

2024/25 價值觀教育傑出教學獎
教案

學校名稱：聖保祿學校

1. 教學單元／課題：

校本跨學科「生物 X 經濟」課程:疫起共對為家園
School-Based BIO X ECON Program: Vaccination and Community Health

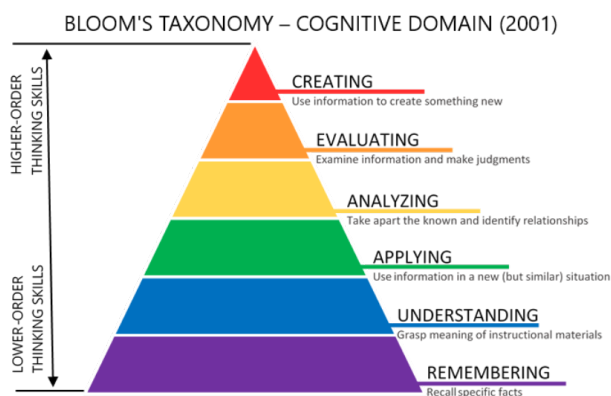
2. 教學時間： 40 分鐘

3. 預期學習成果：

知識：	Biology: The students should be able to explain: • Biological principle of vaccination and its impacts • Biological base of certain infectious diseases (2007) Economics: The students should be able to explain the positive externality, in terms of • The fundamental concept of under-consumption • External benefits of being vaccinated • Government budget on long-term medical expenses and burden (2007) STEAM: The students should be able to use of a self-developed simulation SIR model to • calculate herd immunity thresholds • discuss the ethical importance and underlying values
共通能力／技能：	Basic Skills: • Communication and Information Technology (IT) Skills Thinking Skills: • Critical-thinking and Problem-solving Skills

	Personal and Social Skills: Self-learning and Collaboration Skills
價值觀和態度：	Values Education: Core Values: - National Identity: Filial Piety - Responsibility Other Values: - Unity and Empathy Attitudes: - Be open-minded and understand the pros and cons of being vaccinated to our society - Understand the government's economic benefits and costs in providing vaccination to the citizens - Achieve a long-term health planning and be self-responsible through risk-benefit analysis - Strengthen the relationship between students, society and the government - Strengthen the information literacy among students
教學中凸顯的首要培育價值觀和態度（包括校本價值觀）：（最多 4 項）	School-Based “7Cs” Core Values: - Charity, Conscience, Confidence, Courage, Creativity, Competence and Commitment - Contribute positively to their home, profession, society and homeland Sustainable Development Goals (SDGs): - The formal curriculum will incorporate the SDG Goals SDG 3: Good Health and Well Being SDG 11: Sustainable Cities and Communities Adoption Practice: Catering Learner Diversity: - More advanced and cross-subject materials can be offered to the gifted students

- Implement **Bloom's Taxonomy** in both curriculum and assessment design framework to enhance the overall learning and teaching effectiveness (1956)
- Project works can enhance the overall “assessment for learning” and “learning how to learn” effectiveness



School Core Theme of the Year: 4R Mental Health Values:

- **Resilience** (Biological effects on vaccination)
- **Relationship** (To peers, family, society and government)
 - **Group project and presentation** (A3-size poster)
 - **Community project plan**

