

# **Terveysspalvelujen analytiikka**

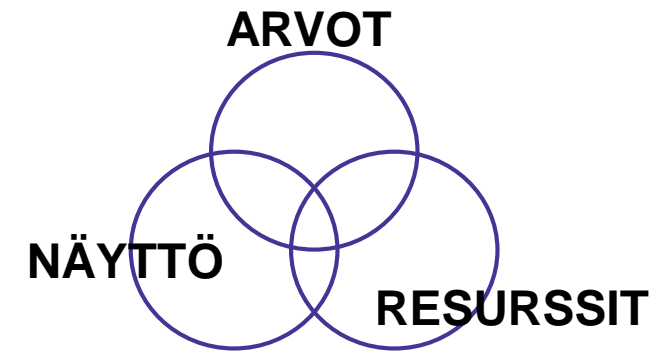
**(Healthcare Analytics Program; HeAP)**

- hankkeen lähtökohdat
- koulutusmoduuli: osa 1

*Tarmo Lipping*

# Miksi terveysdatan analytiikka?

- Terveysthuollon kustannukset karkaamassa käsistä
- Milton Roemer: **"in an insured population, a hospital bed built is a filled bed"** ([https://en.wikipedia.org/wiki/Roemer%27s\\_law](https://en.wikipedia.org/wiki/Roemer%27s_law) )
- Tarvitaan näyttöön perustuvaa hoitoa
- Tarvitaan yksilöityä hoitoa
- Potilaiden / asiakkaiden osallistaminen
- Uudet datavarannot ja analyysimahdollisuudet



Näihin asioihin voidaan vaikuttaa hyödyntämällä terveysdatan analytiikkaa

**=> Tarvitaan uutta osaamista ja uusia osaajia!**

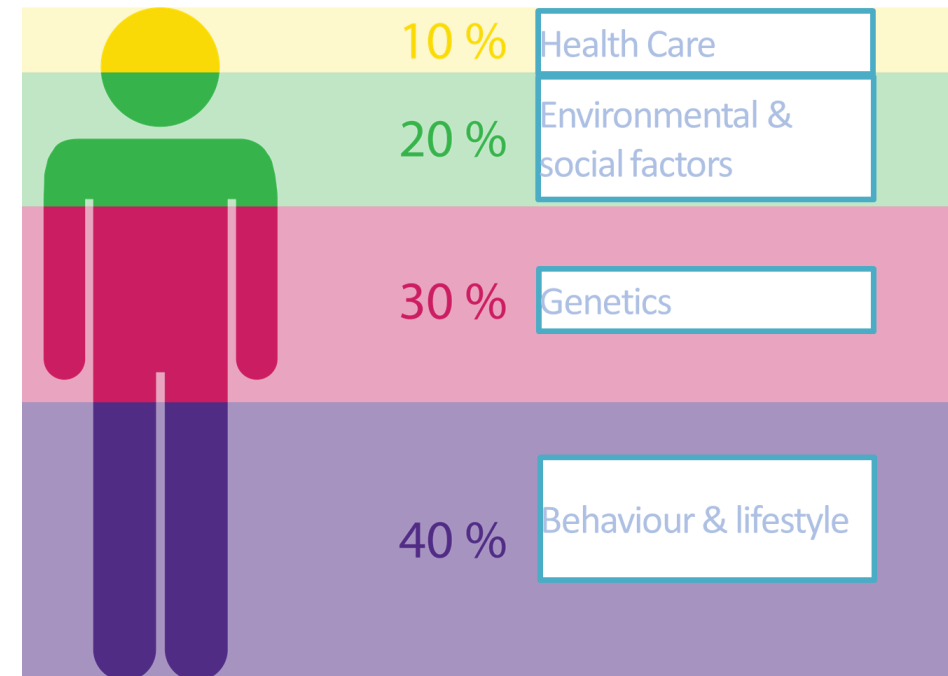
# HeAP-hanke

- Tavoitteena luoda ja pilottitoteuttaa **terveystiedon analyytikon koulutusmoduuli** (30 + 20 op)
- Toteuttajina hankkeessa **Satakunnan ammattikorkeakoulu (SAMK)**, **Tallinnan teknillisen yliopiston (TTÜ) eHealth-laboratorio** sekä **Tampereen teknillisen yliopiston (TTY) Porin yksikkö**.
- **Suunnittelu** v. 2017 kesällä; **teoriaosuuden (30 op) toteutus**: syksy 2017 – kevät 2018; **analytiikan pilotointi (20 op)**: kevät–kesä 2018
- Teoriaosuus:
  - *Terveysteknologian perusteet (10 op; eHealth laboratorio, TTÜ)*
  - *Terveysanalytiikka (10 op; TTY)*
    - *Decision support in healthcare*
    - *Statistical analysis and decision support technologies*
  - *Hyvinvointivalmennus (10 op; SAMK)*
    - *Service Design and Case Management*
    - *Client Involvement and Smart Services*

