Climate change and eHealth

- strategies for health sector mitigation and adaptation

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VÄSTERBOTTENS LÄNS LANDSTING

Sida
SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

Outline

1. Introduction to CMTS and MT-FoU
2. Introduction to the concepts of mitigation and adaptation in the health sector
3. Health sector mitigation potential
4. eHealth & mitigation
5. Mitigation potential in Västerbotten
6. eHealth & adaptation

Group exercise (after Lutfans presentation)

1. Introduction to CMTS and MT-FoU

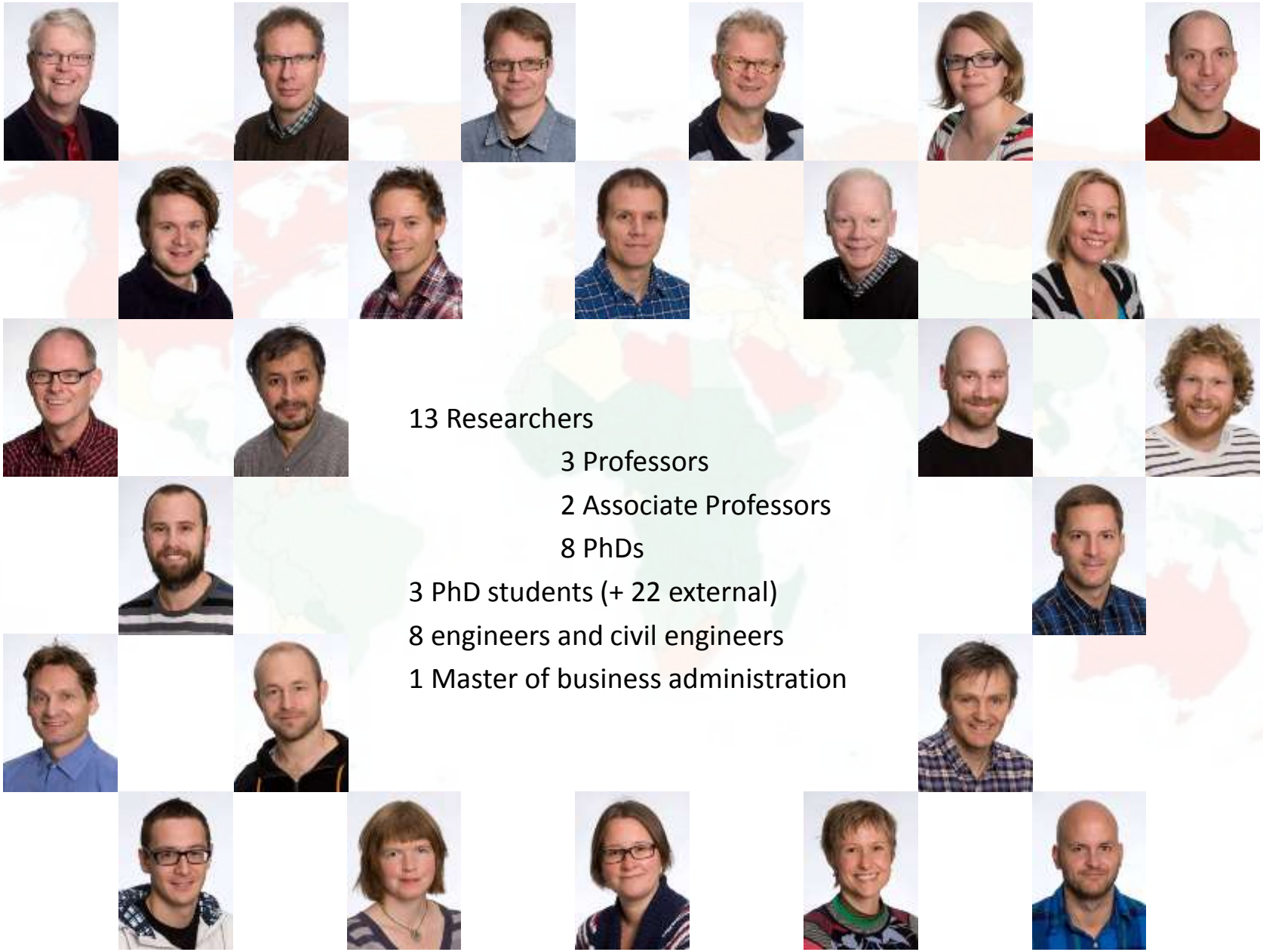
CMTS
Centrum för medicinsk teknik och strålningsfysik
Verksamhetschef Anna Sundén

