

Definitions for Long Term Care Associated Infections

?

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If ageing is
Universal, Intrinsic, Progressive and Deleterious

Environment
(comorbidities)



It is also and mainly
HETEROGENEOUS



Epigenetic
factors

Long term care facilities are very
HETEROGENEOUS

objectives of the settings, public and private, density of health care,
Resident risk factors, level of disability,

National and international level



Is there a need to know ?

Which are the objectives and indicators ?

How to do better ?

Is there a need to
know ?

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Epidemiology of Ageing

Increasing number of elderly
(Increasing number of disable persons)

+

Decreasing Potential support Ratio



2 solutions



Developing Home care or /and
Nursing home and LTC

Who are the elderly NH/LTC
populations ?

Figure I. Proportion of population aged 60 or over: world, 1950-2050

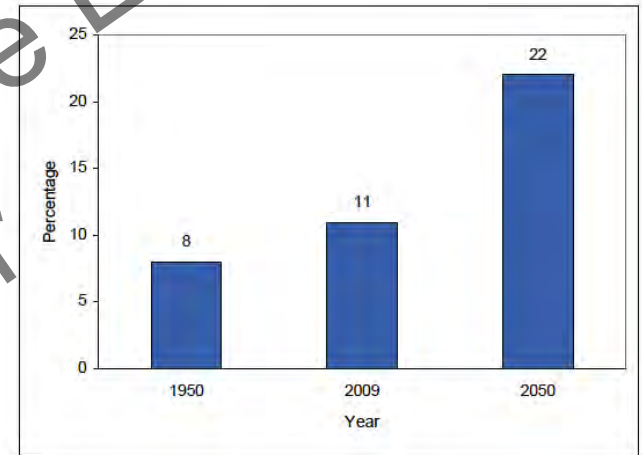
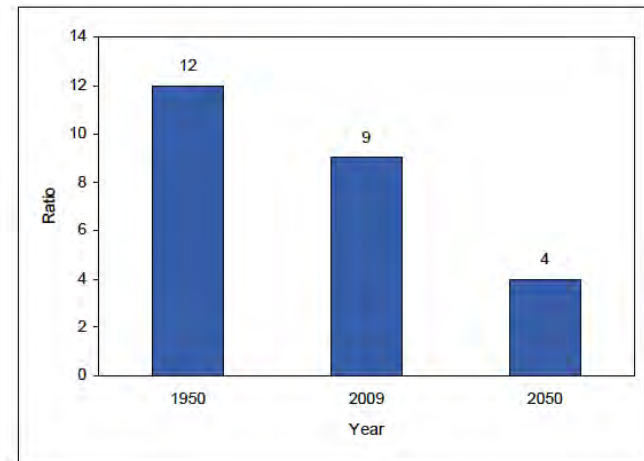


Figure II. Potential support ratio (PSR), 1950-2050



Ageing population in NH /LTC

Cumulative Individual Risk factors for infection

Collective risk factors

Ratio Healthcare workers / resident is the lowest
(even with large variability in Europe)

Population at High risk for infection

Epidemiology of NH-LTCAI

Long term care acquired infection (including outbreak)

Prevalence

3% to 13 %

Incidence

2-14 infections/1000 resident-jour

Bacterial infection

Respiratory / Urinary / Skin Soft tissue / Digestive

Viral Infection Respiratory / Gastrointestinal / Skin

(Outbreaks) Nursing home infection

Bacterial rare

Viral very frequent (VRS / influenza /Norovirus)

Epidemiology of NH-LTCAI

Long term care acquired infection (including outbreak)

Prevalence

3% to 13 %

Incidence

2-14 infections/1000 resident-jour

**NH associated infections are on the
line
Will increase**

Viral

very frequent (VRS / influenza /Norovirus)

Burden of NHA1

Mortality



Direct.....Indirect

Functional status



Direct.....Indirect

Nutritional status



Hospitalisation



Antibiotic use /resistance



Burden of NHAi

Morbidity



\$ BILLIONS €

Institutionnalization



Health care system

Is there a need to know ?