# Terveysteknologian perusteet

## Luennoitsijat ja aiheet:

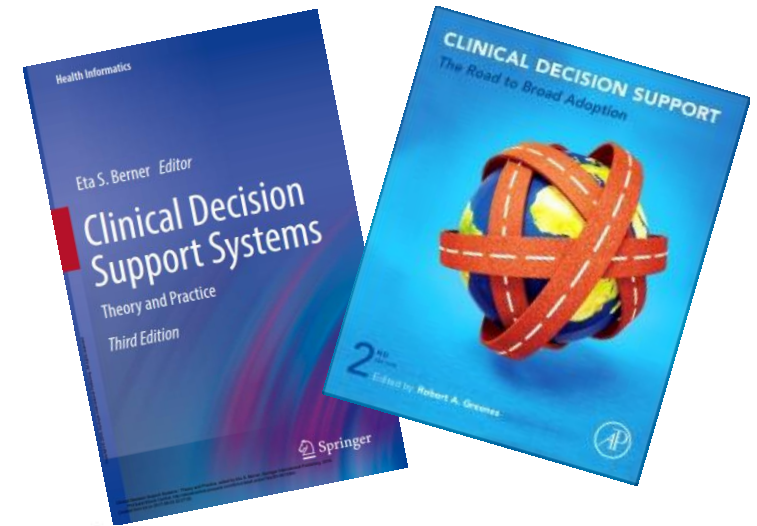
- Peeter Ross, MD, PhD
  - Johdanto terveysteknologian perusteisiin
  - eTerveydenhuollon investointien arviointi ja seuranta
- Madis Tiik (MD, PhD)
  - Terveydenhuollon uudet mallit ja trendit: *From Health 1.0 to Health 4.0*
- Doris Kaljuste
  - Telelääketiede ja datan käyttöoikeudet
- Julia Vohu
  - Terveysdatan hallinta
- Eero Merilind (MD, PhD)
  - *Estonian GP system*
- Helen Tiits
  - Data-analytiikka terveydenhuollossa