MT
Avd.chef Lennart Granberg Umeå
Sekt. chef Robert Brännström Ske-å

MT-FoU
Avd.chef Olof Lindahl

Radiofysik
Avd.chef Lennart Johansson

Biomedical Engineering and Informatics – R&D *(MT-FoU)*



13 Researchers

- 3 Professors
- 2 Associate Professors
- 8 PhDs

3 PhD students (+ 22 external)

8 engineers and civil engineers

1 Master of business administration

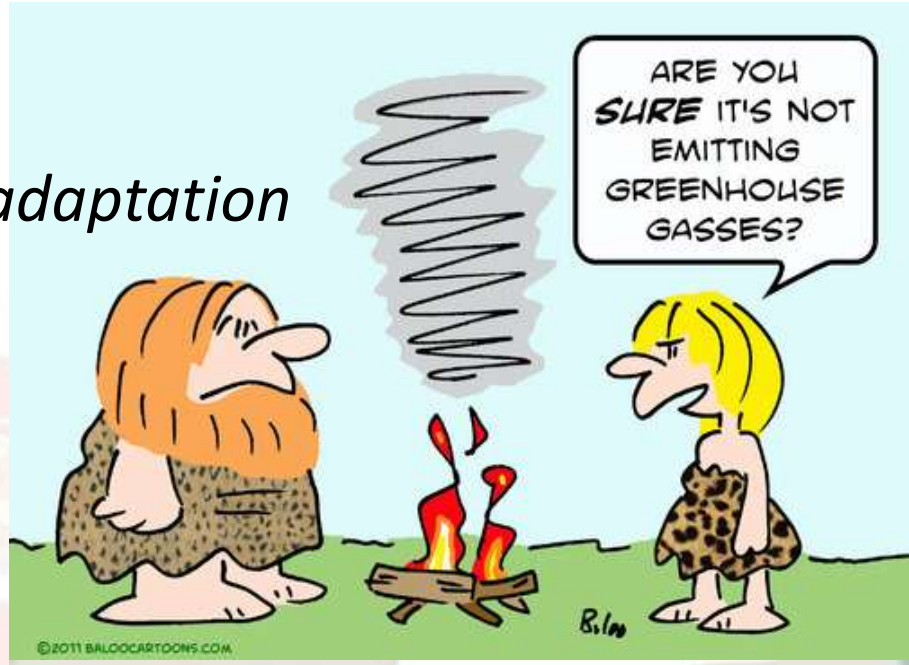
2. The concept of *mitigation & adaptation*

Mitigation

In CC-MAP we use the word mitigation for strategies aiming to reduce the emission of greenhouse gases

