The Prevention of Chronic Non-Communicable Diseases: Generating Evidence and Supporting Decision Making for Public Policy

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Overview of talk

The problem – using diabetes as an example

Generating evidence
  ◦ Policy formulation and implementation
  ◦ Impact on outcomes

Supporting policy decision making
  ◦ Use of modelling
The problem

USING DIABETES AS AN EXAMPLE
Prevalence estimates of diabetes, 20-79 years (%), 2013

Map 2.1 Prevalence* (%) of diabetes in adults (20-79 years), 2013

Source: IDF Atlas, 6th edition
Figure 2.1 Prevalence* (%) of diabetes (20-79 years)
by IDF Region, 2013 and 2035

Source: IDF Atlas, 6th edition

*comparative prevalence
Diabetes related mortality as a percentage of all deaths, by region, 2013

![Bar chart showing diabetes-related mortality by region]

Attributable mortality based on relative risk of death in people with diabetes

Source: IDF Diabetes Atlas 2013 (www.diabetesatlas.org)
Percentage of total deaths due to diabetes, MENA region

Percentage of all-cause mortality due to diabetes by age (20-79 years) and sex:

- Women
- Men
## Risk factors for Type 2 diabetes

<table>
<thead>
<tr>
<th>Modifiable risk factors</th>
<th>Non-modifiable risk factors</th>
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<tbody>
<tr>
<td>Overweight &amp; obesity</td>
<td>Age</td>
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<tr>
<td>Physical inactivity</td>
<td>Sex</td>
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<td>Dietary factors</td>
<td>Family history type 2 diabetes</td>
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<td>Alcohol consumption</td>
<td>Genes/genetic markers</td>
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<td>Tobacco smoking</td>
<td>Previous gestational diabetes</td>
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<td>Previously identified glucose intolerance (IFG &amp; IGT)</td>
<td>Ethnicity</td>
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<td>Prenatal and early life influences</td>
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BMI, waist circumference, and relative risk of incident type 2 diabetes

Source: Am J Clin Nut 2005;81:555
Reduced risk of Type 2 diabetes in individuals at high risk

- 17 studies
- Reduced risk in intervention group
  - Life style intervention: 0.51 (0.44 – 0.60)
  - Oral DM drugs: 0.70 (0.62 – 0.79)
- Numbers need to treat (over 3 to 6 years)
  - Life style 6.4
  - Pharma 10.8

Gillies et al BMJ 2007;334:299-302
Body mass index and waist circumference in women (≥ 25 yrs) in Barbados

BMI > 30: 43.4% (39.5, 47.3)
Waist > 88cm: 61.7% (58.0, 65.2)

Source: Barbados Health of the Nation Study, 2014
High Risk versus population wide approaches to prevention
Examples of Potential Proximal and Distal Interventions to Reduce the Burden of Type 2 Diabetes

- **Fiscal policy to support access to healthy food**
- **Changes to transport infrastructure**
- **Changes to internal built environment**
- **Worksite behavioural interventions**
- **Earlier detection by screening**
- **Diet, physical activity, and drug intervention for high risk groups**
- **Behavioural interventions and medication to lower glucose levels**

**Distal (healthy public policy)**
- Changing the environment

**Mid (prevention)**
- Treating individuals at high risk

**Proximal (treatment/prevention of complications)**

Includes public policy recommendations to reduce:

- Smoking
- Excess alcohol
- Unhealthy diet
- Physical inactivity

Noted that:

A guide based on current evidence and intended to act as a basis to expand the evidence base.

Even those policy interventions thought to be highly cost effective not assessed for specific country contexts.
Generating evidence to guide policy implementation

EXAMPLE OF THE 2007 PORT OF SPAIN DECLARATION ON NCDS
Port of Spain Declaration on NCDs

15 Point Declaration, 27 commitments

Including:

◦ Multi-sectoral national NCD Commissions
◦ Risk factor reduction, including implementation of FCTC
◦ Health Care, quality and coverage
◦ Surveillance
◦ Caribbean Wellness Day
Evaluation of the Port Spain Declaration 7 years on

- Overall goal:
  - Review progress and identify barriers and facilitators on policy development & implementation
  - Assess health impact
  - Assess political impact
  - Identify potential revenue sources to further support NCD prevention and control
  - Guide further implementation of effective policy measures