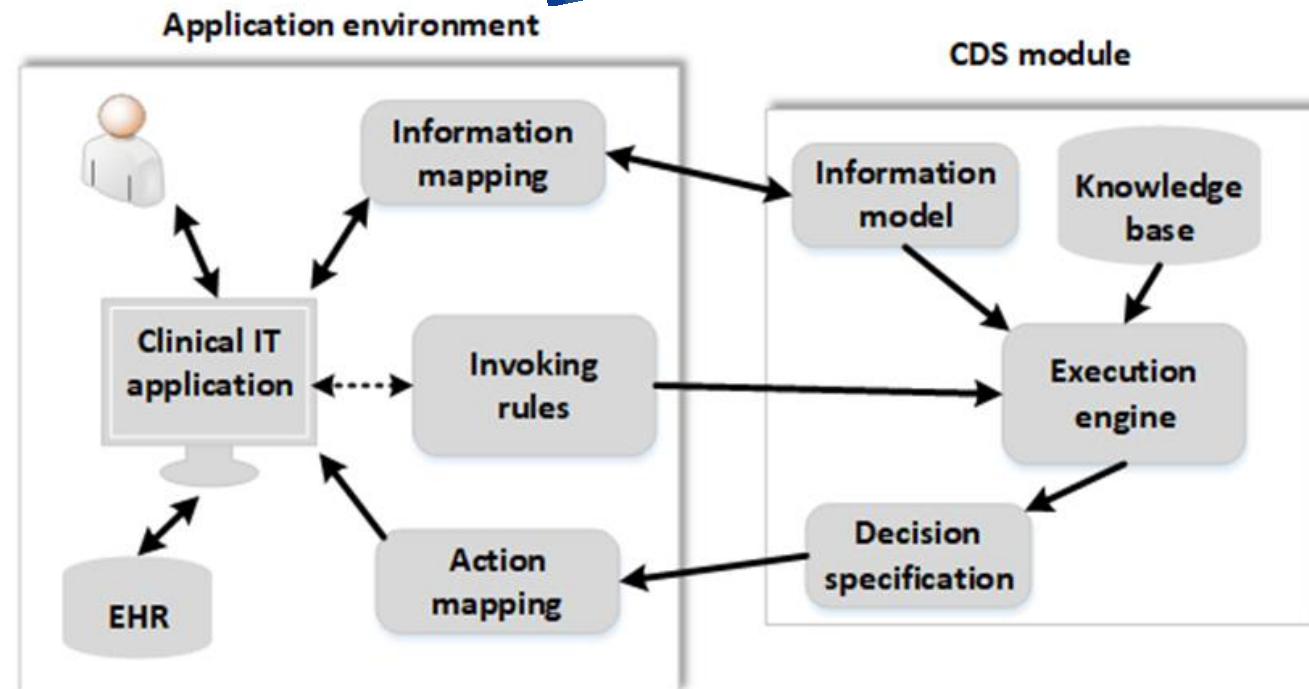
# Päätöksenteon tuki terveydenhuollossa

Clinical Decision Support Systems (CDSS) käsittää laajan kirjon erityyppisiä sovelluksia:

- Hyvinvointivalmennus (terveyshyötyarvio)
- Osasto-/työympäristökohtainen datankeruu ja analyysi (esim. laadun tarkkailu)
- CPOE (*Computer-based Provider Order Entry*)
  - *order sets*
  - *drug-drug adverse effects*
  - *drug-allergy adverse effects*
- High-end ja erikoissovellukset esim. teho-osastoympäristö



CDSS modulaarinen toteutus →



# CDSS: käyttönoton pullonkaulat

CDS-järjestelmien tehokkuudesta  
useita meta-analyysyjä

**Voidaan arvioida:**

- *kliinisiä tuloksia*
- *palveluprosesseja*
- *työn tehokkuutta*
- *potilastyytyväisyyttä*
- *taloudellisia vaikutuksia*

Bright TJ et al. Effect of Clinical Decision Support Systems.  
Annals of Internal Medicine, 2012;157 pp29-43

( <http://annals.org/aim/article/1206700/effect-clinical-decision-support-systems-systematic-review> )

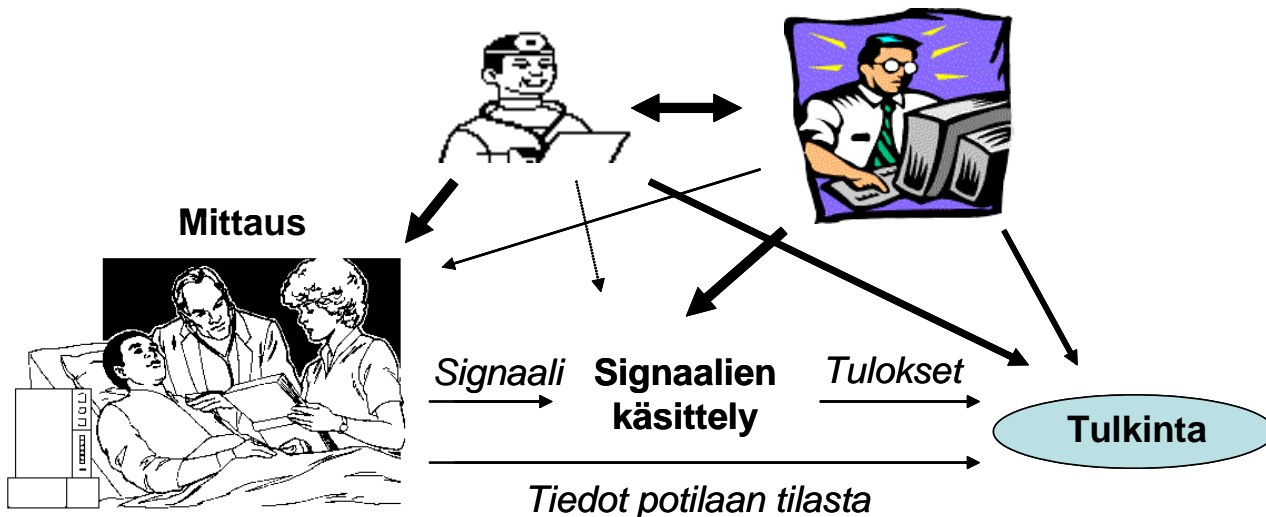
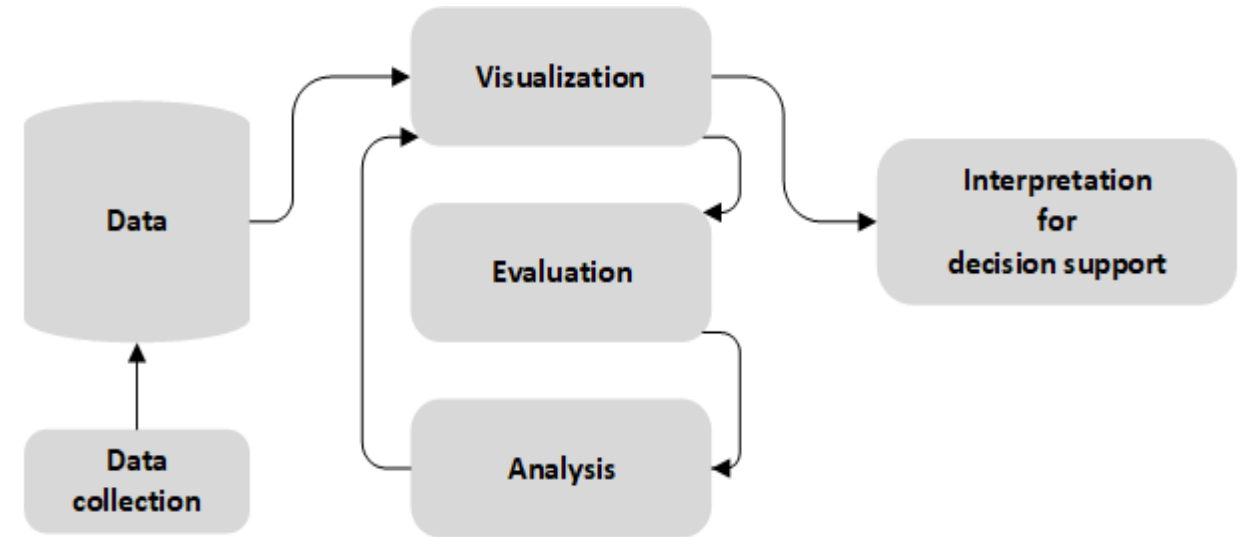
## BOX 6.1 TEN COMMANDMENTS FOR CLINICAL DECISION SUPPORT