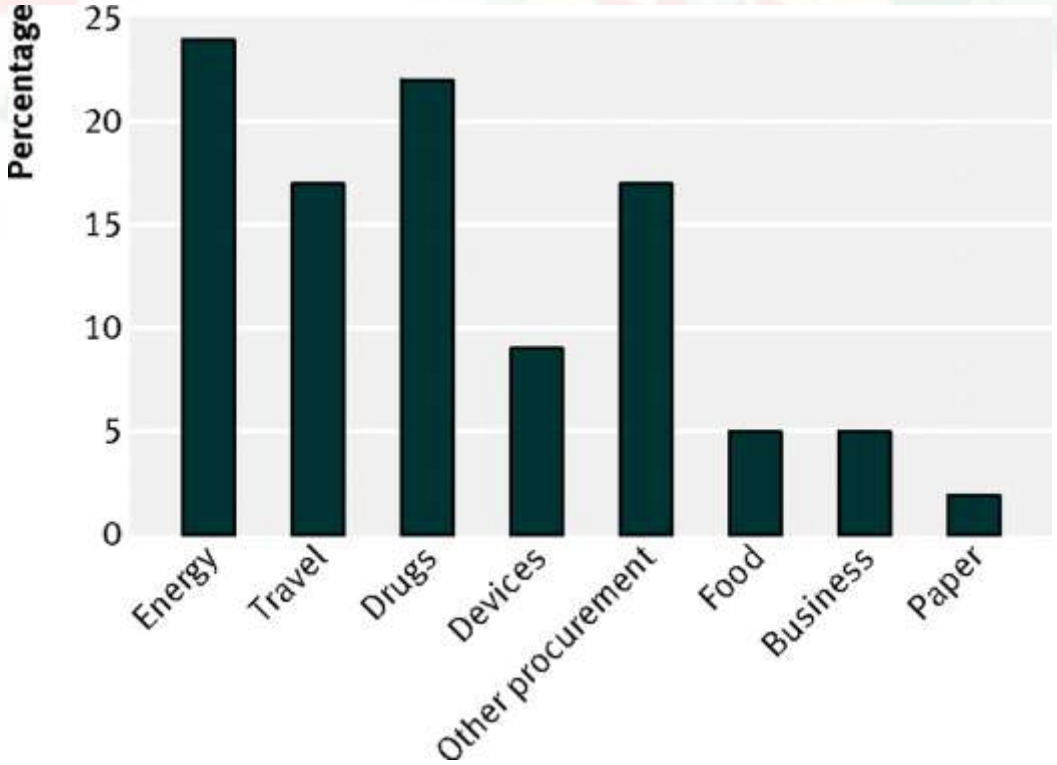
Adaptation

In CC-MAP we use the word adaptation for strategies aiming to reduce the vulnerability and increase the resilience of society to withstand the impacts of climate change



3. Health sector mitigation potential

The National Health Services (NHS) in the United Kingdom has performed the most thorough assessment of the carbon foot print up to date



