Innovations in the field of diabetes

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Where are we today on the global level?
Map: IDF Regions and global projections of the number of people with diabetes (20-79 years), 2011 and 2030

<table>
<thead>
<tr>
<th>REGION</th>
<th>2011 MILLIONS</th>
<th>2030 MILLIONS</th>
<th>INCREASE %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>14.7</td>
<td>28.0</td>
<td>90%</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>32.8</td>
<td>59.7</td>
<td>83%</td>
</tr>
<tr>
<td>South-East Asia</td>
<td>71.4</td>
<td>120.9</td>
<td>69%</td>
</tr>
<tr>
<td>South and Central America</td>
<td>25.1</td>
<td>39.9</td>
<td>59%</td>
</tr>
<tr>
<td>Western Pacific</td>
<td>131.9</td>
<td>187.9</td>
<td>42%</td>
</tr>
<tr>
<td>North America and Caribbean</td>
<td>37.7</td>
<td>51.2</td>
<td>36%</td>
</tr>
<tr>
<td>Europe</td>
<td>52.6</td>
<td>64.0</td>
<td>22%</td>
</tr>
<tr>
<td>World</td>
<td>366.2</td>
<td>551.8</td>
<td>51%</td>
</tr>
</tbody>
</table>
Innovation in health care

diabetes?

• Innovation turns the future of health in the present
MEDICINES IN DEVELOPMENT FOR DIABETES

BIOPHARMACEUTICAL RESEARCH COMPANIES ARE DEVELOPING

180 MEDICINES TO TREAT TYPE 1 & TYPE 2 DIABETES

INCLUDING 128 FOR DIABETES

AND 52 FOR DIABETES-RELATED CONDITIONS

Source: PhRMA, 2014 Medicines in Development for Diabetes
Big changes in diabetes care

- Prevention:
  - Lifestyle changes, no therapies

- Disease management:
  - Therapy:
    - New ADO’s: DPP4-inh, SLGT2 inh, …
    - Injections with incretines
    - New and better insuline
    - Pump therapy and ctu. monitoring systems
  - Monitoring
    - without needles
  - End stage phases
Big changes in diabetes care

- Prevention:
- Disease management:
- End stage phases:
  - Eye disease:
    - maculopathy: injections
  - Cardiovascular disease:
    - treatment of risk factors, stenting, dilatations, …
  - Kidney disease:
    - better medication (Sartanes, ACE-inh, better dialysis, …)
- Diabetic Foot
  - new consensus and implementation programs
But, do we have better diabetes care?

Source: Centers for Disease Control and Prevention (CDC), National Health and Nutrition Examination Survey (NHANES)
But, do we have better diabetes care?

**DIABETES COMPLICATIONS ARE COSTLY**

IN THE UNITED STATES, DIABETES IS THE LEADING CAUSE OF kidney failure, non-traumatic lower limb amputations, and new cases of blindness among adults. The rate of amputation is 10 times higher in people with diabetes.

**YEARLY $87,000**
A single year of hemodialysis for kidney failure patients

**NEARLY $40,000**
The average cost of amputation surgery

**AVERAGE $10,000**
The average cost of a hospital stay

**IN CONTRAST,**
A YEAR OF MEDICINES AND SUPPLIES that can help a patient avoid those outcomes typically averages

**$4,110**

Source: American Diabetes Association, U.S. Renal Data System, Amputee Coalition, Agency for Healthcare Research and Quality
Future on Health economical level?

**Diabetes Costs Society**

- **$245 Billion** Total Cost for Diabetes in the United States
- **$69 Billion** Indirect Medical Costs
- **$176 Billion** Direct Medical Costs

Medical expenditures are 2.3 times higher in people with diabetes.

Source: American Diabetes Association
Future on Health economical level?

Improve adherence to diabetes medications could result in:

- 1,082,000 fewer emergency room visits
- 618,000 fewer hospitalizations annually
- $8.3 billion in potential annual savings

Source: Health Affairs
**Table 4.1.** Mean health expenditures due to diabetes per person with diabetes by income group, R=2*

<table>
<thead>
<tr>
<th>INCOME GROUP</th>
<th>USD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2011</strong></td>
<td></td>
</tr>
<tr>
<td>High-income</td>
<td>5,103.92</td>
</tr>
<tr>
<td>Upper-middle income</td>
<td>760.88</td>
</tr>
<tr>
<td>Lower-middle income</td>
<td>142.71</td>
</tr>
<tr>
<td>Low-income</td>
<td>45.09</td>
</tr>
<tr>
<td><strong>2030</strong></td>
<td></td>
</tr>
<tr>
<td>High-income</td>
<td>5,006.76</td>
</tr>
<tr>
<td>Upper-middle income</td>
<td>767.22</td>
</tr>
<tr>
<td>Lower-middle income</td>
<td>140.85</td>
</tr>
<tr>
<td>Low-income</td>
<td>46.30</td>
</tr>
</tbody>
</table>

*See Glossary
So, what is next?

