



Adapting Your Academic Research for Kids

Terms and Conditions

WHY do we exist?

[Science Journal for Kids](#) is a nonprofit organization with a mission to improve scientific literacy and students' access to the latest scientific discoveries. We produce K-12 science teaching resources adapted from published peer-reviewed academic research. All our content is [free to download](#).

The adaptation process

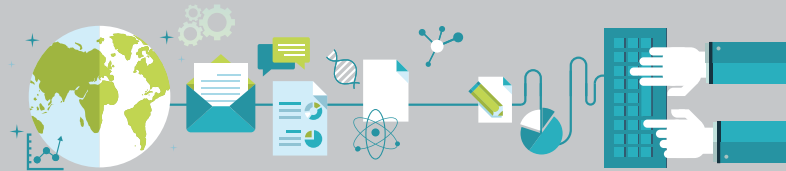
1. Our editor writes the first draft of the kids' version of your paper and sends it to you for review. We work with you until you are satisfied that the adaptation is correct while remaining sufficiently kid-friendly.
2. Our graphic designer creates cartoons, adapted scientific diagrams, and other suitable illustrations, and completes the layout. You review and approve the page proofs.
3. Based on your research, we prepare a packet with educators' resources consisting of a student assessment questionnaire with a teacher's key, video hook from YouTube, curriculum alignment, etc.
4. We publish all this content on our website which has over 500,000 visitors per year - most of them science teachers.
5. To continue providing these science educational resources for free, we charge a production fee usually paid by the researcher's institution or the original research funder (e.g. Bill and Melinda Gates Foundation). The fee is [USD 1,400 per paper](#) due *after* publication. We offer fee waivers in certain situations.

WHY should you have your paper adapted?

- Your research will have a broader impact beyond the scientific community, as required by many research grants. We track download statistics to quantify the paper's reach.
- You retain authorship and control over the adapted paper avoiding any possible miscommunication or misinterpretation of your research.
- The [adaptation process](#) is straightforward and requires minimal time commitment from you. We have a quick turnaround time - on average 3 months from start to completion.

Learn more about us

- Read a controlled [Impact Assessment Study](#) conducted in 2017 by a UC Berkeley researcher on 130 high school students. It measured an average 40% improvement in their scientific reasoning skills attributable to our content.
- Find non-English language translations of our adaptations published on our site. We charge a small additional fee for the foreign language version production.
- See the peer-reviewed journals and research institutions we have adapted papers from. Read other researchers' [testimonials](#).
- Learn more about our [organization](#), our [team](#), and read our [Annual Impact Reports](#).
- Review our [Frequently Asked Questions](#) section.



SPECIFICATIONS GUIDE

Total text length: 800-1000 words for the main text (excluding glossary, references, assessment questions) so that the entire adaptation will fit on 4 pages

Title: an open question that is short and catchy (ideally no more than 40 characters), not a yes/no question. It can be the original research question as long as phrased appropriately.

Authors: researchers from the original paper in order of your choice.

Title cartoon: custom-made for your paper. We discuss it with you before we create it and we offer you two different ones to pick from. You can suggest further changes to the one you pick.

Abstract: max 150 words.

Associate editors: members of our team who worked on the adaptation.

Introduction: 150-250 words.

Option: links to online resources related to your research.

Abstract

Authors:
Mohammed Saiful Islam, Hossain M.S. Sazzad, Syed Moinuddin Satter, Sharmin Sultana, M. Jahangir Hossain, Murshid Hasan, Mahmudur Rahman, Shelley Campbell, Deborah L. Cannon, Ute Ströher, Peter Daszak, Stephen P. Luby, and Emily S. Gurley
Associate Editor:
Elitsa Panayotova

transmit several different viruses, including the Nipah virus which scientists discovered recently. (See the fascinating discovery in References!) We studied 14 cases of people in Bangladesh who got sick with the virus between 2011 and 2014. The source of their infection was unknown.

We found that eight of them drank fermented palm sap - the local palm wine. We believe that drinking this liquor is a potential way to get infected with Nipah virus. Palm wine producers should probably take measures to prevent contact between bats and the sap.

Introduction

Bats have a really bad reputation - undeserved one. Maybe you have heard some horrifying stories yourself like blood-sucking and hair tangling. They are not true, by the way! Bats are in fact important for our environment (Fig. 1) - they keep insect populations in check and some of them are important pollinators (like bees).

One thing, though, that makes bats look bad is that sometimes, not often, they spread diseases. Unfortunately, pretty deadly ones. These include the scary Ebola and Marburg diseases, SARS (Severe Acute Respiratory Syndrome) and Nipah virus infections which cause *encephalitis* - an inflammation of the

because bats like to drink it too. They contaminate it with their saliva in which a lot of viruses reside. Worse still, the virus started to pass from human to human and relatively small Nipah outbreaks occur every year somewhere in Asia.