- Multi-partner study

- Funded by Canadian International Development Research Centre (IDRC)
Seven country case studies

Objectives:

A. *Reported* formulation & implementation vs *effective* formulation & implementation

B. Use of multi-sectoral approaches

C. Factors associated with success and its lack in achieving (a) and (b)

D. Any evidence on health impact

Mixed methods:

- Policy document review
- Key informant interviews
- Review of available health data
Identifying causal factors in policy formulation and implementation – the need for theory

E.g.s

Multiple streams theory
- Problems, policies, politics, role of ‘policy entrepreneurs’

Advocacy coalition framework
- Interactions of different interest groups to influence policy
Realist approach to policy evaluation

Asks: ‘What works for whom in what circumstances and in what respects, and how?’
◦ (Does not ask: what works, or does this programme work?)

Aims to identify: Context/Mechanism/Outcome configurations

Starts with theory and ends with refined theory
Realist evaluations should:

Show what combinations of attributes (contexts and mechanisms) need to be in place to achieve particular outcomes

Contribute to developing theory to guide successful policy implementation in different settings
Relating success in policy implementation to health outcomes

Treating policy interventions as ‘natural experiments’. Examples of possible non randomised designs

- ‘Before and after’ evaluations, with good data on how the intervention was implemented
- ‘Step wedge’ - if similar interventions in different settings, implemented sequentially
- Multi-centre / country studies, where a measure of policy compliance is related to health outcomes
- Time series analysis - when the policy intervention is implemented at a specific time point or period.
Admissions for acute coronary syndrome in Scotland and banning smoking in public places

17% fall, compared to 3% per year over previous 10 years

Figure 1. Admissions for Acute Coronary Syndrome According to Month before and after Smoke-free Legislation.
Using evidence to supporting
decision making for healthy
public policy
Approaches to promoting greater use of evidence in for healthy public policy making

- Prepare and communicate data effectively, simply and persuasively
  - Policy briefs
  - 30 second sound bite
- Personalise messages
  - Case studies of policy initiatives
  - Human stories
- Use epidemiological and systems models to assess the potential impact of different policy options
  - Involve policy makers in model development and choice of policy options
  - Provide costed incremental options, and cost of not taking action

Based on: Bull WHO 2012;90:847
Building a diabetes epidemiological model
Limitations of IDF Diabetes projections

• Only use data on urbanisation and age /sex

• Do not explicitly take into account trends in major diabetes risk factors so may be “conservative”

• Every time the IDF update the diabetes atlas projections rise!
Developing a simple Model for use in data poor settings: Desired features

- Simple to implement and use
- Few data requirements
- Transparent, easy to understand and challenge assumptions
- Platform for economic analysis and policy scenario analysis, including prevalence forecast.
# Key Parameters

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<tbody>
<tr>
<td>Population (structure and trend)</td>
<td>Data</td>
</tr>
<tr>
<td>Obesity (prevalence and trend)</td>
<td>Data</td>
</tr>
<tr>
<td>Smoking (prevalence and trend)</td>
<td>Data</td>
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<tr>
<td>Diabetes incidence</td>
<td>DISMOD/Other</td>
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<tr>
<td>Diabetes prevalence</td>
<td>Data</td>
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<tr>
<td>Diabetes Specific mortality</td>
<td>DISMOD/Other</td>
</tr>
<tr>
<td>General mortality</td>
<td>Data</td>
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*Slide from Prof J Critchley*
FORECASTING T2DM
TUNISIA, 1997 - 2027

Diabetes prevalence, Men & Women

Saidi et al. BMC Public Health (in press) 2014

Slide from Prof J Critchley
Using systems thinking and modelling to engage policy makers
Policy option appraisal for complex systems

Health outcomes arise in complex systems
  Nonlinear relationships
  Time delays
  Feedback loops
  A system can not be understood simply as the sum of its parts

Policy option appraisal *should* be improved by explicitly taking into key features of the system

Group model building is a well defined approach to engage stakeholders in systems thinking and model building
A 'whole of system' approach to compare options for CVD interventions

In summary
Limited evidence base

Evaluate and learn from current initiatives

Realist approaches acknowledge importance of context, while still aiming for generalizable theory
Researchers promoting use of evidence in policy making

- Many factors
- Role for modelling
  - ‘What if’ scenarios
  - Shared understanding of the system generating the problem
Thank you!