

# Public Health 101 Series

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## Introduction to Public Health Informatics

Instructor name  
Title  
Organization

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# Course Topics

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## Introduction to Public Health Informatics

1. A Public Health Approach
2. Public Health Informatics Definition, Components, and Functions
3. Creating a Public Health Information System
4. At the Intersection of the Informatician, the Public Health Official, and the Information Technologist

# Learning Objectives

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After this course, you will be able to

- explain the importance of informatics to the public health mission
- describe the role of the informatician in public health practice
- differentiate between public health informatics and information technology

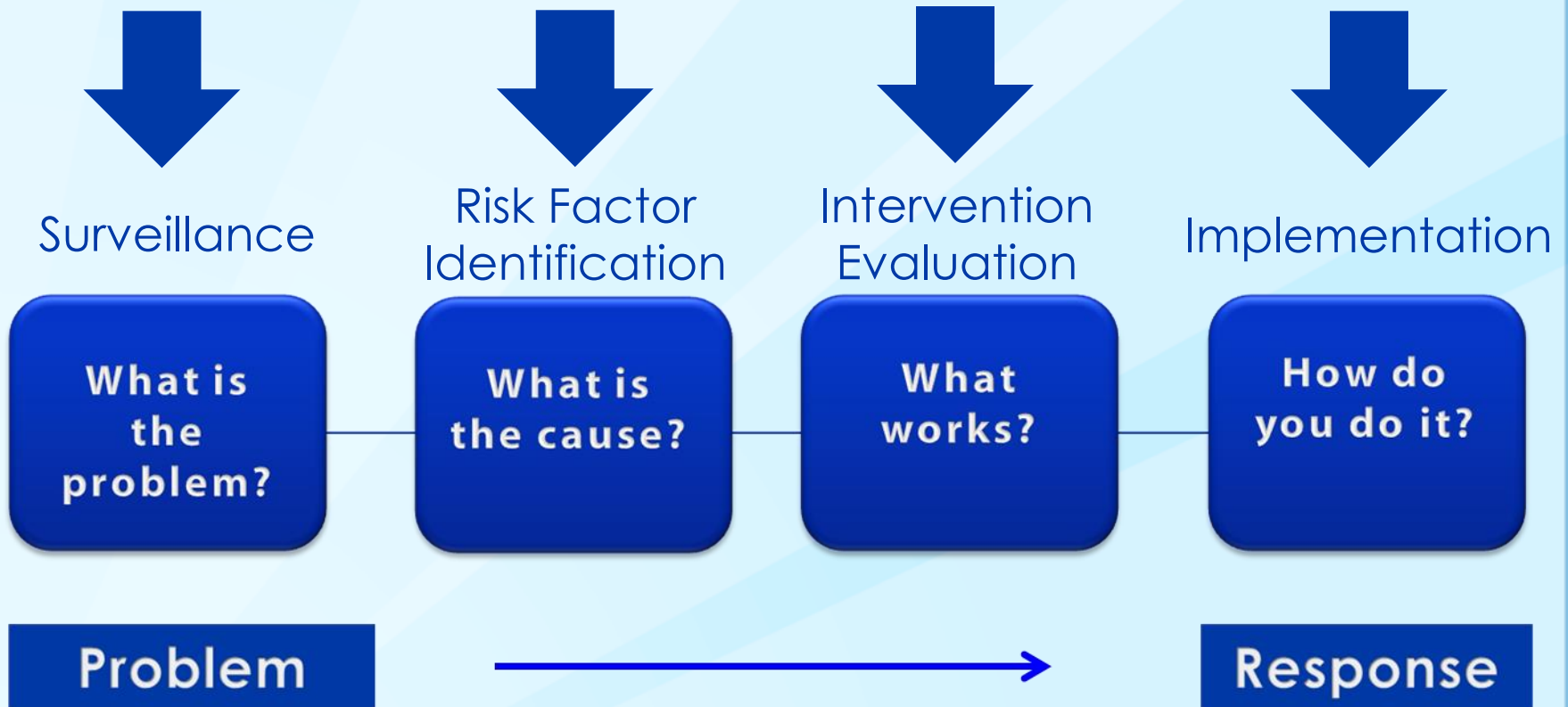
# Topic 1

## A Public Health Approach



# A Public Health Approach

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# Public Health Core Sciences