In the past few years, there were some new Nipah cases in Bangladesh which had an unknown source. Had the virus found yet another way to infect people?

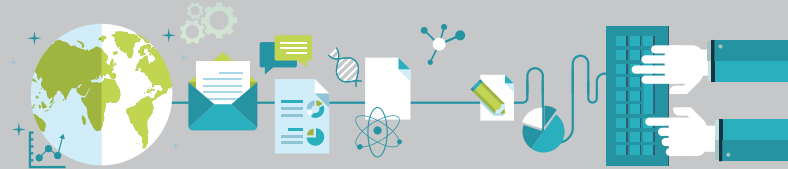
New vocabulary is italicized (when encountered for the first time) and listed in the Glossary in the end.

...d the Nipah virus recently (in 1999) in a village called Nipah (this is how the name came). It turned out that people built their pig farms too close to bat-inhabited forests. The virus jumped from the bats, which are its natural reservoir, to the pigs, then from pigs to humans. Many people got sick and more than half of them died. (Read more in *How one man saved his country from a nightmare virus called Nipah.*)

A few years later, in Bangladesh scientists found that people also could get sick from drinking raw date palm sap. I



Figure 1: bat (*Pteropus giganteus*)



SPECIFICATIONS GUIDE

Methods: 150-200 words.



Methods

Our *epidemiological* study took place in two districts in Bangladesh from 2011 to 2014. We took a few steps and some detective work to find a possible route of infection.

① We identified possible cases of Nipah virus infections. Sometimes, diagnosis is not that easy. So we categorized the possible cases as:

- Suspected = no lab diagnosis but the symptoms were present (fever, altered mental status, seizures);
- Probable = the patient had exhibited the described symptoms and had lived near a patient with confirmed Nipah virus infection but had died before we could take a sample;
- Confirmed = the symptoms were present and we found *antibodies* against the virus.

We also noted if the patient has had contact with another Nipah-infected patient. In this case we are talking about a *secondary infection*. When there has been no such contact we talk about *primary infection*.

② We identified *clusters* of Nipah virus infection - at least two people with brain inflammation living near each other.

③ We identified probable route of infection. We talked to the surviving patients or the friends of the deceased ones. Had they been drinking raw palm sap? Had they had contact with sick pigs or other animals? We **limited this study to clusters where these answers were no**. It turned out that some of them had drunk wine, called *tari*, prepared from fermented palm sap, so we investigated its production as well.

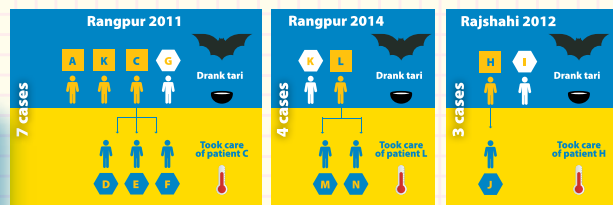
It seemed quite possible that the *tari* was somehow involved so we asked around how it was made. The process resembles the process of collecting raw palm sap: the harvesters cut the old leaves at the top of the palm tree and insert a bamboo spigot (tap). (See Fig. 3 and the [video](#).) Then they hang a pot under the spigot and wait. The collected sap ferments for several days in the pot. This is a mistake – the longer the pots stay there exposed, the more opportunities for bats to contaminate them. Indeed, the harvesters had found bat excreta in and on the sap pots.

Results

We focused on three clusters where the virus source was unknown. Within them, there were 14 cases of sick people described in figure 2.

Eight of the patients had drunk *tari* before their illness began. Another six had close contact with them (for example, they took care of the sick) and then got sick themselves.

Figure 2: Nipah virus transmission in 3 clusters in Rangpur and Rajshahi districts, Bangladesh from 2011, 2012 and 2014.



● probable case
 ○ confirmed case
 Instead of using the patients' names, we call them by the first 14 letters of the alphabet.

■ The top level = primary infections (directly from the wine)
 ■ Bottom level = secondary infections (transmitted from another person)



Figure 3:

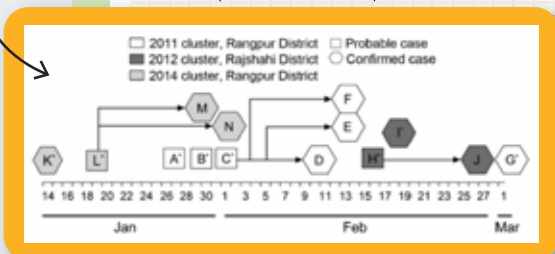
This is how palm sap is harvested to make tari.

