Highlighting the challenges of interoperability in clinical microbiology data

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Selected challenges for CM interoperability

Out of scope (time)

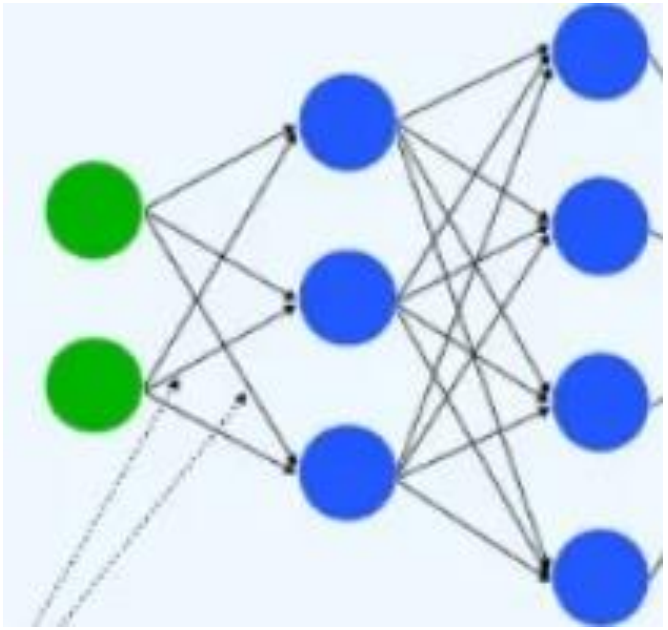
1. Technical transfer (from lis to fhir etc)
2. Receiving reports: where to store etc
3. LIS readiness for specific reporting requirements

In scope

1. Semantic coding
   A. By non experts => errors
   B. By experts => variation
   C. LOINC/SNOMED incompleteness: Molecular microbiology
2. Secondary use how to harmonize?

Hallmark of medical micro: diversity ~ spice of life… and a coding nightmare

- Many different pathogens and culture techniques
- Many possible specimen types
- Susceptibility testing
  - Many ABXagents posssible
  - Several methods existing
  - Species specific rules