Failure to address basic risk factors, appropriately manage those affected, engage patients in self-management, and coordinate care across settings, will only lead to worse outcomes and higher health care costs.
Interlocking interactions, the diffusion of innovations in health care

Louise Fitzgerald, Ewan Ferlie, Martin Wood and Chris Hawkins

ABSTRACT

This article aims to provide a reassessment of the processes of diffusion of innovations into organizations, based on new empirical data. The focus of the article is the latter stages of the diffusion process. The article draws on the results of two studies, which examined the diffusion of innovations in health care in the UK. These projects were a matched pair of qualitative studies, using purposeful selections of comparative case studies. The results demonstrate the ambiguous, contested nature of new scientific knowledge. The highly interactive nature of diffusion, with active adopters is illustrated. There is no evidence of a single adoption decision. The science is socially mediated. The features of context and of actors interlock to influence diffusion.

KEYWORDS

context • diffusion • health care • innovation • professionals
Models in US, Mexico, India

- **Pro Mujer, in Mexico**, integrates health and financial services for low-income women. For instance, it provides diabetes screenings, education, and other health services at reduced cost to women who attend monthly microloan repayment meetings.

- **ClickMedix**, which operates in all three countries, provides virtual medical consultations to vulnerable and rural patient populations. The electronic platform enables health workers to serve more patients while lowering costs.

- **The YMCA Diabetes Prevention Program in US** uses existing community-based centers to reach patients, coordinating exercise and providing health education, nutritional support, and individual counseling at YMCA sites. It has been expanded through results-based, add-on payments made by UnitedHealthcare and Medicaid. Depending on an individual’s attainment of weight-loss goals and class attendance, the program receives $175 per person per session on average. These payments have allowed the YMCA to offer the program to people who otherwise could not afford it or who are not covered by a participating insurer.
Policy Reforms to Reduce Barriers
The authors identified financial, institutional, and regulatory policy barriers that have hindered the diffusion of these and other successful care innovations:

Financial barriers. Across the three case study examples, financial barriers proved to be most critical. “There was a poor fit between the new models of care and many existing payment policies,” the authors note.

Institutional barriers. Pro Mujer in Mexico is dealing with issues related to health services regulation under the finance ministry, as its diabetes program is operated in conjunction with financial services outside the traditional health system.

In the U.S., the fragmentation of public financing across different agencies, such as CMS for diabetes care and the Centers for Disease Control and Prevention for community initiatives, is a complicating factor.

In India, meanwhile, the state-based nature of regulation and financing “complicates the nationwide adoption of new care models,”

Regulatory barriers. In Mexico, the Pro Mujer program found a lack of clarity about which agency had jurisdiction over the program. In the U.S., differing state laws created challenges related to licensing and practicing medicine across state lines. Regulatory barriers were relatively low in India.
The next step forward in improving the quality of care is to financially support patient-centered outcomes and care coordination."
E health projects

1.7. Projects related to diabetes

AP@home
The main goal of AP@home (www.apatbe.eu) is to improve treatment of patients with diabetes at home. The researchers will build and evaluate an artificial pancreas (AP).
Duration: 2010-2014

Commodity12
COMMODOITY12 (www.commodity12.eu) will build a platform for continuous monitoring of diabetes. The project will focus on the interaction between diabetes and cardiovascular diseases.
Duration: 2011-2015

EMPOWER
Duration: 2012-2015

METABO
"Controlling Chronic Diseases related to Metabolic Disorders" - METABO focuses on the improvement of diabetes disease management by providing patients and medical doctors with a technological platform to help them handle and analyse all information related to diabetes treatment, integrating it with patients lifestyle data. More info: www.metabo.eu
Duration: 2008-2012

MISSION-T2D
A patient-specific model for the simulation and prediction of metabolic and inflammatory processes in the onset and progression of the Type 2 Diabetes (T2D). A diagnostic tool to estimate the risk of developing T2D and to predict its progression in response to possible therapies. More info: www.isc.ermou.it
Duration: 2013-2016

MOSAIC
Development of mathematical models and algorithms that can enhance the current tools and standards for the diagnostics of T2DM, RGI, HFG and GDM. That can improve the characterization of patients suffering from those metabolic disorders and that can help evaluating the risk of developing T2DM and GDM and their related complications. More info: www.mosaicproject.eu
Duration: 2013-2016

REACTION
The REACTION project (www.reaction-project.eu) have developed an integrated approach to improve long term management of diabetes. Continuous blood glucose monitoring, clinical monitoring and intervention strategies, monitoring and predicting related disease indicators, complement on education on life style and, ultimately, automated closed loop delivery of insulin will be automated.
Duration: 2010-2014
Eur projects
Eur projects
Figure 2: Chronic Care Package annual components.

