We have a small problem…

» We lack visibility on current morbidity trends
» We are treating too late in the disease course
» We are caring for one disease at a time
» We’re not sure which intervention really works
» We often provide expensive futile care
» Patients get lost between the care silos
» Patients are ignoring, refusing our advice
Demand (aging, morbidity)
Technology Cost
Patient Expectations
Health staff

Machine Learning and Artificial Intelligence

- NZ (100%)
- NOR (99%)
- SWE (99%)
- NETH (98%)
- UK (98%)
- AUS (92%)
- GER (84%)
- US (84%)
- CAN (73%)
- SWIZ (54%)

Source: 2006-2016 Commonwealth Fund International Health Policy Survey of Primary Care Physicians.

A time opportune
How this data can transform healthcare systems

SURVEILLANCE
Situational awareness, priority setting

RISK STRATIFICATION, PREVENTION-DRIVEN
Allowing proactive prevention

EFFECTIVE, EFFICIENT CARE
Prevent waste, increase effectiveness
The need for new surveillance tools

1. Timely (near real-time?)
2. Passive (rather than labor-intensive surveys)
3. Diverse (not single domain, morbidity + risk factors)
4. Trustworthy (validated cross-validated)
5. Comparable (between countries, regions, cultures etc.)
6. Ongoing (rather than interrupted)
7. Credible (acceptable by all stakeholders)
8. Affordable (to lower income countries)
9. Sustainable (not dependent on a single entity)

Surveillance: NCD risk factors

At age 50:
>50% have >2 risk factors


Age

25-34  35-44  45-54  55-64  65-74  75+

0%  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

[Diagram showing prevalence of NCD risk factors across different age groups.]
**Surveillance: Kidney disease**

**Dialysis + Renal transplant rates, Israel (Clalit)**

**Surveillance: Treatment Overuse**

In Israel -
**Chronic sleep medications use:**
- 33% at age 75
- >50% at age 85
How this data can transform healthcare systems

**SURVEILLANCE**
Situational awareness, priority setting

**RISK STRATIFICATION, PREVENTION-DRIVEN**
Allowing proactive prevention

**EFFECTIVE, EFFICIENT CARE**
Prevent waste, increase effectiveness
Risk Assessment: proactive prevention

By time

Asthma related PCP visits per 100 PCP visits, age 2-15 weekly proportions averaged years, 4 consecutive years

“September Epidemic”
Same week, every year

Individual predictive prevention

By person
Risk stratification for proactive prevention

5-year deterioration rates to RRT among CKD stage 3 patients, Clalit

100-fold
RRT increased risk!

How this data will transform NCD control

SURVEILLANCE
Situational awareness, priority setting

RISK STRATIFICATION, PREVENTION-DRIVEN
Allowing proactive prevention

EFFECTIVE, EFFICIENT CARE
Prevent waste, increase effectiveness
Lack of specialist surgeons ‘putting patients at risk’, senior doctors warn

'There is no doubt that around the country people are dying or coming to serious harm due to the lack of interventional radiology provision in their area.'
Prof. Ran Balicer  
April 2018  
WHO Meeting on NCDs, Sitges

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### Care Personalized Tailoring

**i-PREDICT NH Thera**  
Intensive vs. Non-intensive Hypertension Treatment

#### ENTER PATIENT’S DATA

<table>
<thead>
<tr>
<th>Age</th>
<th>Sex</th>
<th>Smoking Status</th>
<th>eGFR (mL/min/1.73 m2)</th>
<th>Total cholesterol (mg/dL)</th>
<th>HDL cholesterol (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>76</td>
<td>Female</td>
<td>Former Smoker</td>
<td>47</td>
<td>212</td>
<td>106</td>
</tr>
</tbody>
</table>

**Cardiovascular disease (clinical or subclinical)**

#### RESULTS

<table>
<thead>
<tr>
<th>Condition</th>
<th>Severity Rank</th>
<th>Adverse events due to intensive treatment*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Myocardial Infarction (INN=364)</td>
<td>1.6%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Acute Decompensated Heart Failure (INN=113)</td>
<td>2.2%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Stroke (INN=1442)</td>
<td>3.9%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Cardiovascular Death (INN=101)</td>
<td>5.5%</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

*Five-year period of 5 years

#### RECOMMENDATION

**Do Not Treat BP Intensively**  
Syndromic blood pressure targets  
(idio-mutation)  
The recommendation is based on the ratio between the individual NHTh and NHTh, weighted by severity (risk) disposed by the different versions.  
The recommended actions are averages of ratios given by several physicians. You can change the ratios and update the recommendation.

#### UPDATE RECOMMENDATION

with new severity ranks
An leapfrog opportunity

- Increase access
- Increase effectiveness
- Improve integration
- Improve equity
- Reduce errors
- Reduce waste
- Reduce costs
Key: International collaboration

How can innovative data-driven approaches help tackle NCDs?

The technical meeting on 10 March 2015 in Tel Aviv, Israel, centered around unstable complexes in the prevention and control of Noncommunicable Diseases (NCDs), and addressed how innovative data-driven approaches can assist in tackling them.

Two key types of complexities were discussed:

- The increasing trend of co-existing multiple risk factors for NCDs;
- Complexities associated with NCD multimorbidity, which is becoming the norm among middle-aged adults.

Clalit Research Institute, the newly designated WHO Collaborating Centre for NCD Research, Prevention and Control that co-hosted the meeting, shared data and insights on the prevalence of these two phenomena, as well as hands-on experience in addressing them using data-driven innovative methods. Experts from ten Member States shared their experience and knowledge, and expressed the need for a new set of integrated tools to address these emerging issues.

Thank you!

“It is not enough to do your best; you must know what to do, and then do your best.

W. Edwards Deming