協助學生從小建立健康的生活習慣，有足夠的休息、充足的睡眠和休閒的活動。

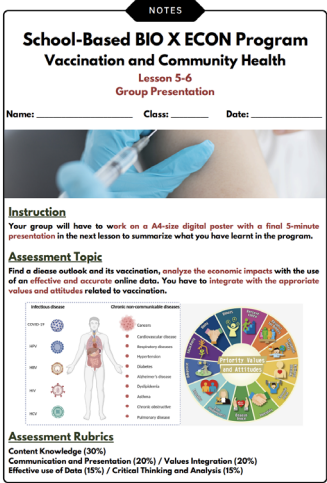


教導學生適時放鬆，關顧自己的精神健康及懂得自我關懷。

加強同儕、師生，以及家長與子女之間的關係，提升聯繫感；幫助學生明白自己在不同關係的角色及其重要性，願意承擔責任並作出貢獻。

裝備學生適應生活中無可避免的壓力和挫折，教導學生以正面的態度處理情緒、應對壓力和克服困難。

4. 教學流程											
學習領域／科目／跨學科範疇：		Science (SS Biology) [Integrated PSHE (Economics) and STEAM]	班別／年級：S. 4								
時間	學習要點／內容 (請於本部份列出有關的價值觀)	學與教活動 (時間)	教材／學習材料								
20 mins	Learning Objectives: Knowledge: Understand the impacts of vaccines on individual and public health; the biological consequences of low vaccination rates. Knowledge: Analyze economic costs associated with vaccine-preventable diseases due to vaccine refusal. Skill: Develop teamwork, research, presentation and critical thinking skills. Skill: Improve the IT (data literacy) skill in identifying fake and accurate online information. Attitude: Appreciate the local government in responding to vaccination issues and strengthen the sense of national identity and responsibility on fulfilling “social contract” spirits. Attitude: Explore ethical considerations, promote empathy and social responsibility in public health. Regarding the Poster, the poster should include the following items: - Introduce the disease and its biological impact. - Explain how vaccine refusal affects disease spread and public health.	20 minutes - Group Presentation and Debriefing Presenters & Teachers: The remaining 2 groups will present their project work and followed by the follow-up questions. <table><tr><td>5 minutes</td><td>First group will present</td></tr><tr><td>5 minutes</td><td>Teacher will ask the follow-up questions</td></tr><tr><td>5 minutes</td><td>Second group will present</td></tr><tr><td>5 minutes</td><td>Teacher will ask the follow-up questions</td></tr></table> Other Students: The students are required to fill out the peer evaluation form and provide feedback (two positive comments and one improvement) to the presenters. Assessment Criteria: - Content Knowledge (30%) - Communication and Presentation (20%) - Values Integration (20%) - Effective Use of Data (15%) - Critical Thinking and Analysis (15%) Sample Work:	5 minutes	First group will present	5 minutes	Teacher will ask the follow-up questions	5 minutes	Second group will present	5 minutes	Teacher will ask the follow-up questions	Tools: - A3 Digital Poster - Smart Board and Mic - Peer Evaluation Form - Assessment Rubric
5 minutes	First group will present										
5 minutes	Teacher will ask the follow-up questions										
5 minutes	Second group will present										
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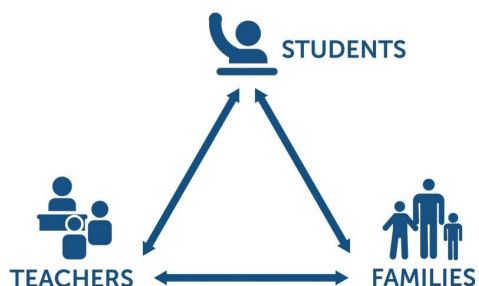
	- Discuss economic consequences, using data and examples. - Highlight ethical considerations and the values involved. - Incorporate perspectives of different stakeholders. - Prepare questions, especially regarding ethical and value aspects. - Other important item(s) As the pupils' learning is often unpredictable, the poster and presentation design can help to validate the unintended learning outcomes, which includes different positive values.	 Use of the Assessment Criteria Scoresheet To ensure the assessment is valid and reliable, a detailed assessment criteria scoresheet with descriptions will be provided for students to reduce the inter-rater reliability.	
5 mins	Learning Objectives: Short Summary: Recall the learning checkpoints, in terms of - Basic biological concepts; - the economic impacts; - and mathematical modeling (SIR Simulation) in vaccination with real-life examples. Values Education: Promote the values of National Identity and Social Responsibility through the understanding of the herd immunity, biological and economic impacts of vaccination.	5 minutes - Brief Summary Direct Teaching: Provide general feedback on the group project work and recall all the learning checkpoints. Incorporate the 4Rs Mental Health Charter - Vaccination can help strengthen resilience (Vaccines prevent illness, both physical and mental well-being). - Vaccination can help to strengthen the relationship with peers, parents and our community, boosting the sense of national identity and social responsibility.	Tools: - A3 Digital Poster - Lecture Handouts - Smart Board

10 mins

Learning Objectives:

Prompt the students to think about how they can be **socially responsible** in promoting the importance of vaccination in our society. It also helps to enhance critical thinking and problem-solving skills.

[Triangle of Teacher Support]



Remark: We also want to involve their **parenting education**, specifically, how vaccination can strengthen the relationship between the students and their families.

Values Education: The teacher will also induce the important values, which includes:

- **Filial Piety and Empathy** (the external benefits of vaccination - not only to our parents, also the kids and elderly in the society)
- **Social Responsibility and Unity** (How can we do more to contribute to our society and strengthen our relationship with it?)

