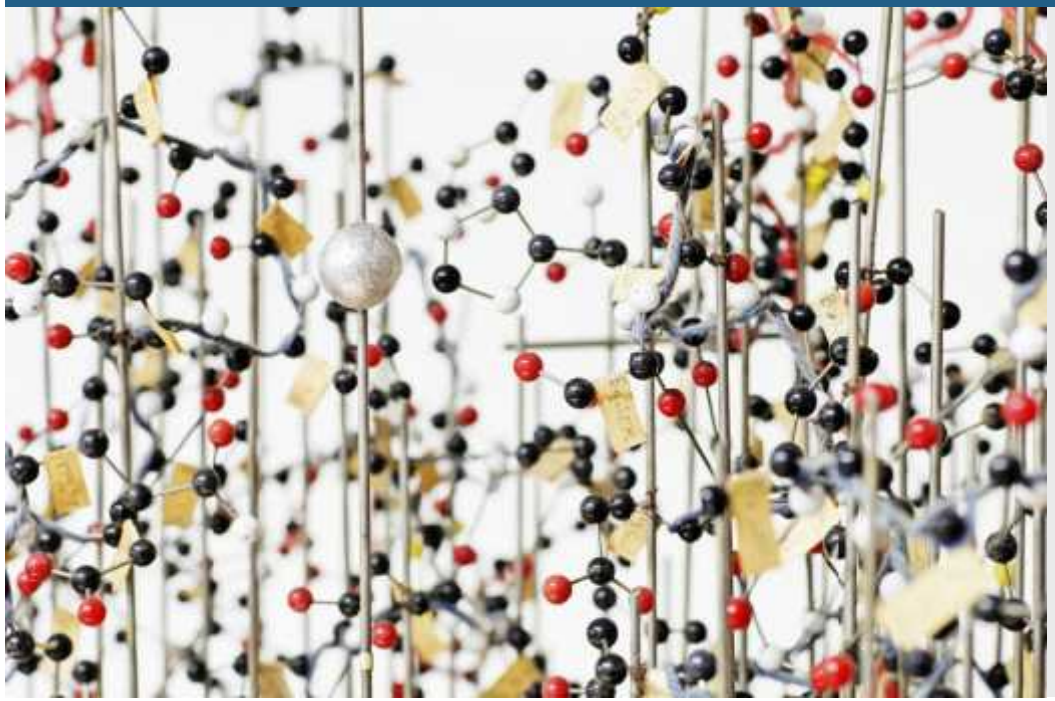
Succesful Implementation of Telemedicine Solutions



Jesper Thestrup

IN-JET APS

Trends in telemedicine implemenation

Where telemedicine works;
and why it sometimes doesn't work.