YES

YES

YES

YES

YES

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What are the objectives And resources ?

Management of Infection
for NH resident

or / and

Infection Control

What are the objectives and resources?

Management of Infection for NH resident

Diagnosis is diagnosis
but....

Issues from atypical clinical presentation

Who detect the first symptoms ?

Which, where are the available tools to achieve the diagnosis ?

Who decide for Antibiotic use ? Who Control ?

Which is the follow up ?

Difficulties for diagnosis of infection ?

Several pitfalls among

Anamnesis and atypical clinical presentation

Morphological (radiograph and scan)

Biological markers

Bacteriological samples

Availability
In LTC
and
NH

What are the objectives and resources?

Infection Control

The burden of infections in NH / LTC

The burden of antibiotic consumption / antibiotic resistance

To better take into account

infection risk

to adapt IC policy

Infection Surveillance

How to measure ?
CDC/SHEA McGeer criteria or New definitions criteria....others ..

Limitations for criteria ?

What are the objectives and resources?

Infection surveillance

2 exemples with McGeer criteria or New CDC/SHEA definitions criteria...

Pneumonia and Urinary tract infection..

What are the Mc Geer criteria?

Ex : Pneumonia

Presence of at least 2 of following clinical signs:

New or increased cough

New or increased sputum production

Fever ($\geq 38^{\circ}$ C)

Pleuritic chest pain

New or increasing physical findings at auscultation (rales, rhonchi, wheezing, bronchial breathing)

Changes of respiratory rate (tachypnea ≥ 25 at rest)

Worsening of the mental status or functional status not otherwise explained

AND

Radiological signs:

Presence of probable pneumonia or new or evolutive infiltrate

Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria

Nimalie D. Stone, MD;¹ Muhammad S. Ashraf, MD;² Jennifer Calder, PhD;³ Christopher J. Crnich, MD;⁴
Kent Crossley, MD;⁵ Paul J. Drinka, MD;⁶ Carolyn V. Gould, MD;¹ Manisha Juthani-Mehta, MD;⁷
Ebbing Lautenbach, MD;⁸ Mark Loeb, MD;⁹ Taranisia MacCannell, PhD;¹ Preeti N. Malani, MD;^{10,11} Lona Mody, MD;^{10,11}
Joseph M. Mylotte, MD;¹² Lindsay E. Nicolle, MD;¹³ Mary-Claire Roghmann, MD;¹⁴ Steven J. Schweon, MSN;¹⁵
Andrew E. Simor, MD;¹⁶ Philip W. Smith, MD;¹⁷ Kurt B. Stevenson, MD;¹⁸ Suzanne F. Bradley, MD^{10,11}
for the Society for Healthcare Epidemiology Long-Term Care Special Interest Group*

Ex : Pneumonia

3 CRITERIA

C. Pneumonia (all 3 criteria must be present)

1. Interpretation of a chest radiograph as demonstrating pneumonia or the presence of a new infiltrate
2. At least 1 of the following respiratory subcriteria
 - a. New or increased cough
 - b. New or increased sputum production
 - c. O₂ saturation <94% on room air or a reduction in O₂ saturation of >3% from baseline
 - d. New or changed lung examination abnormalities
 - e. Pleuritic chest pain
 - f. Respiratory rate of >25 breaths/min
3. At least 1 of the constitutional criteria (see Table 2)

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 Term Care Special Interest Group

Constitutional Criteria for Infection

FEVER

LEUCOCYTOSIS

ACUTE CHANGE IN MENTAL STATUS FROM BASELINE

ACUTE FUNCTIONAL DECLINE (3 PTS OF ADL)

A. Fever

1. Single oral temperature $>37.8^{\circ}\text{C}$ ($>100^{\circ}\text{F}$)

OR

2. Repeated oral temperatures $>37.2^{\circ}\text{C}$ (99°F) or rectal temperatures $>37.5^{\circ}\text{C}$ (99.5°F)

OR

3. Single temperature $>1.1^{\circ}\text{C}$ (2°F) over baseline from any site (oral, tympanic, axillary)

B. Leukocytosis

1. Neutrophilia ($>14,000$ leukocytes/ mm^3)

OR

2. Left shift ($>6\%$ bands or $\geq 1,500$ bands/ mm^3)

Are Mc Geer criteria are adapted?