<table>
<thead>
<tr>
<th>Hypertension Package</th>
<th>Diabetes Gold Package</th>
<th>Diabetes Silver Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 clinic visits (1/month)</td>
<td>11 clinic visits</td>
<td>9 clinic visits</td>
</tr>
<tr>
<td>1 year of medications</td>
<td>5 home visits</td>
<td>1 year of medications</td>
</tr>
<tr>
<td>Regular BP checks</td>
<td>16 point of care, blood glucose and BP tests</td>
<td>9 point of care blood glucose testing</td>
</tr>
<tr>
<td>Blood glucose check-up at enrollment</td>
<td>2 tests for HbA1C</td>
<td>Clinician and health worker always available by phone</td>
</tr>
<tr>
<td>Clinician and health worker always available by phone</td>
<td>1 annual health exam</td>
<td>Continuous patient education</td>
</tr>
<tr>
<td>Ongoing patient education</td>
<td>1 eye and heart specialist check-up and consult</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3: Chronic Care Package pricing model

<table>
<thead>
<tr>
<th>Package Type</th>
<th>Price (INR) / Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes only - SILVER</td>
<td>1,200 (20 USD)</td>
</tr>
<tr>
<td>Diabetes only - GOLD</td>
<td>2,400 (40 USD)</td>
</tr>
<tr>
<td>Hypertension only</td>
<td>1,200 (20 USD)</td>
</tr>
<tr>
<td>Hyperlipidemia only</td>
<td>2,000 (33 USD)</td>
</tr>
<tr>
<td>Diabetes SILVER + Hypertension</td>
<td>1,600 (27 USD)</td>
</tr>
<tr>
<td>Diabetes GOLD + Hypertension</td>
<td>2,800 (47 USD)</td>
</tr>
<tr>
<td>Diabetes SILVER+ Hyperlipidemia</td>
<td>2,300 (38 USD)</td>
</tr>
<tr>
<td>Diabetes GOLD + Hyperlipidemia</td>
<td>3,500 (58 USD)</td>
</tr>
<tr>
<td>Hypertension+ Hyperlipidemia</td>
<td>2,300 (38 USD)</td>
</tr>
</tbody>
</table>
Do we have a future?


DIABETES PRIORITIES

IDF's advocacy is driven by the ambition to improve the lives of people with diabetes and those at risk. Whether working at the global or local level, our advocacy is underpinned by following three major issues as outlined in our Global Diabetes Plan (2011-2021).

Improve health outcomes for people with diabetes

IDF estimates that over 100 million people with diabetes lack access to the treatment and care they need. Universal access to essential medicines and technologies is a critical priority of IDF and we are advocating for it at the highest level. In addition, IDF will develop a 'model of care' to outline the essential treatment and care governments should prioritize for people with diabetes, and IDF is working to make self-management education available to all people with diabetes.

Prevent Type 2 Diabetes

Preventing future cases of diabetes is vital if countries are to avoid or reduce the costs and impact of the growing burden of diabetes. IDF is working to see health included in all policies, make healthy nutrition available for all, and promote physical activity.

Stop discrimination against people with diabetes

At the core of IDF's advocacy work is the pursuit of social justice and health equity for people with diabetes and those at risk. Diabetes is strongly linked to social and economic disadvantage, and people with diabetes face health inequity, discrimination and stigma.

The UN Resolution on Diabetes:

- Recognises diabetes as 'a chronic, debilitating and costly disease associated with severe complications, which poses severe risks for families, Member States and the entire world'.
- States that diabetes poses serious challenges for the achievement of the Millennium Development Goals.
- Encourages governments to develop national policies for diabetes prevention, treatment and care.

The Parliamentarians for Diabetes Global Network (PDGN) is a major advocacy programme of the International Diabetes Federation.

It was established in December 2013 at the World Diabetes Congress in Melbourne, Australia. Parliamentary representatives from 55 countries met at a special forum for diabetes political champions.

The Parliamentarians agreed to establish the Network on a permanent basis to be led by a team of three officers:

- Adrian Sanders MP (UK), President
- Honor Dr. Simon Busuttil MP, (Malta), Vice-President
- Dr. Rachael Nyamai MP (Kenya), Vice-President

They will be supported by the Hon Judi Moylan (Australia) as Global Coordinator.
example of our implementation programs on the diabetic Foot
‘pathway of guideline implementation’
Intervention programs/Implementation guidelines on different levels
Intervention programs/Implementation guidelines on different levels

- Patient & lesions
- Primary Care
- Diabetic Foot Clinic
- Hospital

IWGDF Guidelines

Healing
Activities of IWGDF/IDF

- Implementation programs
  - from Step By Step to TtFT courses

- Diabetic Foot Care assistant programs
The Bottom Line

“Disruptive innovation” in diabetes care is essential in the fight against this costly global disease, but financial and other policy barriers must be overcome if the most promising programs are to reach those populations most likely to benefit.
Be creative…
„A journey of a thousand miles begins with one step“

Lao Tzu, China, 6th century