REACTION

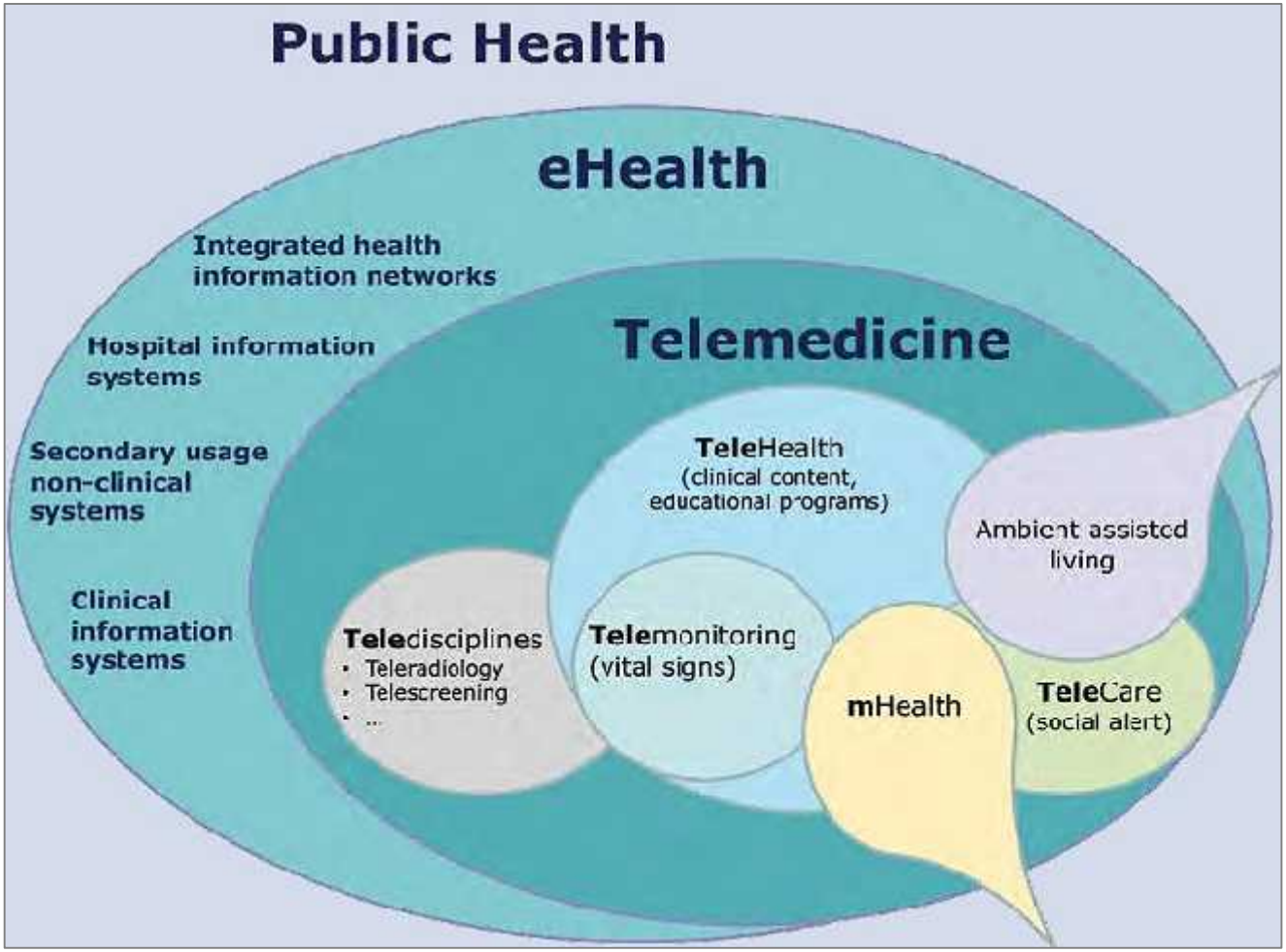
Agenda

- Current trends in telemedicine
  - Terminology
  - Transformation of care organisations
  - Best of breeds – now and in the future
- Medical evidence
  - Now it works! Now it doesn't!
- Why pilot projects fail
  - Elements of today's programme