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## Topic 2

# Public Health Informatics Definition, Components, and Functions



# The Public Health Mission

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CDC provides crucial scientific  
information that protects our  
nation against dangerous and  
costly health threats



# Public Health Informatics — Defined

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Public health informatics is the systematic application of information, computer science, and technology to public health practice, research, and learning

Yasnoff WA, O'Carroll PW, Koo D, Linkins RW, Kilbourne EM. Public health informatics: improving and transforming public health in the information age. *J Public Health Manag Pract* 2000;6:67–75.

Riegelman R, ed. *Public health 101: healthy people—healthy populations*. Sudbury, MA: Jones & Bartlett Learning; 2010: 40.

# Building Your Dream Home

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Electrician



Framer



Developer/Architect



Brick Layer



Plumber



Painter

# Building Your Public Health Information System



Programmer



Database Administrator



Informatician



Network Administrator



Web Designer



Security Specialist



## Knowledge Check

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A tuberculosis outbreak has occurred in 10 states across the country. To increase knowledge of the health threat, CDC uses computer science, technology, and applied information methods that will inform the nation's population about important \_\_\_\_\_.

A. research



B. health information

C. security measures



# Knowledge Check

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Informatics uses public health knowledge to

- A. broaden the public health knowledge base through learning
- B. improve population health in daily practice
- C. further knowledge in public health research



D. all of the above

# Topic 3

## Creating a Public Health Information System



# The Informatician

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# Creating a Public Health Information System

| Creating a Public Health Information System                                                                                                                                            | Public health official                                                                                    | Informatician                                                                                                 | Information technology professional |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Step 1 — Vision and System Planning</b>                                                                                                                                             |                                                                                                           |                                                                                                               |                                     |
| Envision solutions, opportunities, and application of information technology in public health                                                                                          |                                                                                                           | Broad knowledge of public health practice, proficiency in information technology, and capacity for innovation |                                     |
| <b>Step 2 — Health Data Standards and Integration</b>                                                                                                                                  |                                                                                                           |                                                                                                               |                                     |
| Define and design health data standards and transformation (e.g., HL7, ICD, SNOMED) and health domain integration (e.g., ELR, EHR, CMS, HIE, surveillance, demographics, social media) |                                                                                                           | Expertise in health data standards, database design, and data linking and integration across health systems   |                                     |
| Design and implement databases, tables, columns, data formats, and keys for linking tables and data to support defined health data standards and integration                           |                                                                                                           | Expertise in relational/SQL databases and unstructured data design and management                             |                                     |
| <b>Step 3 — Data Privacy and Security</b>                                                                                                                                              |                                                                                                           |                                                                                                               |                                     |
| Define and implement health data privacy and HIPAA regulations                                                                                                                         |                                                                                                           | Knowledge of health data privacy                                                                              |                                     |
| Implement and enforce data, systems, and communication security                                                                                                                        |                                                                                                           | Understanding information technology security functions                                                       |                                     |
| <b>Step 4 — Systems Design and Implementation</b>                                                                                                                                      |                                                                                                           |                                                                                                               |                                     |
| Define and design methods for public health functions, data elements, data flow, case definitions, and message mapping                                                                 |                                                                                                           | Expertise in health systems and data interoperability                                                         |                                     |
| Implement information technology for defined functions, data elements, data flow, and case definitions                                                                                 |                                                                                                           | Expertise in managing information technology systems development                                              |                                     |
| <b>Step 5 — Visualization, Analysis, and Reporting of Health Data</b>                                                                                                                  | Expertise in public health practice, business intelligence, decision making, and use of analytic software |                                                                                                               |                                     |

CMS = Centers for Medicare and Medicaid Services; EHR = electronic health record; ELR = electronic laboratory record; HIE = health information exchange; HIPAA = Health Insurance Portability and Accountability Act; HL7 = Health Level 7; ICD = *International Classification of Diseases*; SNOMED = Systematized Nomenclature of Human Medicine; SQL = structured query language.