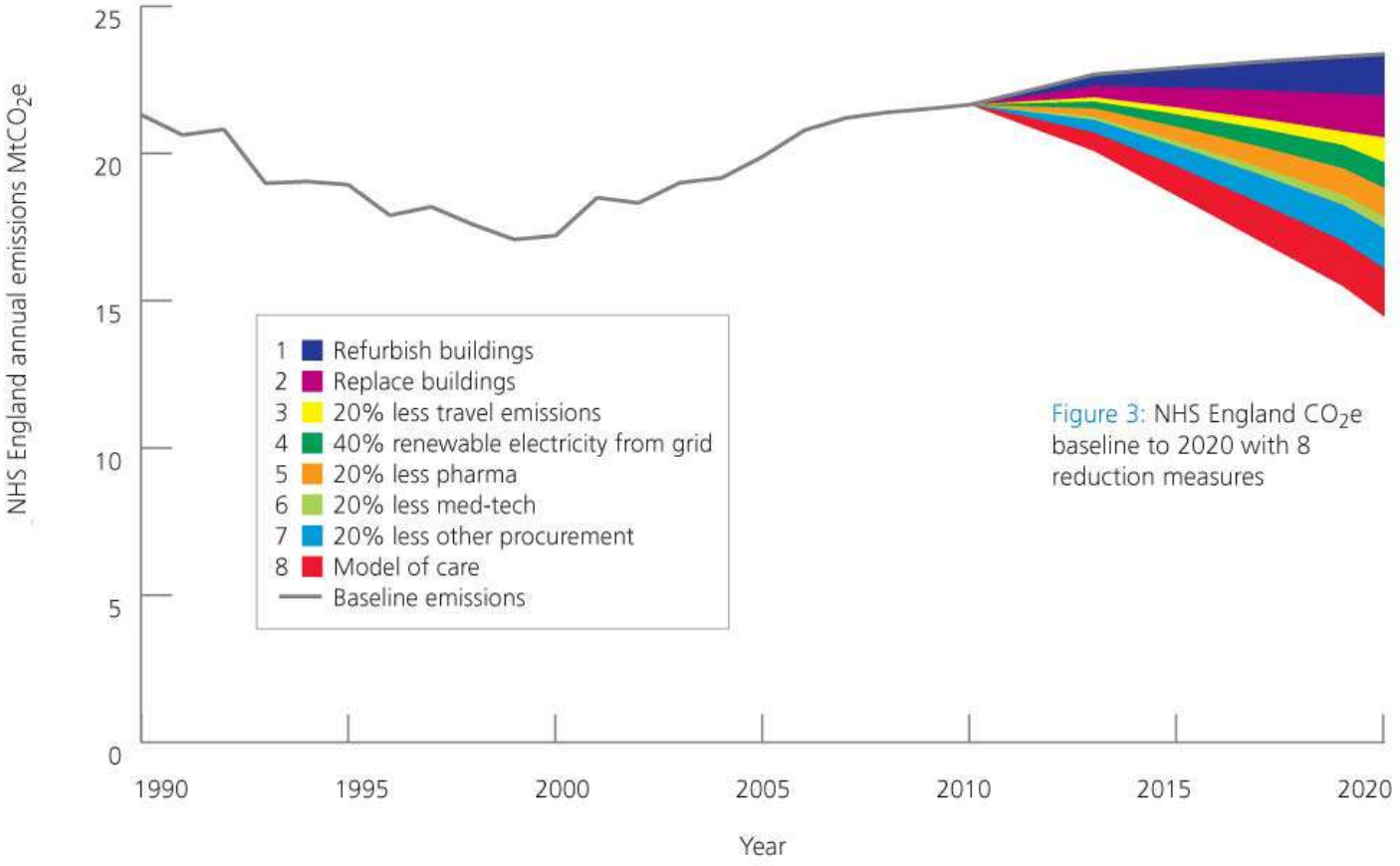


Figure 3: NHS England CO_2e baseline to 2020 with 8 reduction measures

NHS England CO2 baseline emissions to 2020 with 8 reduction measures

4. eHealth and mitigation

Is this green ICT?

eHealth is according to the WHO "*the transfer of health resources and health care by electronic means*"

CC-MAP address health ICT in general, for example:

- Telemedicine or tele-healthcare: the delivery of health information through the Internet and telecommunications
- eLearning: Using the power of IT to improve public health services, e.g. through the education of health workers
- The use of electronic information systems in health and health systems management

What is green ICT?

ICT currently stand for about 2% of global emission of GHGs but is considered a promising solution for reducing the remaining 98%. **Green ICT** strategies typically include two main areas:

i) The manufacturing of green components and systems, e.g., components and systems with low production cost (in terms of GHG emission), long lifetime and low energy consumption.

ii) The use of ICT to make other industries and processes more green, including the healthcare, i.e. eHealth

Example of ICT in healthcare that could be considered green ICT strategies:

- Minimizing the use of energy from lighting using movement sensors (Buildings)
- Preventing unnecessary travel using video conferencing (Travel)
- More efficient care processes using health information systems (Model of care)