REACTION

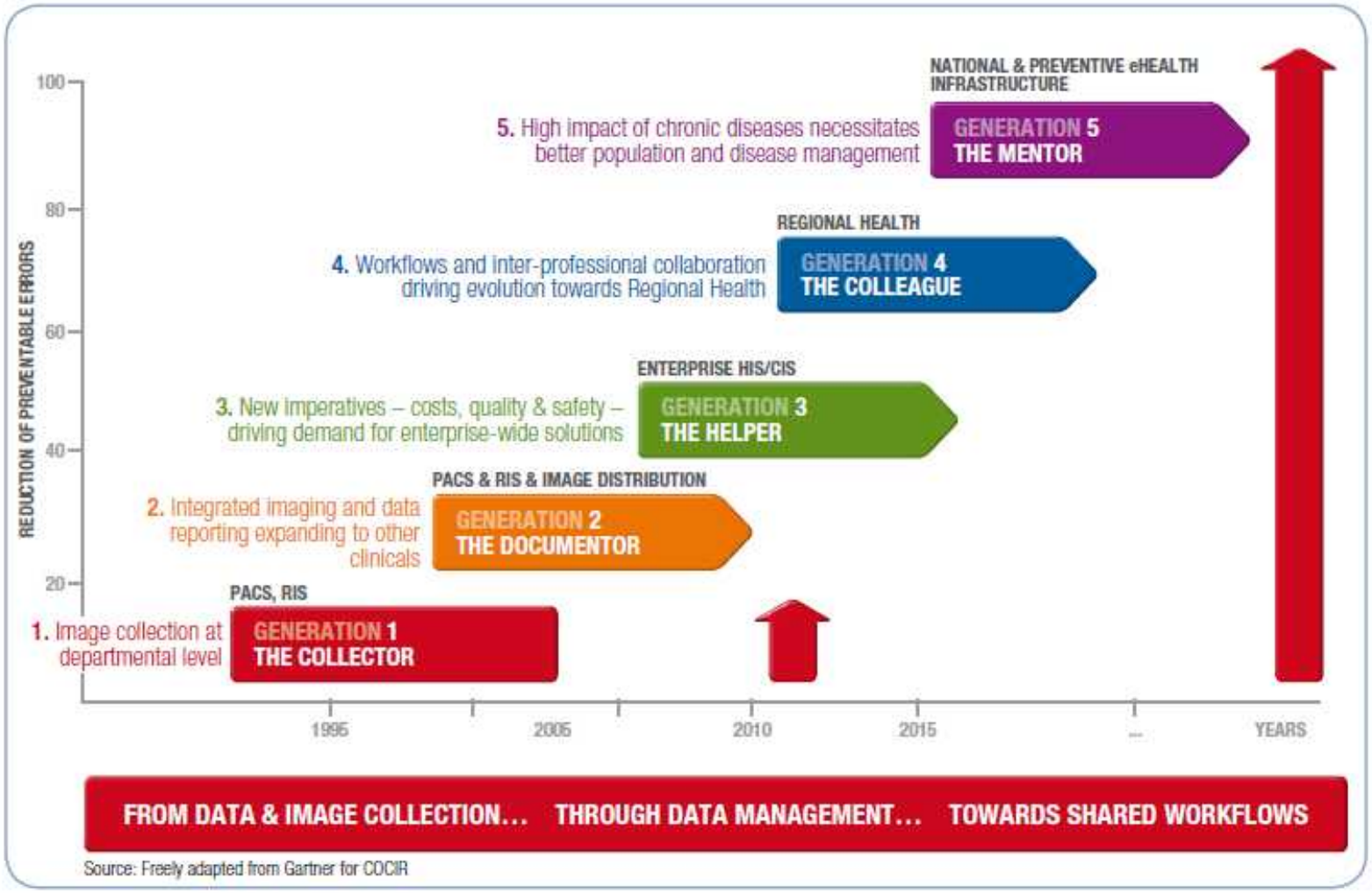
Current trends in telemedicine

Definition of Telemedicine



Source: Telemedicine Toolkit, COCIR 2011

Incremental step-by-step transformation of care organisations



Source: eHealth Toolkit, COCIR 2013

Installed base

- Present focus: From silos to integrated care
- Still some distance to the ultimate integrated Electronic Health Record (iEHR = EPR + PHR)

	Germany	Italy	Poland	Portugal	Saudi Arabia	Spain	United States
Administrative Systems							
ADT/Registration	99.2%	94.4%	91.4%	96.2%	76.7%	98.2%	99.0%
Clinical Information Systems							
Laboratory							
*Laboratory Information System**	94.7%	90.2%	50.6%	73.3%	77.2%	91.8%	97.4%
Pharmacy							
*Pharmacy Management System**	57.0%	75.1%	77.5%	94.2%	74.2%	96.6%	97.0%
Electronic Medical Record / Electronic Patient Record							
Computerized Practitioner Order Entry (CPOE)	49.3%	50.1%	18.2%	38.6%	57.6%	75.7%	69.1%
Electronic Patient Record/Clinical Data Repository	88.5%	53.6%	51.7%	93.5%	71.7%	90.2%	92.5%
ePrescribing	34.8%	35.1%	7.6%	47.9%	68.1%	54.3%	n/a
Order Entry (Includes Order Communications)	79.3%	68.4%	19.3%	89.4%	78.9%	80.3%	93.8%
Physician Portal	19.4%	31.0%	0.9%	5.3%	35.2%	64.6%	51.7%
Radiology & PACS							
*Radiology Information System**	80.7%	86.9%	46.8%	91.7%	69.9%	91.2%	95.1%
*Radiology PACS**	75.0%	61.8%	42.8%	93.1%	54.6%	83.9%	85.9%