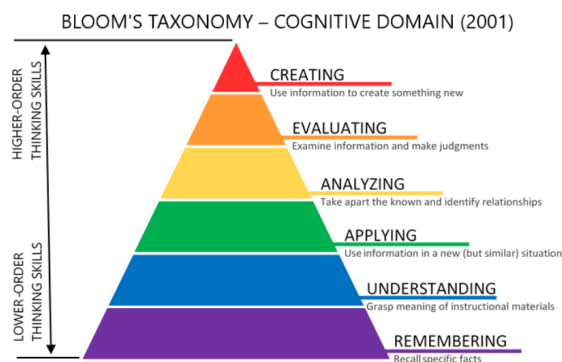
10 minutes - Guided Reflection and Discussion

Student-Led Discussion: Hold a structured discussion to reflect on what they can do further.

Key Focus Question: What and how can the students achieve after the lessons?

Pose reflective questions:

1. Share reflections on what they learned.
2. Discuss how values play a role in public health decisions.
3. "What values did you identify as important in addressing vaccine refusal?"
4. "How do our personal values influence our decisions about health?"
5. "In what ways could you (and with your parents) help or contribute to our homeland?"



To fully utilize students' potential, they can think of suggestions to boost the vaccination rate in our community.

Tools:

- Lecture Handouts
- Smart Board

5 mins	Learning Objectives By adopting the teaching pedagogy of 'Learning by Doing,' students will use the same idea in the digital poster to create a project campaign that could be implemented in our society. It also helps to enhance self-learning and collaboration skills through BYOD policy and flipped classroom initiatives. Sustainable Development Goals (SDGs): - SDG 3: Good Health and Well Being - SDG 11: Sustainable Cities and Communities   Teachers can co-construct the projects with the students and provide constructive feedback to improve “Assessment for Learning” and “Learning How to Learn” initiatives.	5 minutes - Assign Group Work Explore ways to promote positive values in their communities in the Community Engagement Project. Align with the teaching pedagogy of “Learning by Doing” Practice - Student-led Project Learning The project should include: • Clear Objectives • Target Audience • Market Research • Action Plan (e.g. the time, venue and timeline) • The Values you want to promote • Evaluation Metrics Ongoing Role of Subject Teacher: Use of “Feedforward” to enhance Assessment for Learning and Self-Directed Learning (SDL) initiatives The project progress can be treated as part of the assessment through grading and timely feedback, which can help improve the work before it is submitted as the final product. Different values can be taught on an ongoing basis outside the formal classroom setting, serving as the self-directed learning experience. Integration of Both Formal and Informal Curriculum through Interdisciplinary Programs With more time allocated to the informal curriculum and an emphasis on promoting values and positive education, the summative project can be used to collaborate with other parties, such as a community service team.	Tools: • Lecture Handouts • Smart Board • Project Description Sheet
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Supplementary information of the design of the Learning and Teaching Plan (bullet points can be used in this part; in no more than 600 words)

Section 1 - Introduction and School Culture

Value education is essential to whole-person education. Our school has long been considering value education as our ongoing major concern. **Embedding the 'Four Key Tasks' design in our teaching and learning, this plan integrates school-based “7C”s and curriculum core values, primarily focusing on Biology while incorporating elements of Economics and STEAM to enhance value education through global and historical perspectives.**

Section 2 - Learning and Teaching Strategy

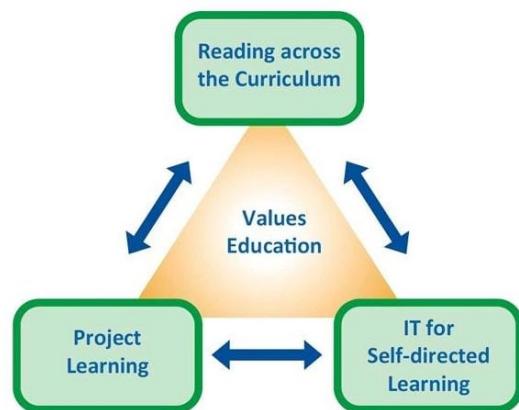


Figure 1: “Four Key Tasks”

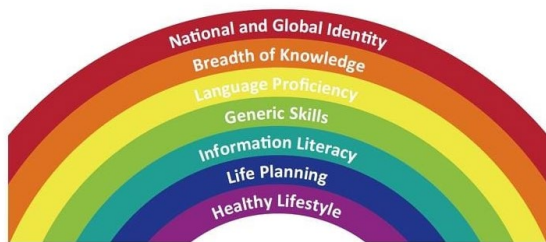


Figure 2: Seven Learning Goals of Secondary Education

2.1 Reading Across the Curriculum

2.1.1 Cross-disciplinary Learning through Biology and Economics

Using Biology as the main focus, students explore vaccination principles, benefits and risks. They analyze related policies such as mandatory vaccination and its economic incentives. Common diseases like HPV were discussed to **enhance global identity**. Through PSHE (Economics) integration, students understand vaccination's external benefits to society (achieving a **well-balanced healthy lifestyle** in society) and their **responsibility** within the social contract - **deepening the breadth of cross-curriculum knowledge**.