5. Mitigation potential in Västerbotten

– Telemedicine, mediated meetings

Administrative meetings

Project meetings

Economy

Procurement

Business meetings

Education

Conferences

Clinical applications

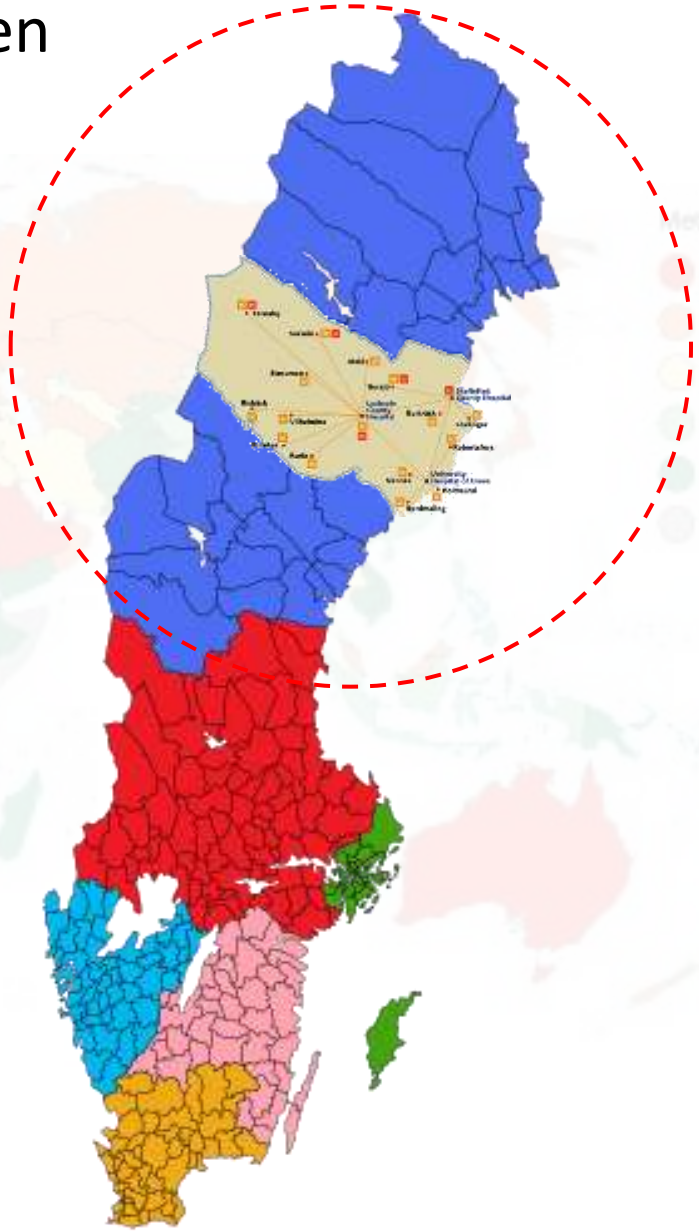
Consultations

Follow-up visits

Rehabilitation

Hospital rounds

Remote control of diagnostics instruments



Carbon reduction potential in Västerbotten

Example from a prize-winning project in Västerbotten - Speech therapy at distance**.** This work model is successfully implemented and in regular clinical use

194 patients, of which 36 in their own home,
779 treatments, of which 219 in the home,
25 care facilities participated in the study

Environment	154 840 kilometers of travel was saved for the patient
Economy	1 million SKR or about 100.000 EUR were saved during approximately one year – based only on reduction in patient travels Staff reduced their time on the road with 1-3 days per month.
Patient benefits	The telemedicine treatment resulted in better results and compliance and fewer patients dropped out of rehab.

Carbon reduction potential of telemedicine

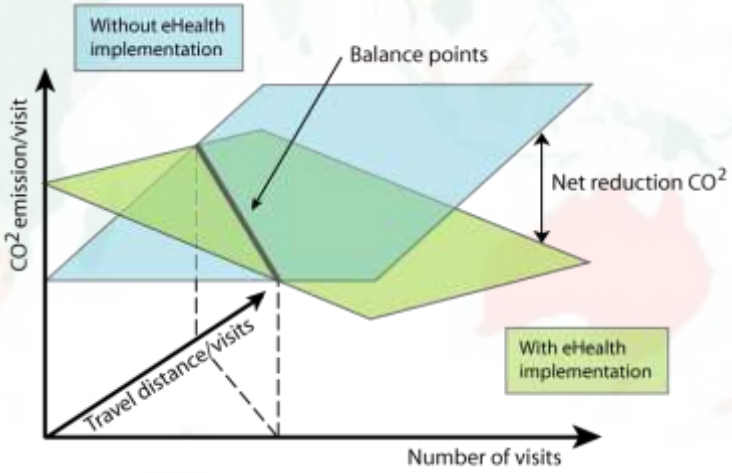
- Reports from the literature

Telemedicine program in UC Davis, California

13,000 outpatient consultations over a period of 5 years, has resulted in a savings of 4.7 million miles of travel and a reduction of 1,700 tonnes of CO2 emissions Similar benefits are reported in Scotland, Wales and Canada.