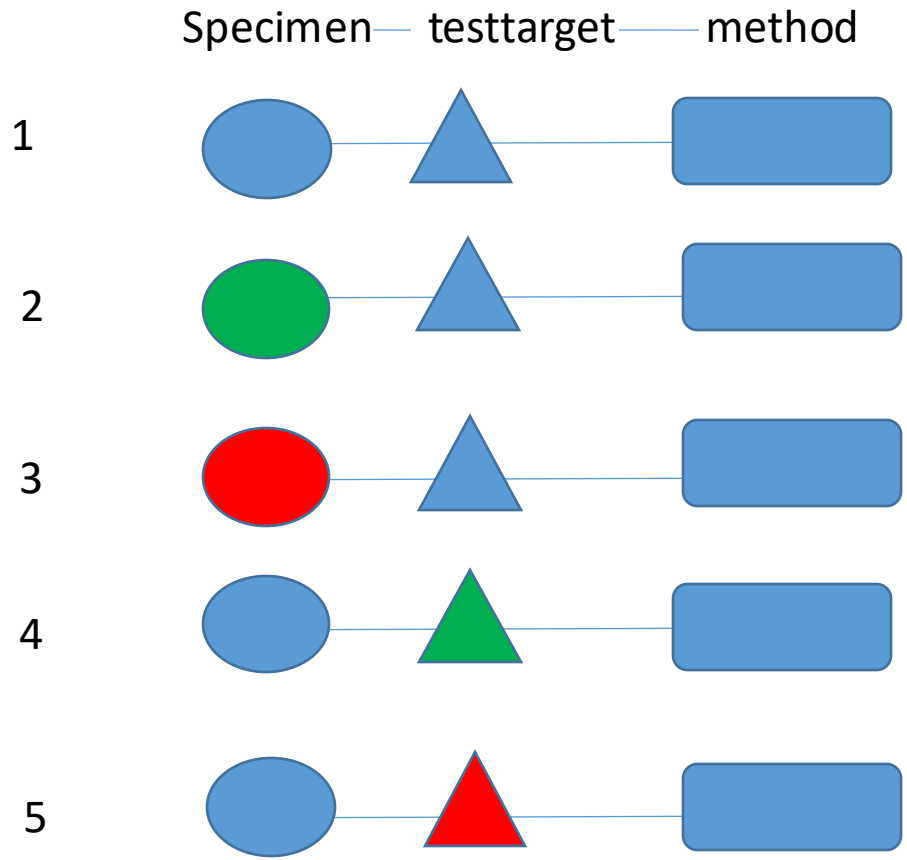


Explosion of codes: specimens + pathogens/culturetechniques + abx

Coding diversity:reducing complexity

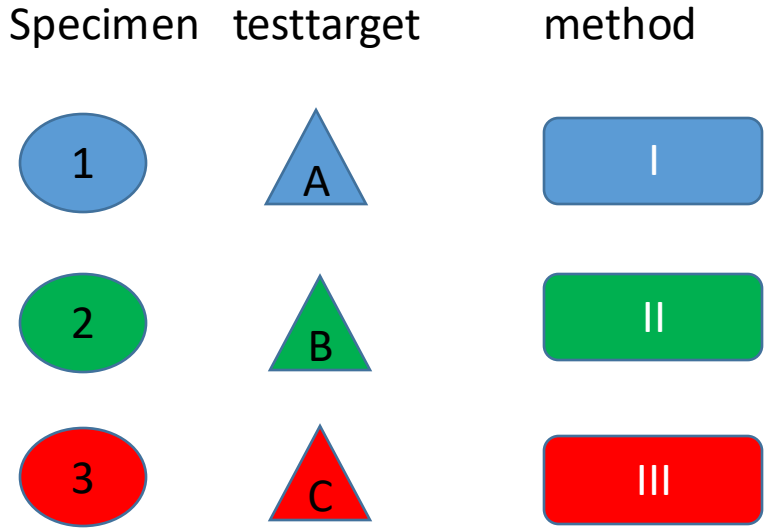
- What are the essential elements?
- Pre vs post- coordination

Pre: one code covering all details



…etc… too many codes

Post: atomic coding, free combinations



Trade off: Simplicity <=> Code explosion

Semantic coding choices

- Pre vs post coordination: might be somehow convertable… **if perfectly coded** and technically equiped… **big if …**

- Coding of CM data to be performed by laboratories, who ensures it is correct?

LOINCS: even if performed by experts different choices possible …
… for apparently the same lab-test

Who is to decide on the level of detail needed?