2.1.2 Integration of Bioethics and Social Responsibility

Bioethics discussions help students examine healthcare decisions while recognizing their role in preventing infections and reducing the public healthcare burden. Students learn to evaluate the ethical implications of healthcare policies and their impact on community well-being with a **healthy lifestyle** and **respect for others with empathy, unity, responsibility and commitment** towards our homeland.

2.1.3 Differentiated Learning Materials for Student Diversity

Through LAC, reading materials were designed at various difficulty levels to accommodate learner diversity, with basic content suitable for all students and advanced materials for those interested in Economics. Different reading and research papers could improve students' **language proficiency**.

2.2 IT for Self-Directed Learning

2.2.1 Digital Tools and Information Literacy

We utilize various IT tools to enhance learning effectiveness while promoting **information literacy** through proper citation of online sources. Students **develop critical thinking skills** in evaluating and using digital resources effectively.

2.2.2 STEAM and Data Interpretation



Figure 3: Twelve Priority Values

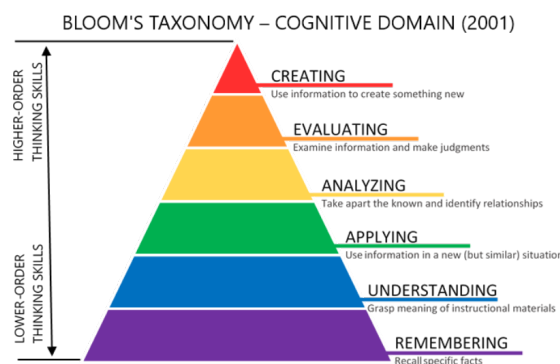


Figure 4: Bloom's Taxonomy

Students engage with STEAM elements through simulation models, developing understanding through data interpretation to **enhance IT, mathematical and modeling skills**. They learn to make probability-based predictions about future events, emphasizing **community health and collective responsibility**.

2.2.3 BYOD Implementation and Bloom's Taxonomy

Following the BYOD Policy, the curriculum incorporates **Bloom's Taxonomy (1956)** throughout the entire curriculum and assessment design to further **strengthen the breadth of knowledge** effectively, starting with **basic vaccination concepts** in Biology, followed by an **analysis of impacts** economically, and culminating in the **creation of their own project work** as a summative assessment.

Digital student-led research process enhances **information literacy skills** and **strengthens integrity and national identity** through policy analysis.

2.3 Project Learning

2.3.1 6C Deep Learning Framework Implementation

The curriculum incorporates **Creativity, Communication, Collaboration, Critical Thinking, Character, and Citizenship** as learning values. Students demonstrate these competencies through their project work and discussions. In-class debate and final presentation could also strengthen students' **language proficiency** and **communication, critical thinking and analysis skills**.

2.3.2 Co-teaching and Professional Development

Co-teaching enhances overall teaching quality, with teachers actively learning beyond their expertise. This collaborative approach supports professional development and **enriches the cross-curriculum teaching experience**.

2.3.3 Student-led Assessment and Collaborative Work

Students **collaborate** using electronic devices for final assessment projects, demonstrating their understanding of vaccination concepts through **creating their own piece of work**. This student-led approach has shown improved academic outcomes, particularly effective with active and talkative students, could have a **memorable and long-lasting personal reflection in values education**.