# Step 1 — Vision and System Planning

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Hardware



Software



Communication  
Technology

## Step 2 — Health Data Standards and Integration

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Health data standards and integration are required when defining the data.

## Step 3 — Data Privacy and Security

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Data privacy and security must be identified, prescribed, and implemented throughout the data lifecycle.

## Step 4 — Systems Design and Implementation

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- Define or design methods for public health functions, data elements, data flow, case definitions, and message mapping
- Implement information technology for defined public health functions, data elements, data flow, case definition, and similar needs

## Step 5 — Visualization, Analysis, and Reporting of Health Data

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Visualization and implementation of the required analysis, reporting, and meaningful use of the data collected and managed by the system.

# Informatics in Action — CDC's FluView

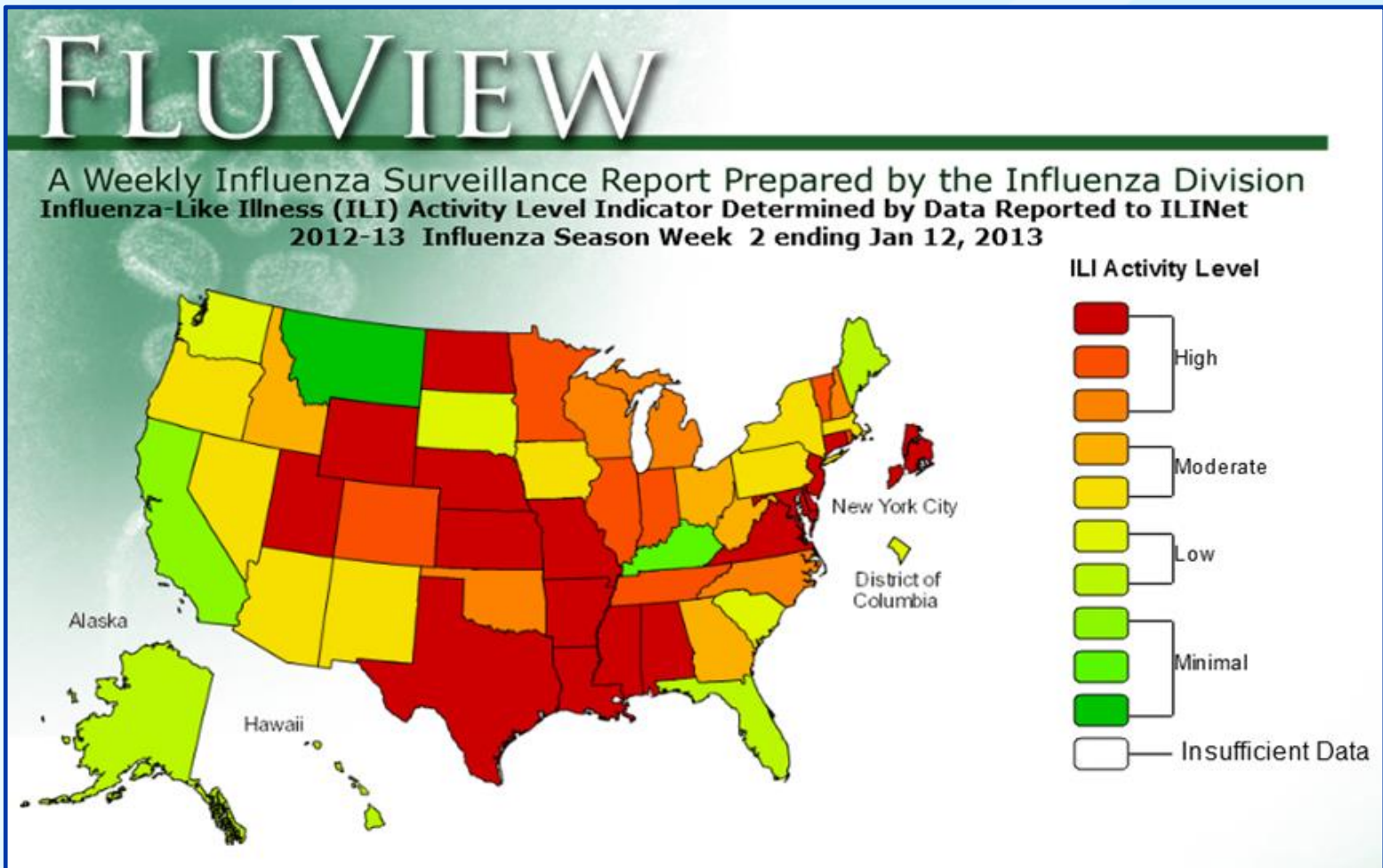
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A clear-cut way to share national influenza data was needed by