Source: HIMSS Europe, 2012 – reproduced in eHealth Toolkit, COCIR 2013

A few Best-of-Breed cases

- Denmark: MedCom (1995)
  - Development, testing, dissemination and quality assurance of telemedicine systems, 6 mio. EDI messages per month, 100% GPs and Pharmacies
- USA: Health Buddy (~2000)
  - Bosch's Health Buddy System uses telehealth to help patients manage a broad range of chronic illnesses, started by VA
- Austria: NÖMED WAN (2005)
  - Master patient index, patient history integrates all 27 hospitals of the region, XDS standard, to be integrated with national EPR ELGA
- USA: Kaiser Permanente (2011)
  - Implemented over 50 telehealth/telemedicine projects that provided 250,000+ visits/encounters
- Finland: KanTa (2011)
  - Nationwide system for professionals and patients. Prescriptions, patient data, pharmaceuticals, etc.
- France: Le Dossier Médical Personnel (DMP) (2011)
  - National web-based EHR programme, prescriptions, medication, etc. Now available with 378 healthcare providers (2013)

Soon to come Best-of-Breed cases

- The Netherlands: VitaPorta (2012)
  - Web-based Disease Management System for 65.000 chronic patients offering monitoring of INR, Diabetes T1 and T2, Asthma/COPD, CVRM and Elderly Care.
- Italy: Chronic Related Group (CReG) 'Buongiorno CReG' (2013)
  - Large-scale initiative with cloud-based remote monitoring for over 300 general practitioners and 37 000 patients with chronic diseases
- Sweden: Digital Personal Health Records (2014+)
  - Empower the patient and improve and rationalise national health and caregiving with Microsoft HealthVault
- Denmark: NSI, RSI, KL (2014+)
  - National strategy for telemedicine, architecture, standards (HL7, XDS, Continua)
- Switzerland: eHealth (2015)
  - An electronic patient's file and a health portal with quality-assured online information and access to one's own patient file
- Spain: Valcrònic in Valencia autonomous region (2015)
  - Biomedical information is transferred to healthcare professionals via tablets or smartphones. 12 000 individuals monitored since 2012 to be extended with 148 000 patients subject to more than ten different treatments

REACTION

Is there sufficient medical evidence for the efficacy of telemedicine?

Evidence of improvements in diabetes outcome from literature review

- Best estimates for the impacts that each form of telemedicine has on Type 2 diabetes care processes.
- 10 RCT and intervention studies were included, some multicentre

		Blood Glucose	Blood Pressure	Cholesterol	Eye Exam Screening	Foot Exam Screening	Microalbumin Screening
Payer	Payer	*HbA1c (%)* 8.36 to 8.02[14]	*SBP (mmHg)* 132.5 to 128.7[15]	*LDL (mg/dl)* 114 to 104.6[15]	*Rate (%)* 40 to 48[16]	*Rate (%)* 2 to 25[17]	*Rate (%)* 27.3 to 37.3[16]
Provider	Clinical Decision Support Systems	*HbA1c (%)* 8.4 to 8.17[18]	*SBP (mmHg)* 138.1 to 139[18]	*LDL (mg/dl)* 126.7 to 112[18]	*Rate (%)* 12.2 to 19.3[19]	*Rate (%)* 46.2 to 55.6[19]	*Rate (%)* 23.3 to 43.6[19]
	Diabetes Registries	*HbA1c (%)* 7.3 to 6.1[20]	*SBP (mmHg)* 140 to 139.1[20]	*LDL (mmol/dl)* 3.2 to 2.7[20]	*Rate (%)* 36 to 69[20]	*Rate (%)* 67 to 88[20]	*Rate (%)* 27 to 55[20]
Patient	Remote Monitoring	*HbA1c (%)* 9.5 to 8.6[21]	*SBP (mmHg)* 141 to 131[21]	*LDL (mg/dl)* 100 to 94[21]			
	Self-management	*HbA1c (%)* 7.45 to 7.42[22]		*Total Chol:HDL* 5.7 to 5.13[22]			