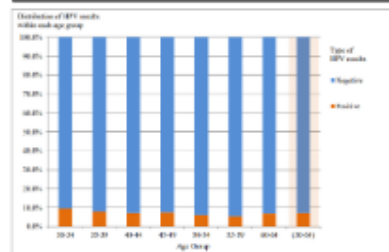
HPV Vaccination in Hong Kong

Protect Your Future Health

About HPV

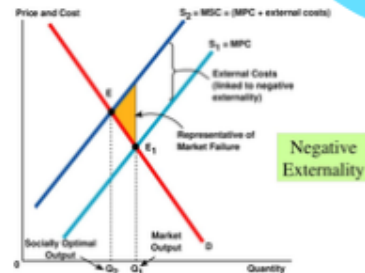
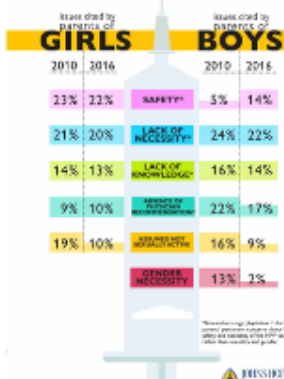
Human Papillomavirus - most common viral infection of reproductive tract Over 100 types, with at least 14 cancer-causing variants Types 16 and 18 cause 70% of cervical cancers. If vaccination rates reach the target of 80% among adolescents, it is estimated that over 90% of cervical cancer cases could be prevented.

Unlike many Western countries, Hong Kong has not yet implemented a universal HPV vaccination program and the current uptake rate remains low; only 7-9% of school-aged girls and 9.7% of university aged girls are reported to be vaccinated.



THE HPV VACCINE:

Why parents really choose to refuse
Study results suggest safety concerns top the list, and that physicians need to step up their patient education and vaccine recommendations.



Economic Impacts

Individuals with HPV can unknowingly spread the virus, raising healthcare costs and posing public health challenges. The average cost of treating cervical cancer can exceed \$100,000 per patient, including medical care, hospital stays, and long-term follow-up.

This highlights the importance of personal responsibility. Widespread vaccination reduces the virus's prevalence and protects the community by lowering exposure risks. By getting vaccinated, individuals show empathy and care for others, leading to fewer HPV-related health issues and lower healthcare costs for everyone.

8,000 cases of cervical cancer could be prevented

\$800m million in treatment costs avoided annually

Take Action!

A resilient healthcare system relies on both individual responsibility and collective action. We need to prioritize self-care and preventive health, they not only protect our own wellbeing but also support public health initiatives. The efforts we have made can enhance public health through mechanisms like herd immunity. **Together, let us be a responsible resident to our society, actively committed to establish a robust network that benefits both personal and public health.**

NOTES

School-Based BIO X ECON Program Vaccination and Community Health

Lesson 5-6 Group Presentation

Name: _____ Class: _____ Date: _____

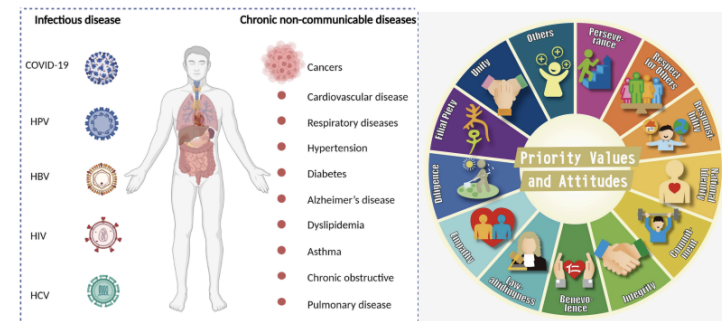


Instruction

Your group will have to **work on a A4-size digital poster with a final 5-minute presentation** in the next lesson to summarize what you have learnt in the program.

Assessment Topic

Find a disease outlook and its vaccination, **analyze the economic impacts with the use of an effective and accurate online data.** You have to **integrate with the appropriate values and attitudes related to vaccination.**



Assessment Rubrics

Content Knowledge (30%)
Communication and Presentation (20%) / Values Integration (20%)
Effective use of Data (15%) / Critical Thinking and Analysis (15%)

Enhanced SIR Model Simulator

Parameters

Total Population (N)

Initial Infected (I_0)

Basic Reproduction Number (R_0)