- the public health community,
- clinicians,
- scientists, and
- the general public

# Informatics in Action — FluView





## Knowledge Check

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On the basis of what you have learned about creating a public health information system, which of the following does an informatician consider first when identifying technologies to use for sharing national malaria data?

A. Health data standards and integration



B. Vision and systems planning

C. System design and implementation





## Knowledge Check

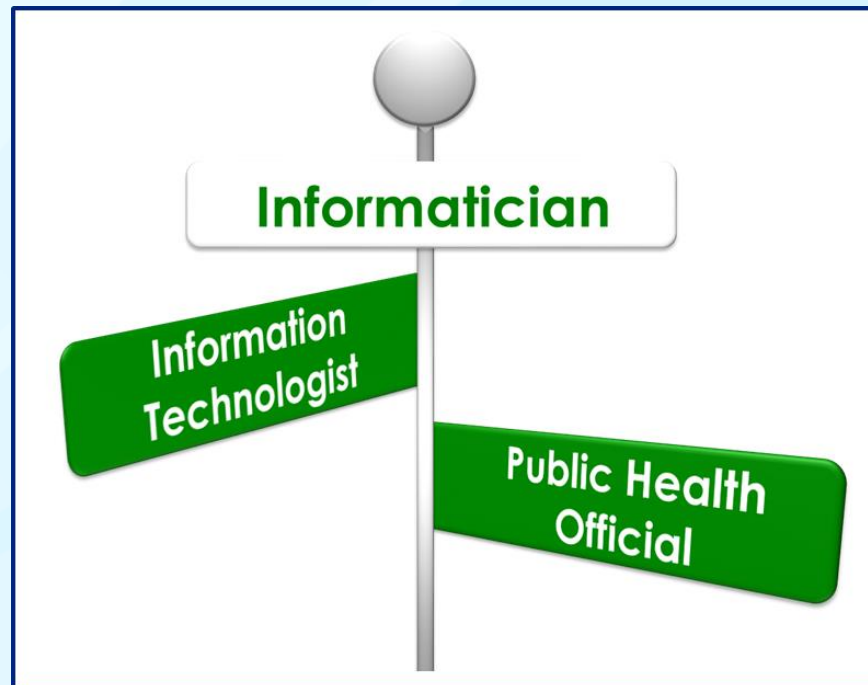
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Informatics is used to create a program such as CDC's FluView. Which of the following three disciplines must work together to visually represent the data in an effective method?

- A. Computer science, epidemiology, and public health
- ✓ B. Technology, computer science, and applied information methods
- C. Technology, surveillance systems, and epidemiology

# Topic 4

At the Intersection  
of the Informatician,  
the Public Health Official,  
and the Information Technologist