CONFIRMED CASE (Mc Geer)

Presence of at least 2 of following clinical signs:

New or increased cough

New or increased sputum production

Fever ($\geq 38^{\circ}$ C)

Pleuritic chest pain

New or increasing physical findings at auscultation (rales, rhonchi, wheezing, bronchial breathing)

Changes of respiratory rate (tachypnea ≥ 25 at rest)

Worsening of the mental status or functional status not otherwise explained

AND

Radiological signs:

Presence of probable pneumonia or new or evolutive infiltrate

PROBABLE CASE

Same Symptoms or/ clinical findings

AND

Attestation by a clinician of a focus of crepitant rales on chest examination.

ORIG

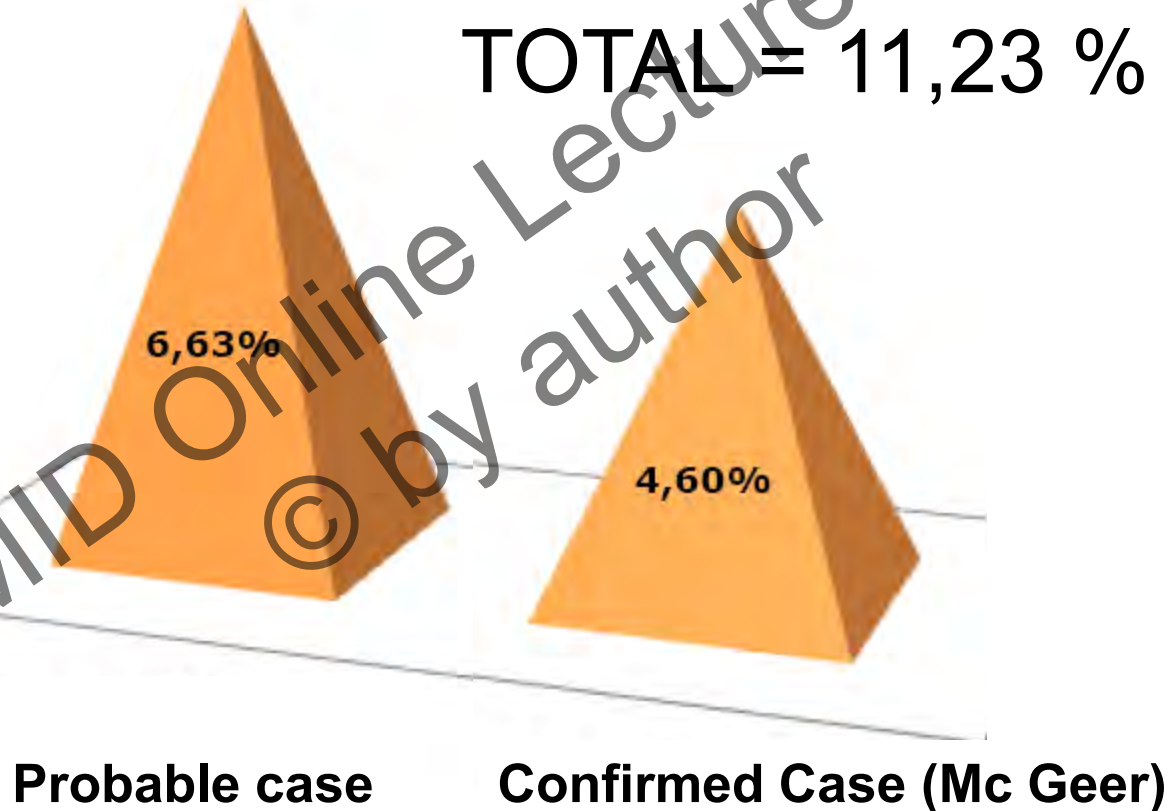
OBSERVATOIRE DU RISQUE
INFECTIEUX EN GERIATRIE