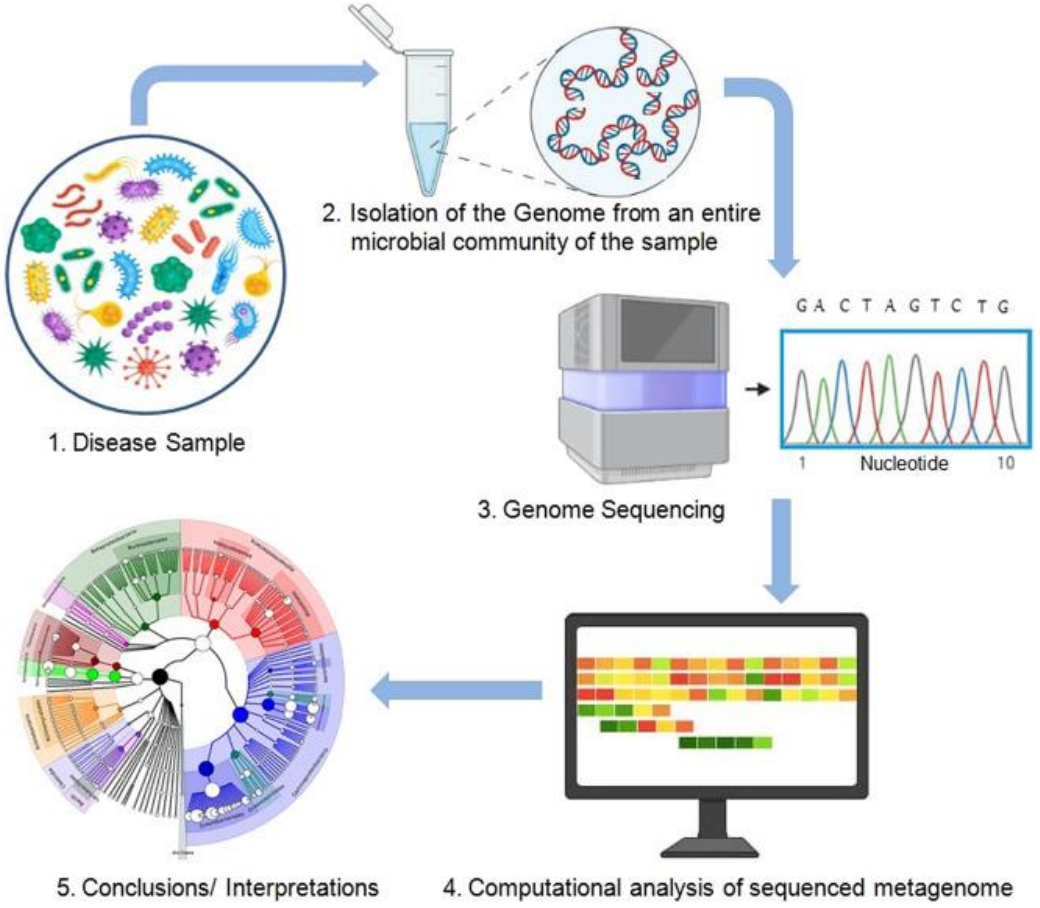
Borrelia IgG example

LOINC | borrelia IgG | Search

RESULTS 130 | DISPLAYING 200 1-130 | FILTER | VIEW List Card | EXPORT

Status	LOINC	Long Common Name	Component	Property	Timing	System	Scale	Method	Class	Type	Example UCUM Units
	92815-0	Borrelia afzelii+burgdorferi+garinii IgG panel - Serum and CSF LHC-Forms	Borrelia afzelii+burgdorferi+garinii Ab.IgG panel	-	Pt	Ser+CSF	-		PANEL.MICRO		
	41279-1	Borrelia burgdorferi IgG Ab/IgM Ab [Ratio] in Serum	Borrelia burgdorferi Ab.IgG/Borrelia burgdorferi Ab.IgM	Ratio	Pt	Ser	Qn		MICRO		{Index_val}
	104603-6	Borrelia burgdorferi B31 IgG Ab [Presence] in Serum by Line blot	Borrelia burgdorferi B31 Ab.IgG	PrThr	Pt	Ser	Ord	Line blot	MICRO		
	13208-4	Borrelia hermsii IgG Ab [Units/volume] in Serum	Borrelia hermsii Ab.IgG	ACnc	Pt	Ser	Qn		MICRO		[arb'U]/mL
	101357-2	Borrelia burgdorferi.VlsE+OspC IgG+IgM Ab [Presence] in Serum by Immunoassay	Borrelia burgdorferi.VlsE+OspC Ab.IgG+IgM	PrThr	Pt	Ser	Ord	IA	MICRO		
	22138-2	Borrelia hermsii IgG Ab [Titer] in Serum	Borrelia hermsii Ab.IgG	Titr	Pt	Ser	SemiQn		MICRO		{titer}
	101403-4	Borrelia burgdorferi.VlsE1+pepC10 IgG+IgM Ab [Presence] in Serum by Immunoassay	Borrelia burgdorferi.VlsE1+pepC10 Ab.IgG+IgM	PrThr	Pt	Ser	Ord	IA	MICRO		
	22128-3	Borrelia burgdorferi IgG Ab [Presence] in Serum	Borrelia burgdorferi Ab.IgG	PrThr	Pt	Ser	Ord		MICRO		
	60522-0	Borrelia hermsii IgG+IgM Ab [Presence] in Serum	Borrelia hermsii Ab.IgG+IgM	PrThr	Pt	Ser	Ord		MICRO		
	48360-2	Borrelia afzelii IgG Ab [Presence] in Serum by Immunoblot	Borrelia afzelii Ab.IgG	PrThr	Pt	Ser	Ord	IB	MICRO		
	53363-8	Borrelia burgdorferi 49736 IgG Ab [Units/volume] in Serum	Borrelia burgdorferi 49736 Ab.IgG	ACnc	Pt	Ser	Qn		MICRO		[arb'U]/mL
	7817-0	Borrelia burgdorferi IgG Ab [Units/volume] in Serum	Borrelia burgdorferi Ab.IgG	ACnc	Pt	Ser	Qn		MICRO		{Index_val}
	22130-9	Borrelia burgdorferi IgG Ab [Titer] in Serum	Borrelia burgdorferi Ab.IgG	Titr	Pt	Ser	SemiQn		MICRO		{titer}
	34251-9	Borrelia garinii IgG Ab [Presence] in Serum by Immunoblot	Borrelia garinii Ab.IgG	PrThr	Pt	Ser	Ord	IB	MICRO		
	48361-0	Borrelia valaisiana IgG Ab [Presence] in Serum by Immunoblot	Borrelia valaisiana Ab.IgG	PrThr	Pt	Ser	Ord	IB	MICRO		
	101352-3	Borrelia burgdorferi Ab.IgG and IgM with reflex to immunoassay panel - Serum or Plasma LHC-Forms	Borrelia burgdorferi Ab.IgG & IgM with reflex to immunoassay panel	-	Pt	Ser/Plas	-		PANEL.MICRO		
	34942-3	Borrelia burgdorferi IgG and IgM panel - Serum LHC-Forms	Borrelia burgdorferi Ab.IgG & IgM panel	-	Pt	Ser	Qn		PANEL.MICRO		
	96431-2	Borrelia burgdorferi 49736 IgG bands [Identifier] in Specimen by Immunoblot	Borrelia burgdorferi 49736 Ab.IgG bands	Prid	Pt	XXX	Nom	IB	MICRO		
	92810-1	Borrelia afzelii+burgdorferi+garinii IgG Ab [Units/volume] in Serum by Immunoassay	Borrelia afzelii+burgdorferi+garinii Ab.IgG	ACnc	Pt	Ser	Qn	IA	MICRO		[IU]/mL
	92814-3	Borrelia afzelii+burgdorferi+garinii IgG Ab [Presence] in Serum by Immunoassay	Borrelia afzelii+burgdorferi+garinii Ab.IgG	PrThr	Pt	Ser	Ord	IA	MICRO		
	87275-4	Borrelia afzelii+burgdorferi+garinii IgG Ab [Presence] in Serum by Line blot	Borrelia afzelii+burgdorferi+garinii Ab.IgG	PrThr	Pt	Ser	Ord	Line	MICRO		

