Web Versus App –

Compliance of Patients in a Telehealth Diabetes Management Programme Using Two Different Technologies

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"Delivering Quality Healthcare Anywhere Through Telehealth"

Telehealth in Australia's „Red Center"

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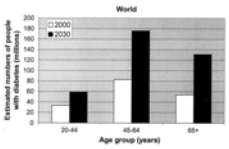
Diabetes

- shows a dramatic increase in prevalence*
- is a complex chronic disease associated with devastating late complications
- is an expensive disease
- late complications could be prevented or reduced

- Health care systems fail to provide adequate care for citizens with diabetes

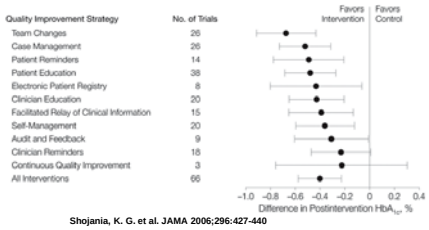
- Disease management including Information management is urgently needed.



*** Wild S. et al. Global Prevalence of Diabetes. Estimates for the year 2000 and projections for 2030. Diabetes Care 27:1047–1053, 2004**

What can be done?

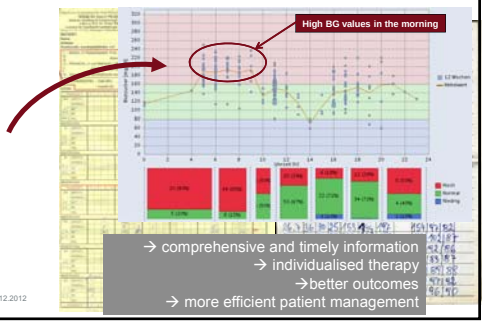
- Effectiveness of various actions on Glycated Hemoglobin (HbA1c)



Shojania, K. G. et al. JAMA 2006;296:427-440

- → **ICT** (**I**nformation and **C**ommunication **T**echnology based **T**herapy) is key!

Solution – better data analysis and presentation



→ comprehensive and timely information
→ individualised therapy
→better outcomes
→ more efficient patient management

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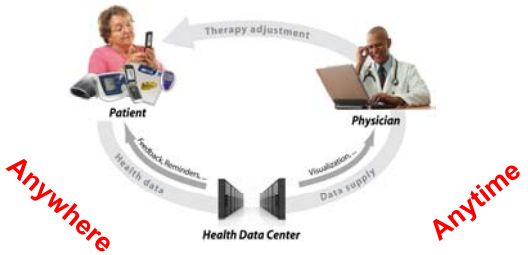
Solution - Closed Loop Healthcare



Kastner P, MorakJ, Modre R, Kollmann A, Ebner C, Fruhwald FM, Schreier G.
Innovative telemonitoring system for cardiology: from science to routine operation.
Appl Clin Inf 2010; 1: 165–176

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Interaction with the real world …

by touching things

with NFC

Morak, J, Kumpusch H, Hayn D, Modre-Osprian R, Schreier G
Design and evaluation of a telemonitoring concept based on NFC-Enabled mobile phones and sensor devices
IEEE TRANSACTIONS ON INFORMATION TECHNOLOGY IN BIOMEDICINE 16 (1):17-23, 2012

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Long distance …

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mHealth based on Near Field Communication (NFC)

- Short range (5 cm), low-power, wireless communication technology
- By 2015, 50% of the smartphones shipped will support NFC*
- "Bring-in-Touch" – paradigm
  - Touch contactless smartcard to
    - start software application automatically
    - read data for identification and authentication
  - exchange data with NFC enabled devices
  - read out static data from RFID tag

  without prior pairing

*Source: Gartner Research, Publication Date: 22 March 2011, ID Number: G00211393

Intuitive data acquisition for patients based on NFC

- Touch ID card
  - To launch application
  - For patient identification and authentication

- Touch device to read out recently measured values
  - Blood pressure
  - Blood glucose
  - …