ORIG

OBSERVATOIRE DU RISQUE
INFECTIEUX EN GERIATRIE

PPS in NH With modified McGeer criteria?

PRIAM2 study : 45 000 residents (cumulative data from 5 PPS over 1 year)



Pneumonia in PRIAM study?

PRIAM 2 study : 45 000 residents (cumulative data from 5 PPS over 1 year)

TOTAL = 1,28 % (n=528)

0.89%
(n=400)

0.39%
(n=174)

Probable case

Confirmed Case (Mc Geer)

ORIG

OBSERVATOIRE DU RISQUE
INFECTIEUX EN GERIATRIE

Chami K, Rothan-tondeur M J Hosp Infect

Pneumonia in PRIAM study?

PRIAM 2 study : 45 000 residents (cumulative data from 5 PPS over 1 year)

TOTAL = 1,28 % (n=528)

Antibiotic use
for these cases
?????

0.89%
(n=400)

0.39%
(n=174)

Probable case

Confirmed Case (Mc Geer)

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INFECTIEUX EN GERIATRIE

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Urinary tract Infection in NH study?

modifications between MCGeer and New CDC/SHEA guidelines

2 definitions : Without Urinary catheter AND with Urinary catheter

1. At least 1 of the following sign or symptom subcriteria
 - a. Acute dysuria or acute pain, swelling, or tenderness of the testes, epididymis, or prostate
 - b. Fever or leukocytosis (see Table 2) and at least 1 of the following localizing urinary tract subcriteria
 - i. Acute costovertebral angle pain or tenderness
 - ii. Suprapubic pain
 - iii. Gross hematuria
 - iv. New or marked increase in incontinence
 - v. New or marked increase in urgency
 - vi. New or marked increase in frequency
 - c. In the absence of fever or leukocytosis, then 2 or more of the following localizing urinary tract subcriteria
 - i. Suprapubic pain
 - ii. Gross hematuria
 - iii. New or marked increase in incontinence
 - iv. New or marked increase in urgency
 - v. New or marked increase in frequency
- And positive Bacteriological sample of urine
- a. At least 10^3 cfu/mL of no more than 2 species of microorganisms in a voided urine sample
 - b. At least 10^2 cfu/mL of any number of organisms in specimen collected by in-and-out catheter

Are Mc Geer criteria adapted?

Nursing Home Practitioner Survey of Diagnostic Criteria for Urinary Tract Infections

Manisha Juthani-Mehta, MD, Margaret A. Drickamer, MD,† Virginia Towle, MPhil,†
Ying Zhang, MD, MPH,† Mary E. Tinetti, MD,† and Vincent J. Quagliarello, MD**

Less than 60% of Physician Know or use MC Geer Criteria for UTI diagnosis

Diagnostic Accuracy of Criteria for Urinary Tract Infection in a Cohort of Nursing Home Residents*

*Manisha Juthani-Mehta, MD, Mary Tinetti, MD, Eleanor Perrelli, MSN, Virginia Towle, MPhil,
Peter H. Van Ness, PhD, and Vincent Quagliarello, MD*

	Sens	Spec	NPV	PPV
Mc Geer	30	82	57	61

**Among patient with positive urine culture
> 50% without any criteria received ATBics**

Are Mc Geer criteria accepted?