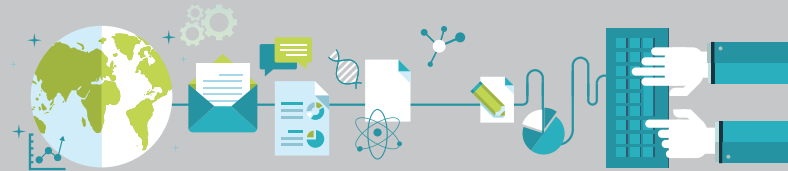
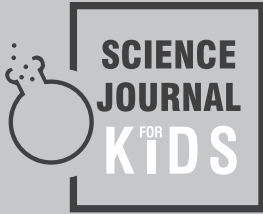
Numbers or bullet lists make the text easier to digest.

We highlight key points in the research to draw students' attention.

Results: 50-150 words.

We adapt one of the results graphs from the original paper. Compare this adaptation to the original graph.





SPECIFICATIONS GUIDE

Conclusion: 100 words. Generally different from the original paper. Instead of summarizing the paper/reiterating the findings, it suggests things that the reader can do. What are the implications for the individual student?

Discussion: 150-200 words.



Discussion

Is drinking *tari* one more way for Nipah virus to get you? We believe so. All of the primary case-patients had been drinking *tari* regularly. They hadn't been drinking raw palm sap and they hadn't been in contact with any sick pigs.

Maybe there had still been some raw palm sap inside the *tari*? No, we checked that the harvesters collect *tari* in the morning and all the patients had been drinking it in the evening – enough time for the sap to ferment at least partially.

Unfortunately, raw palm sap is tasty for bats. They often lick it and sometimes pee inside the collection pots. Both bats' urine and saliva are rich in viruses (when the bat is infected).

We also know that alcohol tends to kill some viruses. So is it possible for the Nipah virus to survive inside the *tari*? If we want to sterilize a surface or an object we use 60-70% alcohol solution. Palm wine contains only 5-8% alcohol, so yes, the virus can survive.

Conclusion

Using an epidemiological approach we were able to link clusters of Nipah virus infection with drinking *tari*. There is the possibility that other bat viruses can infect people the same way. So what can we do?

First, palm sap harvesters can use bamboo to cover the tree cuts so that bats have less contact.

What about the bats? Shouldn't we kill them all? No! Don't hate bats. It's not their fault. They don't even know they are sick when

they carry the virus passively. Killing bat populations would lead to an ecological disaster as they are really important pollinators. Plus, one single bat can eat 2000 insects per night, including mosquitoes.

However, you shouldn't touch bats! If you find a bat on the ground, don't pick it up! It may be sick. Instead, call a local wildlife rehabilitation center. If you absolutely have to touch it always use thick leather gloves.

Glossary of Key Terms

Encephalitis – inflammation and swelling in the brain. Most often viruses and bacteria are to blame. It can lead to fever, confusion, changes in behavior, seizures and even death.

Natural reservoir – the host in which the virus lives and reproduces for a long time. Usually the natural reservoir gets sick but it spreads the virus. For example – the natural reservoir for plague bacteria are wild rodents.

Palm sap vs *tari* – just as we have a blood stream, plants also have vascular system. The fluid there is called palm sap. People (and bats) drink it. *Tari*, also called palm wine, is fermented palm sap and it's alcoholic.

Epidemiology – part of medicine which studies the spread of a disease – how does someone get infected? Where are people at risk, where people are at risk and so on. For example, there is no risk for you to get Ebola if you had contact with someone who had it.

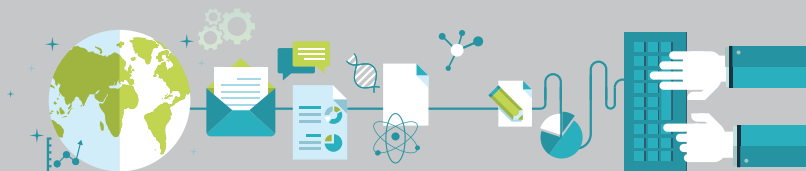
Antibodies – scientists use the presence of specific antibodies - molecules in the blood - as an indirect sign of an infection. For example, if you had chickenpox as a baby you developed specific anti-chickenpox antibodies. If scientists detect these antibodies they will know you have had chickenpox in the past. They can also tell if you had it in the past or if you are having it right now.

Cluster – a group of people with a disease in a relatively small area in a short period of time. For example, a cluster of Ebola virus is when five people have the disease in a small area.

Primary vs. Secondary infection – patients with a primary infection get sick first. In those cases, the illness occurs several days after the primary infection. In a secondary infection, the illness occurs several days after the primary infection in another way.

