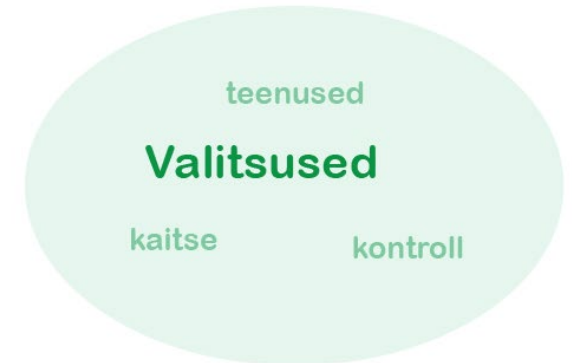




# Ohustatud rühmad?

- Vähemused => pole andmeid
- Vaesed => pole olulised

# Erinevad osapooled ei räägi



Erinevad eesmärgid



Ei teata teiste olemasolu  
Ei mõisteta teineteist

# Aitäh!