# Common Knowledge and Skills

| Creating a Public Health Information System                                                                                                                                            | Public health official                                                                                        | Informatician | Information technology professional |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------|-------------------------------------|
| Step 1 — Vision and System Planning                                                                                                                                                    |                                                                                                               |               |                                     |
| Envision solutions, opportunities, and application of information technology in public health                                                                                          | Broad knowledge of public health practice, proficiency in information technology, and capacity for innovation |               |                                     |
| Step 2 — Health Data Standards and Integration                                                                                                                                         |                                                                                                               |               |                                     |
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| Design and implement databases, tables, columns, data formats, and keys for linking tables and data to support defined health data standards and integration                           | Expertise in relational/SQL databases and unstructured data design and management                             |               |                                     |
| Step 3 — Data Privacy and Security                                                                                                                                                     |                                                                                                               |               |                                     |
| Define and implement health data privacy and HIPAA regulations                                                                                                                         | Knowledge of health data privacy                                                                              |               |                                     |
| Implement and enforce data, systems, and communication security                                                                                                                        | Understanding information technology security functions                                                       |               |                                     |
| Step 4 — Systems Design and Implementation                                                                                                                                             |                                                                                                               |               |                                     |
| Define and design methods for public health functions, data elements, data flow, case definitions, and message mapping                                                                 | Expertise in health systems and data interoperability                                                         |               |                                     |
| Implement information technology for defined functions, data elements, data flow, and case definitions                                                                                 | Expertise in managing information technology systems development                                              |               |                                     |
| Step 5 — Visualization, Analysis, and Reporting of Health Data                                                                                                                         |                                                                                                               |               |                                     |
|                                                                                                                                                                                        | Expertise in public health practice, business intelligence, decision making, and use of analytic software     |               |                                     |

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# Step 4 — Creating a Public Health Information System

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| Creating a Public Health Information System                                                                           | Public health official | Informatician                                         | Information technology professional                              |
|-----------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------|------------------------------------------------------------------|
| Step 4 — Systems Design and Implementation                                                                            |                        |                                                       |                                                                  |
| Define and design methods for public health functions, data elements, data flow, case definition, and message mapping |                        | Expertise in health systems and data interoperability |                                                                  |
| Implement information technology for defined public health functions, data elements, data flow, and case definition   |                        |                                                       | Expertise in managing information technology systems development |

# Combined Disciplines — The Informatician and the Information Technologist

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# The Role of the Informatician in Public Health

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- Plans, designs, and defines functional requirements for public health information systems
- Evaluates the application and impact of information systems in support of health goals
- Serves as a liaison between multidisciplinary teams
- Uses data standards to support interoperability of data between systems
- Ensures confidentiality, security, and integrity standards
- Is knowledgeable about health data standards, sources, and meaningful use of health data

# The Role of the Information Technologist in Public Health

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- Plans technology projects and milestones, develops software, and maintains and operates systems
- Evaluates the performance and availability of information systems
- Designs, implements, and administers database architecture, privacy, security, and backup procedures



## Knowledge Check

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One of the United Nations' Millennium Development Goals is to substantially reduce infant mortality worldwide. A system has been developed that will display the data and track the progress of attaining this goal.

Which of the following professionals works with health data standards and sources and ensures the integrity and security of the standards?

A. The information technologist



B. The informatician





## Knowledge Check

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Which of the following is NOT a function of a public health informatician?

- A. Uses data standards to support interoperability of data between systems
- B. Ensures confidentiality, security, and integrity standards
- ✓ C. Designs, implements, and administers database architecture, privacy, security, and backup procedures
- D. Is knowledgeable about health data standards, sources, and meaningful use of health data

# Learning Objectives

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During this course, you learned to

- explain the importance of informatics to the public health mission
- describe the role of the Informatician in public health practice
- differentiate between public health informatics and information technology

# QUESTIONS?

# Resources and Additional Reading

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- Yasnoff WA, O'Carroll PW, Koo D, Linkins RW, Kilbourne EM. Public health informatics: improving and transforming public health in the information age. J Public Health Manag Pract 2000;6:67–75.
- Riegelman R, ed. Public health 101: healthy people—healthy populations. Sudbury, MA: Jones & Bartlett Learning; 2010: 40.
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- Centers for Disease Control and Prevention (CDC). Youth violence: state statistics; Texas. Atlanta, GA: US Department of Health and Human Services, CDC; 2011. [http://www.cdc.gov/ViolencePrevention/youthviolence/stats\\_at-a\\_glance/TX.html](http://www.cdc.gov/ViolencePrevention/youthviolence/stats_at-a_glance/TX.html).

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