We try to use as little technical terminology as possible. You might not realize that everyday terms that sound simple to you, are not so simple to a kid. (E.g. compound terms such as "plant community flowering patterns" etc). If a term is essential to your research, we introduce it in the text and define it in the glossary. But we try to limit these to the truly essential ones.

Ultimately, the adaptation will sound very different from the original paper - this is the point! In many cases it may initially sound TOO simple. But we recommend you trust our editors as they have extensive experience communicating with children and can judge when a text or image is too complex for the intended reading level.



SPECIFICATIONS GUIDE

List of references: contains the reference and link to the original paper + some popular science resources. Usually 3 or 4 references per adaptation.

Reading level: The intended audience is school students ages 7-17. We classify each of our adaptations using the following reading levels:

- + Elementary school
- + Middle school
- + High school, lower level
- + High school, upper level

Which reading level your paper will be adapted to mostly depends on the complexity of the original research.



REFERENCES

Islam et al (2016) Nipah Virus Transmission from Bats to Humans Associated with Drinking Traditional Liquor Made from Date Palm Sap, Bangladesh, 2011–2014. *CDC Emerging Infectious Diseases*.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4806957/pdf/15-1747.pdf>

Luby et al, 2006. Foodborne transmission of Nipah virus, Bangladesh. *CDC Emerging Infectious Diseases*.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3291367/pdf/06-0732.pdf>

National Public Radio reports:

• **The fascinating story of how Nipah was first discovered: How one man saved his country from a nightmare virus called Nipah**

<http://www.npr.org/sections/goatsandsoda/2017/02/25/515258818/a-taste-for-pork-helped-a-deadly-virus-jump-to-humans>

• **Disease detectives find a really good reason not to drink date palm wine**

<http://www.npr.org/sections/goatsandsoda/2016/03/22/470803523/disease-detectives-find-a-really-good-reason-not-to-drink-date-palm-wine>

Check your understanding

- 1 Nipah virus is related to measles, mumps and parainfluenza viruses. There is something really alerting about that. So alerting that a lot of governments donated a total of 460 million dollars for the fast development of a vaccine against Nipah virus. What is it?
- 2 Bats are mammals like us. Do you have any ideas why they don't get viruses they carry?
- 3 Are bats and the viruses they carry in a mutualistic relationship?
- 4 Why are bats an important part of our environment?
- 5 What should you do if you discover a bat in your house or fallen on the ground?

Assessment questions to help teachers integrate the content into the classroom. We create a teacher's key which you can also review during the adaptation process.



IMPACT ASSESSMENT STUDY

Executive Summary

By Alana Siegner and Tanya Dimitrova,
Energy and Resources Group, University of California Berkeley

Background:

Science Journal for Kids (SJK) is a US-based non-profit which produces an open-access online science outreach and teaching resource called [Environmental Science Journal for Kids](#). SJK adapts recent environmental science research published in high-impact peer-reviewed journals making it accessible to the general audience, in particular K-12 students. SJK publishes on average 50 adapted science articles per year. A foundational assumption is that if young readers are exposed to original scientific research presented in accessible manner, they will develop a better understanding of the scientific method and process.

Goal:

SJK's founder, in collaboration with a UC Berkeley Energy and Resources Group PhD student, developed this Impact Assessment Study to test the foundational assumption in practice. We looked for a quantifiable improvement in students' understanding of the scientific method (measured by College Board's AP Environmental Science exam) as a result of using SJK resources.

Study design:

We collaborated with three U.S.-based environmental science teachers who participated in the study with their eight high school science class sections (total of 127 students, aged 14 to 18).

- These eight sections were grouped in four "Intervention"/"Control" pairs.
- In the "Intervention" sections, the teachers used one of SJK's articles to teach and illustrate experimental design as a scientific method.
- In the "Control" sections, the teachers taught experimental design using an alternative popular science article with very similar content (e.g. from *Wired* magazine).
- Following the class, all students were given a quiz with a question about experimental design from the 2003 College Board's AP Environmental Science exam (see Appendix).
- The teachers blind-scored the quizzes (i.e. they were not aware if they were grading a student from their "Intervention" or "Control" section). They used College Board's published scoring guides.
- The quiz scores were collected and statistically analyzed using a t-test.
- The study was conducted between January and June 2017.

Results:

We measured a 40% improvement in the sections where teachers used SJK's resources. The results were statistically significant to above 99% confidence interval. (i.e. if there were no difference between control and intervention groups, there would be a less than 1% chance of observing the results we found.)

	Averaged score (out of 4 possible points)
"Intervention" sections	2.47
"Control" sections	1.77

Conclusion:

This Impact Assessment demonstrates a clear measurable improvement in young readers' understanding of the scientific process as a result of reading *Science Journal for Kids* in class. Follow up study with increased sample size is merited.