HbA1c = hemoglobin A1c, SBP = systolic blood pressure, LDL = low-density lipoprotein, HDL = high-density lipoprotein

Source: CITL, 2007

Evidence of improvements in medical outcome from literature review

27 meta and RCT studies analysed

- CHF (17) e.g. from Inglis et al. 2011 (meta analysis n=9805):
  - CHF-related hospitalisations RR 0.79 (95% CI 0.67 to 0.94, P = 0.008)
  - all-cause mortality RR 0.66 (95% CI 0.54 to 0.81, P < 0.0001)

- COPD (5) e.g. from Koff et.al. (2009) RTC monocentric n=38 1/1)
  - Quality of life (SGRQ): intervention: 10.3 points improved (19%), control: 0.6 points improved (1%), p=0.018
  - Detection of exacerbations (9 vs. 2 patients)

- Diabetes (2) e.g. Chumbler et al. 2009 (retro. comp. n=774 1/1) :
  - Mean survival time: intervention 1348 days versus 1278 days, p=0.015
  - 4-year all-cause mortality: RR 0.69 (95% CI 0.50–0.92, p=0.013)

- Multimorbidity (3) e.g. Darkins et al. 2008 (NC post eval. N=17025)
  - 25% reduction in numbers of bed days of care
  - 19% reduction in numbers of hospital admissions

Source: Telemedicine toolkit, COCIR, 2011

The Whole System Demonstrator (UK)

- Launched in May 2008 by the Department of Health to show just what telehealth and telecare is capable of
- The largest RCT of telehealth and telecare in the world, involving 6191 patients and 238 GP practices
- 3030 people with one of three conditions (diabetes, heart failure and COPD) were included in the telehealth trial
- Early headline findings of telehealth (if used correctly):
  - 15% reduction in Accident & Emergency visits
  - 20% reduction in emergency admissions
  - 14% reduction in elective admissions
  - 4% reduction in bed days
  - 8% reduction in tariff costs
  - 45% reduction in mortality rates

Source: WSD Headline FIndings, DH 2011

But also….

- Insufficient evidence of benefit: a systematic review of home telemonitoring for COPD
  - Two randomized trials and four other evaluations of telemonitoring were included.
  - The studies are typically underpowered, had heterogeneous patient populations and had a lack of detailed intervention descriptions and of the care processes that accompanied telemonitoring.
  - In addition, there were diverse outcome measures and no economic evaluations.
  - The telemonitoring interventions in each study differed widely. Some had an educational element that could itself account for the differences between groups.

Source: Bolton et al, 2011

REACTION

Why is it so difficult to take telemedicine projects into full-scale?

Issues often found in telemedicine (RPM)

- Clinical issues
  - Lack of definitive evidence for clinical effectiveness (Wootton, 2001)
- Organisational and human issues
  - Lack of definitive evidence for cost-effectiveness when applied wide-scale (Whitten et al., 2002)
  - Lack of funding to establish services (Hopp et al., 2006)
  - Lack of experience (Richards et al., 2005)
- Technical issues
  - Technical issues, especially with the early equipment (Hopp et al., 2006)
  - Absence of a well-established industry (Craft, 2003)
  - Uncertainty due to the lack of
    - standards (Loane & Wootton, 2002)
    - guidelines (Stanberry, 2006)
    - service models (Barlow et al, 2006)

Source: Bratan, Thesis, 2007

Relation to today's programme

- Clinical issues 
  - Not today
- Organisational and human issues
  - Policy and legal
    - Regulatory activities: Medical Device Directive, Patient Directive, Cross Border Healthcare Directive, etc.
    - Legal: Liability
  - Human
    - Ethics issues, data privacy, European Charter of Human Rights, etc.
  - Organisational
    - Health Technology Assessment, MAST, evaluation methodologies,
    - Cost effectiveness, value propositions, sustainable business models,
- Technical issues
  - Standards
    - Standards: Continua, HL7, IEEE, XDS, etc.
  - Maturity
    - Demonstrations of mature telemedicine solutions from the REACTION project waiting to be implemented!