Nursing Home Practitioner Survey of Diagnostic Accuracy of Urinary Tract Infections

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Less than 60% of Physician Knowledge of Urinary Tract Infection diagnosis
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	NPV	PPV
Mc Geer	57	61

At least 50% of patients with positive urine culture
> 50% of patients with any criteria received ATBics

Infection in HALT 1 study ?

HALT 1 : 61,932 eligible residents Point prevalence survey 2010

CASE DEF : Mc Geer and signs and symptoms (MD diagnosis)

Signs and symptoms of an infection were reported for

2,495 (4.0%)

Case definitions according to Mc Geer definition =
in

1 488 (2.4%)

Antibiotic consumption ,

> 2 500 (4.3%)- > 27% for ATB prophylaxis

Infection in HALT 1 study ?

HALT 1 : 61,932 eligible residents Pointprevalence survey 2010

What are the other cases....??

**WHO are those receiving ATBic
true or false infections??**

DO we have to miss it ?

**The issue of cases definitions and limits of criteria
are present every where in Europe whatever the type
of LTC Probable case**

ATBic use is a part of the Iceberg

Limited Resources for acquisition Data ?

Medical Staff

Country	Personal GP. (In all or some NHs)	Medical staff employed by the NH. (In all or some NHs)	Both: GPs and medical staff employed by the NH. (In all or some NHs)
Belgium	All		
Croatia	All		
Czech Republic		All	
Denmark			All
Finland	Some	Some	Some
France	All		
Germany	Some	Some	
Hungary	Some	Some	Some
Ireland	Some	Some	
Italy	Some	Some	Some
Latvia			All
Malta			All
Netherlands		All	
Norway	Some	Some	Some
Poland	Some	Some	Some
Russian Federation		Some	Some
Slovenia	All? ^a	All? ^a	
Sweden	Some	Some	
UK			
England	All		
Northern Ireland	All		
Scotland	All		

Ressources for Infection control

ICP Staff

24 % of NH

17.4%
Infection
Surveillance

Tasks	Countries				
	Ireland	Northern Ireland	Norway	Russian Fed.	Slovenia
Surveillance (registration and follow-up) of infections in the NH	+	+	+	+	
Infection prevention training of nursing and paramedical staff	+		+	+	+
Infection prevention training of GPs and medical staff			+	+	+
Development of care protocols	+		+		+
Registration of NH residents colonised or infected with multi-resistant micro-organisms	+		+	+	+
Investigation of outbreaks	+	+	+		+
Feedback on surveillance results to nursing/medical staff	+	+	+		
Formulation of recommendations/ advice for good AB use. Development of NH AB policy			+		
Supervision of disinfection and sterilisation of medical and care materials		+	+	+	+
Deciding on isolation and precautions for residents colonised with multi-resistant micro-organisms	+	+	+		+
Supervision and development of vaccination policy in the NH		+	+	+	+
Feedback to GPs on AB consumption in the NH			+		
Organisation of, control of and feedback on hand hygiene in the NH	+	+	+	+	+

Are Mc Geer/ Stones criteria adapted?

NO

Yes

NO

According to what we want to know

Yes

NO

Yes

NO

Yes

NO

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Are CDC-SHEA criteria adapted?