- Touch tag board/book with icons
  - touch smileys to indicate wellbeing
  - …

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NFC based mHealth system „DiabMemory"

- How the telemonitoring system is being used in the „Health Dialogue"
- (starting 03:54)

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The "Health Dialogue"

- The "Health Dialogue"
  - Large scale pilot on telehealth in diabetes patients
  - driven by a health care funding organisation
  - "mHealth prescribed"
  - Based on the AIT DiabMemory system
- Proof of Concept:
  - **is mHealth for diabetes ready for day2day use?**
  - **Acceptance by patients** and doctors?
  - Health outcomes?
  - Health economics?

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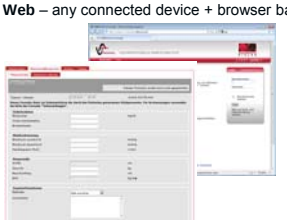
DiabMemory – patient interface choices

- **App** – NFC enabled mobile phone + dedicated application based
- **Web** – any connected device + browser based



Results – patient group

- Cut-off date for analysis
  - 21.06.2012
- A total of 403 patients were included in the analysis
  - all patients enrolled to the telehealth program were included → intention to treat
- Drop outs
  - Patients who did not submit any values within the 20 days prior to the cut-off date

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Results – Percentage of data submitted via App

Percentage of data transmitted via the App	Number of patients
0	95
>0 and <10	4
≥10 and <20	6
≥20 and <30	4
≥30 and <40	2
≥40 and <50	1
≥50 and <60	5
≥60 and <70	4
≥70 and <80	5
≥80 and <90	8
≥90 and <100	102
100	167

112 patients transmitted their data predominantly via the Web

291 patients transmitted their data predominantly via the App

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Results - Demographic data for the two groups

	App group	Web group	P-value
Number of patients (females)	291 (59)	112 (3)	-
Females, %	20.3	2.7	<0.001
Mean age (SD), years	57 (10)	56 (11)	n.s.
Type of diabetes (1 / 2 / unknown)	17 /257 /23	9 /99 /4	n.s.

n.s = not significant

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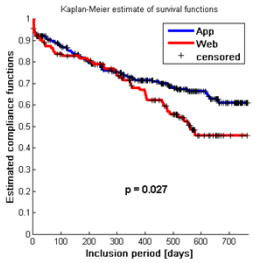
Results – Compliance, App versus Web



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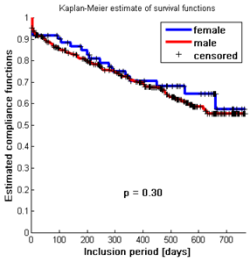
Results – Compliance, Males versus Females



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Summary & Conclusions

- > 400 diabetes patients have been enrolled into a **large proof of concept telehealth pilot** in Austria. They had the choice between different ways to collect disease related data
- Statistical analysis **revealed a significantly higher compliance rate for patients using a mobile phone and NFC-based application (App) user interface** to acquire and transmit their health data than for patients predominantly submitting data via web-browser **(Web)**.
- **Different types of data acquisition technologies** may have an important **effect on patients' willingness to participate** in telehealth programmes in the **long-term**.
- Further research is needed to gain more insight into critical factors with respect to long-term compliance of patients in telehealth programs.

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Conclusions - **Telemedicine was digital at first!**

- Alice Springs Telegraph Station (opened in 1872)

Duties of the station master …

1 The boss and his family

The Station Master was a man of great importance. As well as being in charge of the largest Station on the Telegraph Line, he ran the region's Post Office and was the government official responsible for Central Australian Aborigines . As the only magistrate in Central Australia, he held court at the Station; he sold rations to travellers and he even acted as an emergency doctor, following instructions telegraphed from Adelaide!

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From Australia back to Austria …

- **www.eHealth2013.at**
- May 23-24, 2013
- Schloss Schönbrunn Conference Center, Vienna, Austria
- Deadline for submission of Papers: January 15th, 2013