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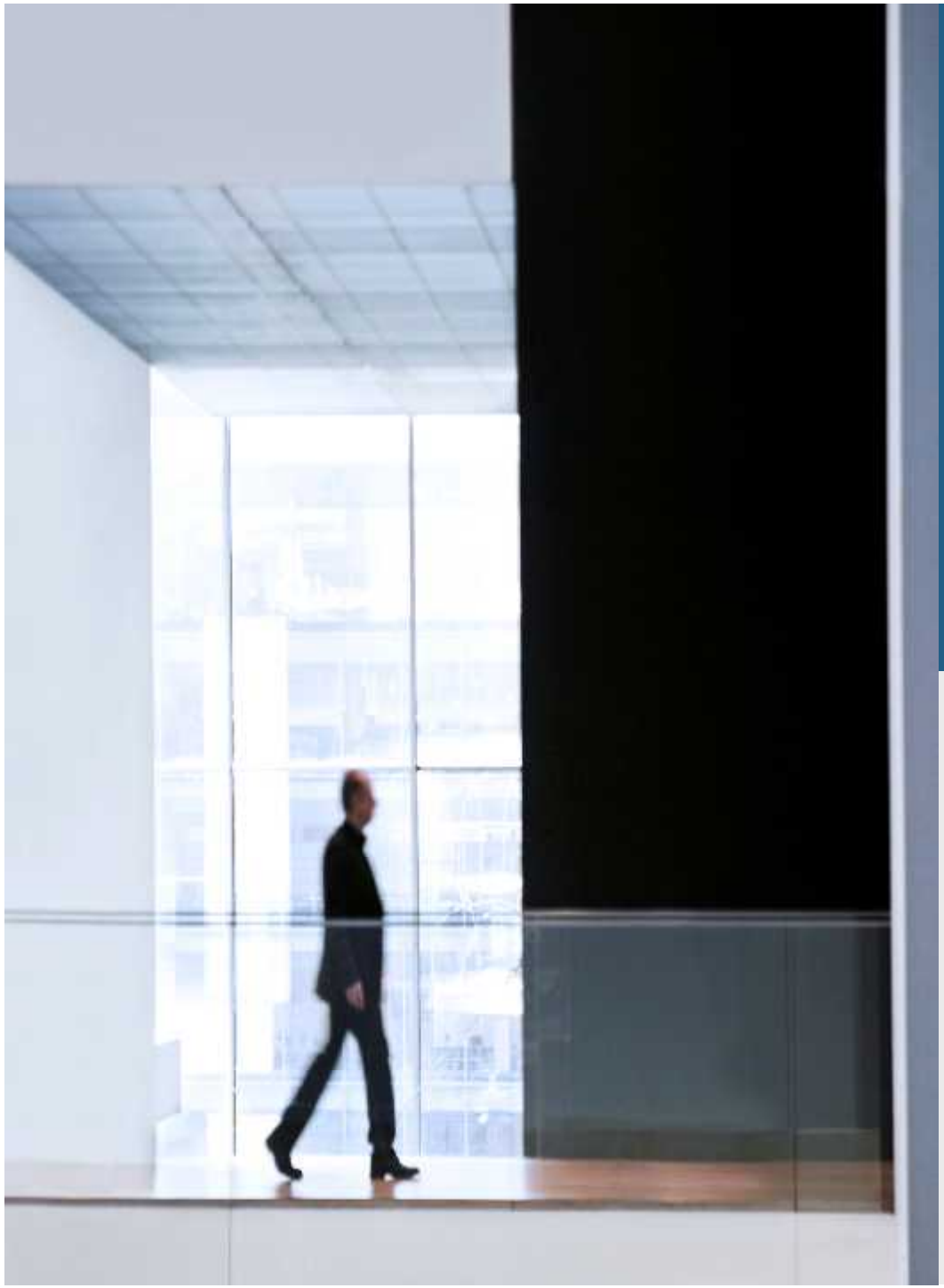

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