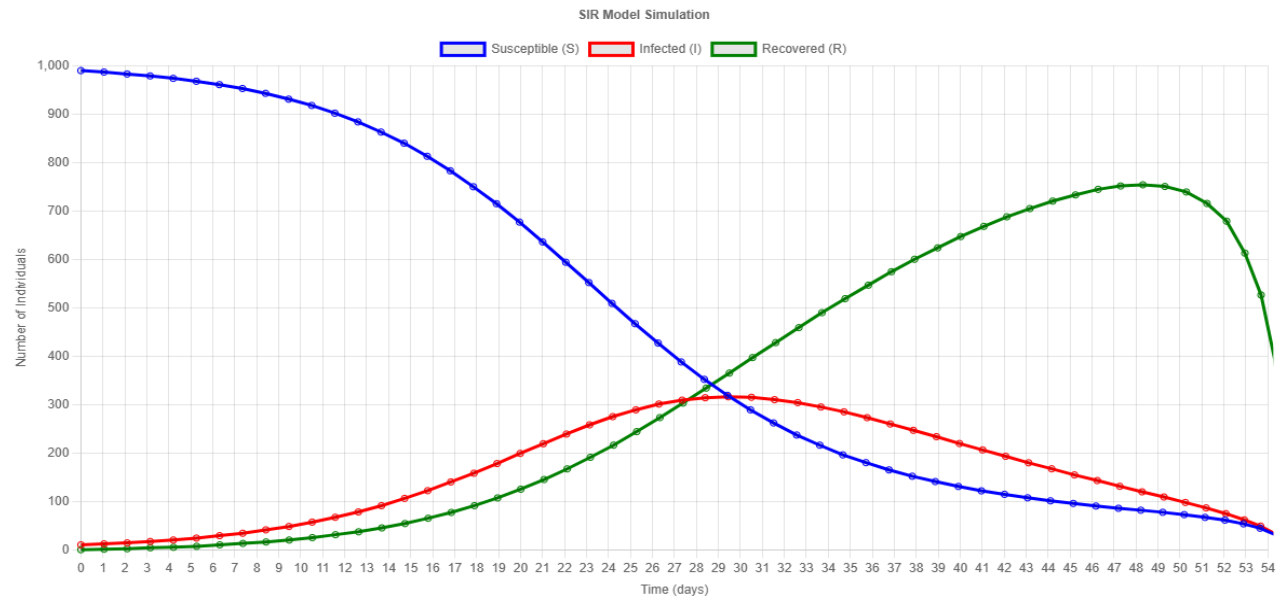
Recovery Rate (γ)

Transmission Rate (β)

Vaccination Coverage (%)

 0%

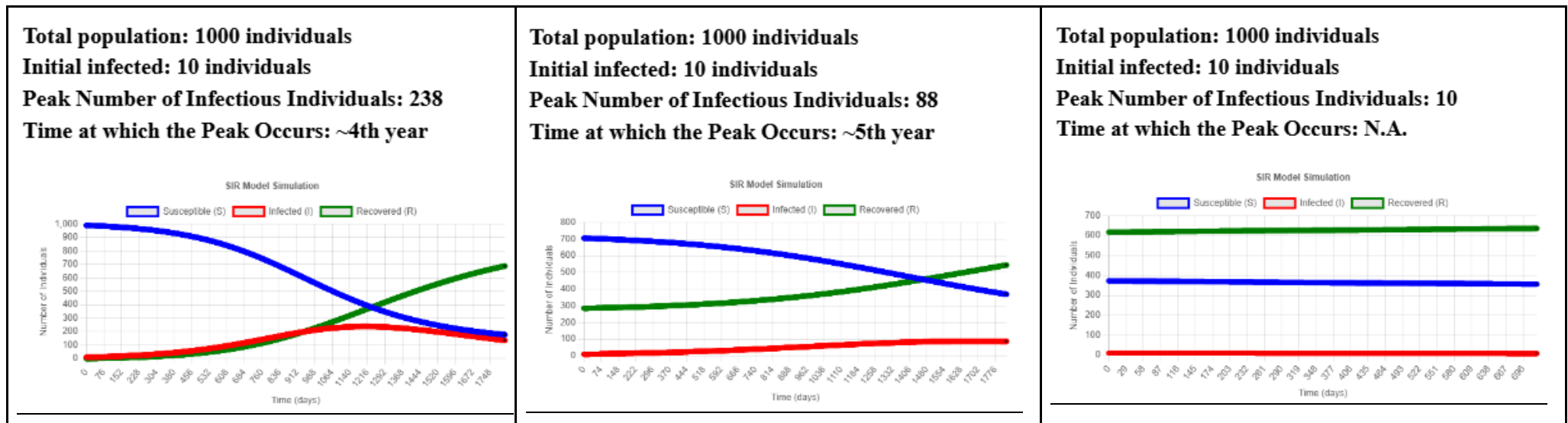
Vaccine Efficacy (%)



Without Vaccine for HPV (0% Vaccine coverage)

With Vaccine for HPV (30% Vaccine coverage)

With Vaccine for HPV (65% Vaccine coverage)



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