Incompleteness
coding sequencing (standardizing outcomes)





NL/Individual countries → **EU (EHDS in transition)** → **Future EHDS/ECDC/Research*harmonized**

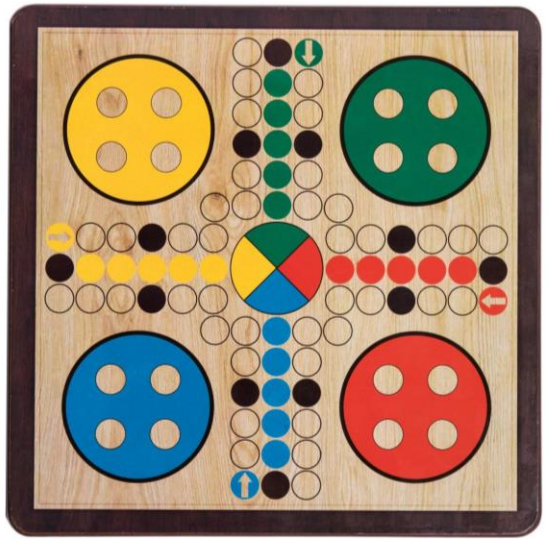


High level interoperability: sharing data in a roughly understandable way;
recognizing pieces and playground



Using a clinical expert curated comprehensive list of codes =>
*same codes** under the same conditions*