1. **Speed is everything:** A routine goal is subsecond screen flips, since providers will not tolerate much longer than that, and minimizing the number of screens used is also important.
2. **Anticipate needs and deliver in real time:** One example is showing the potassium lab values when a drug that lowers potassium is prescribed.
3. **Fit into the user's workflow:** If a suggestion seems to come out of left field or at a time when the user is focused on another issue, it is much less likely to be heeded.
4. **Little things can make a big difference:** In the prototypical example, the decision regarding how a default is set can have an enormous impact on the frequency that a provider will choose a specific action. Generally, it is good informatics practice to set the default to an action that is most likely to be correct.
5. **Physicians resist stopping:** Here, the point is that, when you suggest that a physician not take an action but fail to provide an alternative, the initial action is likely to be continued even if it is virtually certain to have little or no yield.
6. **Changing direction is fine:** The corollary to point 5 is that when one does suggest a superior clinical alternative, physicians are fairly willing to accept the recommendation.
7. **Simple interventions work best:** Here, the point is that the level of success has been highest for straightforward guidelines and much lower for more complex guidelines, nearly all of which have required substantial adaptation before they could be computerized.
8. **Ask for additional information only when you really need it:** Implementation of many guidelines or pieces of clinical decision support has required some information, such as the weight for renal dosing, which was not already available. Although clinicians eventually supplied the weight in most instances, even getting this small piece of clinical information routinely required an effort, which seemed completely disproportionate. Getting multiple pieces of data would undoubtedly prove even harder.
9. **Monitor impact, get feedback, and respond:** For most of the pieces of clinical decision support implemented, at least some additional changes are required. Failure to make multiple incremental changes can result in lack of benefit, and can even promote errors (Koppel et al., 2005).
10. **Manage and maintain your knowledge-based systems:** This is related to the preceding tenet, but it is useful to routinely track how often each piece of decision support is triggered, and try to ensure that there is an "owner" for each rule, and that each will get periodic follow-up to make sure it still applies.

# Tilastollinen analyysi ja päätöksenteon tuen teknologiat

Tavoitteena antaa yleiskuva datan keruun ja analysoinnin prosessista, sen eri **vaiheista, menetelmistä** ja **työkaluista**.

Prosessi on usein iteratiivinen sisältäen tulosten **visualisoinnin, arvioinnin** sekä **analyysin**



Terveysdatan keruu, analyysi ja tulosten tulkinta vaativat sekä **hyvinvoinnin/lääketieteen** että **analytiikan** osaamista.

Tulokset riippuvat tarkasteltavan ilmiön lisäksi myös käytettyjen menetelmien ominaisuuksista ja rajoitteista