Telemedicine in home healthcare in Canada

More than 11 million home visits by nurses could be replaced by telecare (estimate), resulting in a reduction of about 120 million km of travel and 33.220 tonnes of associated GHG emissions annually



Driving forces – *telemedicine only for rural and remote areas?*

+ Long distances

Västerbotten is the second largest county in Sweden

+ Limited resources

Rural areas are hit hard by cutbacks

+ Low mobility

Snow, poor roads, maintenance

- Few users

Sparsely populated; Only 260.000 people live in this county, which is one-eight of the country's area

Telemedicine – *also for urban regions!*

- Short distances

Short distances may disguise the advantages. Distances should also be counted in time

+ Traffic

The traffic situation in Stockholm is one of Europe's most tense, which has negative effects on the environment

+ Many potential users

The number of inhabitants in Stockholm is more than 5 times that in Västerbotten County!

CC-MAP activities (Sweden)

eHealth in Mitigation

Carbon cost-benefit analyses based on (initially) three different levels of telemedicine applications in the Västerbotten county council:

- *Administrative meetings – baseline case, collaborative care planning*
- *Telerehabilitation – baseline case, speech therapy at distance*
- *Remote control of diagnostics instruments – baseline case, echocardiography at distance*

eHealth in Adaptation

Systematic, narrative literature review of the use of ICT in disasteres
Report on eHealth readiness
Demonstrator (Indonesia, autumn 2013)

6. eHealth and adaptation

Examples of potential adaptation strategies based on eHealth

Health threat	**Adaptation Strategy** -proactive and/or reactive
Infectious diseases	• Early warning systems; detection and prediction of disease outbreak based on syndromic data • Mobile diagnostics of e.g., malaria, dengue
Accidental deaths	**• Telemedicine support for on-site medical staff at disaster site (mobile, satellite)** **• Health information systems for planning and coordination of support actions and rescue operations** **• ICT for public health education to increase public awareness and preparedness**
Non-communicable diseases	• ICT-based health campaigns to increase awareness of threats (heat exposure, pollution etc.) • Education of health workers in resource poor settings to cope with health issues (chronic disease management)

Learning from History – Examples of ICT in disasters

TelEmergency provided telemedicine service for emergency medical coverage in hurricane Katrina, 2005

Coordination of evacuations and support actions using mobile communication systems in several recent wildfires

1985 1990 1995 2000 2005 2010

NASA telemedicine Spacebridge Armenian earthquake, 1988

Telemedicine used for providing psychological treatment to children after tsunami, Nagapattinam 2004.

Technical considerations

Information and communication technology	Advantages	Disadvantages
Fixed (wired) technology, including broadband	• Higher bandwidth and thus potential for e.g., high-quality video communication and real-time applications • Negligible delay	• Low penetration in developing countries, in particular geographically challenging regions • potentially sensitive to weather and climate extremes • Fixed location
Mobile technology (2-3G/4G),	• Good penetration globally (2G) • Relatively high penetration also in geographically challenging regions (e.g. Pakistan, Indonesia) • Suitable for mobile, off-line data gathering and sharing of information	• Lower bandwidth • Lower penetration of 3G and 4G • Less suitable for real-time applications and large data transfer • Devices sensitive to heat, moisture and other environmental exposure
Satellite based communication	• Global coverage (depending on satellite type and position)	• Significant signal latency compared to ground-based communication • Sensitive to moisture and precipitation

CC-MAP activities (Sweden, Indonesia)

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Group exercise

-What are the major **challenges** for successful implementation of eHealth? What **solutions** are there for these challenges and who is **responsible** for implementing them? What can we in **CC-MAP** do to support this work?

Challenges	*Solutions*	*Responsibility*	*Role of CC-MAP*
x	*x*	*x*	*x*
x	*x*	*x*	*x*
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