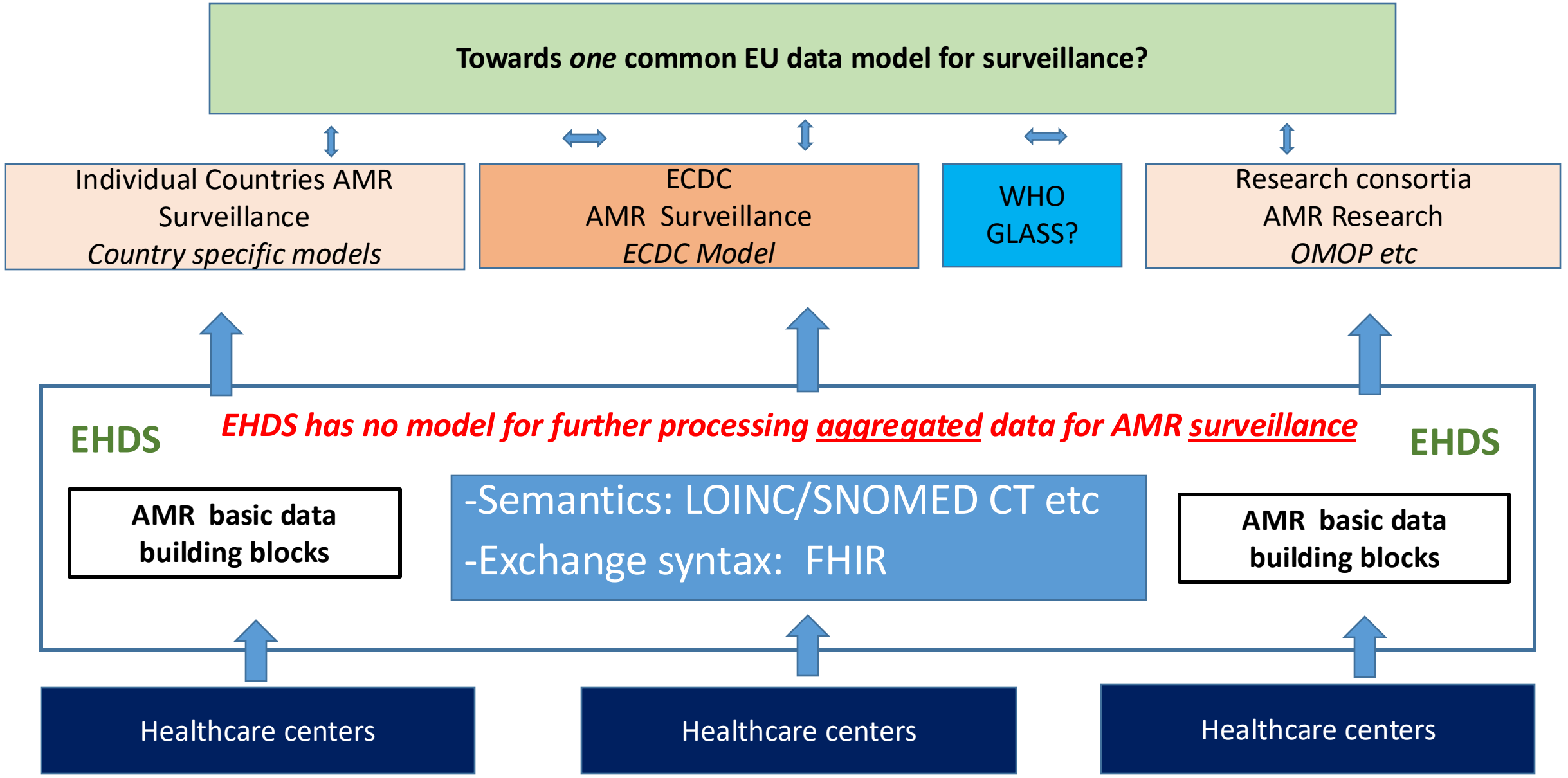






*FHIR => OMOP **Or future platform for 1:1 SNOMED ct transformations

Secondary use: lack of harmonization, AMR showcase



Summary and discussion points, selection

1. Garbage in garbage out: build capacity for labs to get coding right
2. For harmonisation professional clinical societies (ESCMID/EFLM) should get way more involved in the EHDS: need for *clinical expert curated comprehensive lists of codes => use same codes under the same conditions*
3. For medical *molecular* microbiology coding a special taskforce is needed
4. Standardizing the base is a start… We also should start thinking on how to standardize secondary use of basic data