1c.

Eve would not be able to recover a complete or partial key based off one encrypted message between Alice and Bob. It would also be impossible to get any meaningful insight into the message or its encryption key as any form of frequency analysis is impossible with such a limited dataset. In other words, without other encrypted messages between Bob and Alice within the same day it would be impossible for Eve to decipher or determine the key used by Alice and Bob.

1d.

If Eve has two encrypted messages between Bob and Alice, she could recover a partial key. Eve could do this by observing the first 22 characters of the message as they would be the exact same. The only part of both messages that would be different is the gossip itself while the protocol implemented by Alices app will never change until the private keys roll over. This means Alice could know who sent and received the message but not much else.