NO

NO

**The burden of infection,
risk of infection**

ATB use

Infection control and
improvement of infection control
practice ,

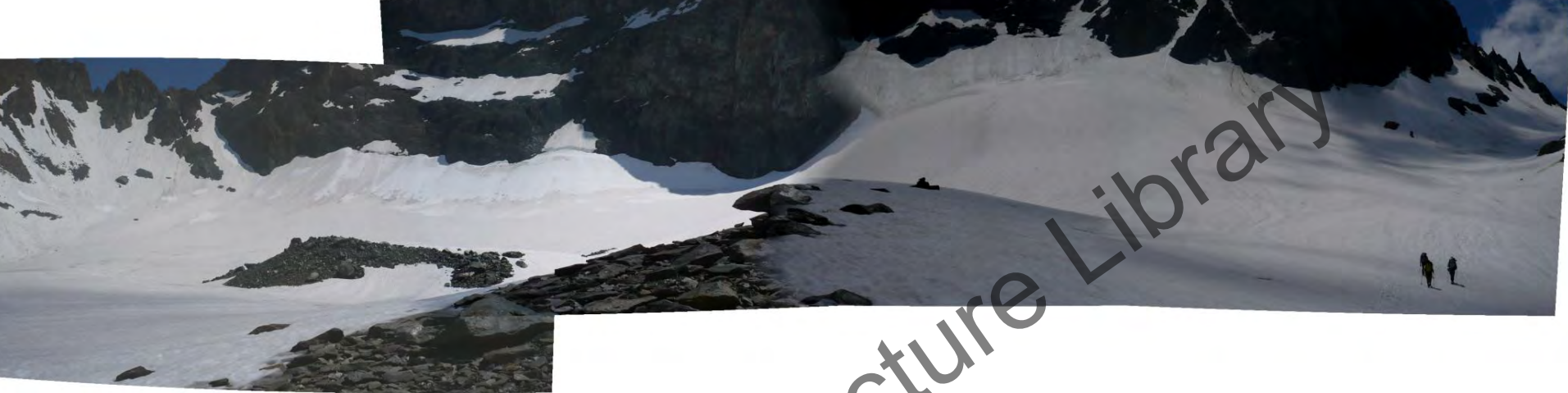
NO

NO

NO

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How to do better?

Clinician's perspective

control perspective

Infection

Do we need new definition criteria ?
Can we reach correct definition ?

To measure the burden of infection

Which are the parameters ?

Surveillance of true infection

?

We need High level of resources

To help diagnosis

To help surveillance

To collect data

If you have the resources

Use them as in Intensive care Unit

What is the burden of NHAIs?

Bacterial infection

Respiratory / Urinary tract infection /
Skin soft tissue / Digestive / Devices

what ever the definitions

= **Antibiotic treatment**

Nursing home viral infection

very frequent (VRS / influenza / Norovirus)

what ever the definitions

= **Outbreaks**

What could be discussed for NHAI?

Bacterial burden of infection Measuring

Together Antibiotic treatment AND Infection rates

with a simple definition :

For each prescribed ATBic ask for Coordinator or
General Practitioner which infection did he treat ?

Viral Burden of infection

Develop good level of practice to
recognize and report outbreaks in NH/LTC

Take Home messages

LTCF -NH are very different (national /International)

The level of resources is vary largely but limited quite everywhere

We need to know the burden of infection in LTCF

Majority of bacterial infection are sporadic and commun infection and are treated with ATB

Majority of outbreak are related to viral infections

Take Home messages

Separate Management of infection
(diagnosis performance and ATB stewardship)
from Infection control measurements

Mc Geer/ CDC SHEA 2012 Criteria are not adapted to
NH European situation (are they for North America?)

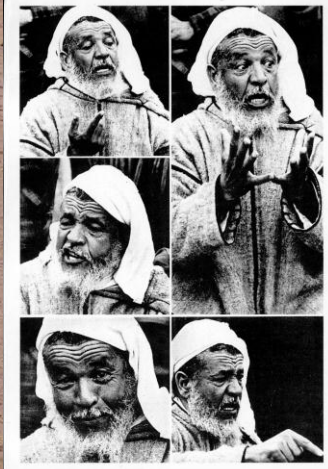
To measure the burden of infection in limited resources
context

Use the most simple ways to count....

Antibiotic + A simple definition for Bacterial Infection
Outbreak surveillance for Viral Infection

...These is not a desert...

Jourdoun 2009



GREPI Groupe de Recherche et d'Etude du Processus Inflammatoire

UNIVERSITE JOSEPH FOURIER

CHU CENTRE NATIONAL DE RECHERCHES SCIENTIFIQUES

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